

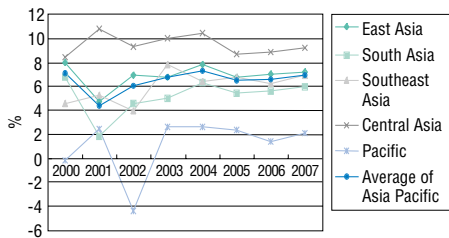
## CHAPTER 2

### Sustainable development in Asia: Dilemmas, achievements and challenges

#### Asia's dynamics and vulnerability

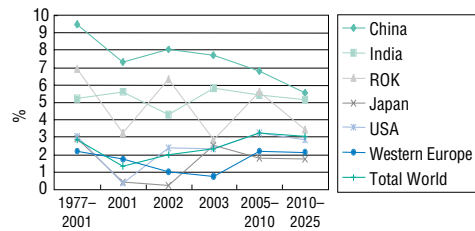
Asia's economic growth over the past twenty-five years has been impressive, considerably surpassing that of other regions of the world. While the annual world GDP growth rate since the 1980s has fluctuated between 2 – 3 per cent, Asia's has remained at over 6 per cent (ADB 2005). Moreover, growth in the Asia-Pacific region has continued at a robust pace during the first years of the 21<sup>st</sup> century (Fig. 2-1). Can this trend be expected to continue? The Asian Development Bank (ADB) is optimistic. It assumes that high investment levels and restrained inflation will continue and projects well above the global average annual GDP growth of 5.8 per cent and 4.7 per cent for 2005-2010 and 2010-2025, respectively (Fig 2-2).

**Fig. 2-1: Annual GDP growth rate**



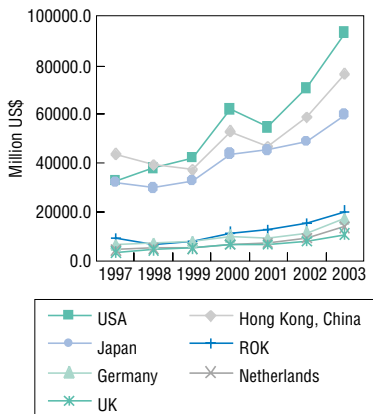
Source: ADB (2005)

**Fig. 2-2: Annual GDP growth projections**



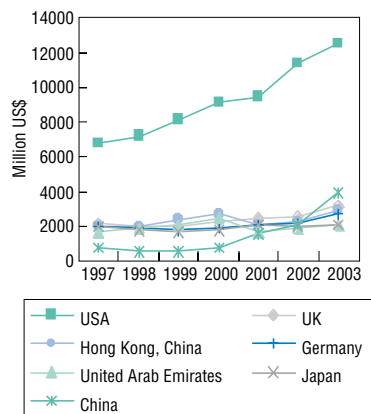
Source: EIA (2004)

**Fig. 2-3: China - Direction of exports**



Source: IMF (2004)

**Fig. 2-4: India - Direction of exports**



Source: IMF (2004)

Others are pessimistic and argue that the global economy is at the precipice of a major shock. They point to the extent and severity of the structural imbalances in the global economy, including the size of the current account deficit and low or negative levels of domestic savings of the United States, the fiscal deficit of Japan, the implications of Europe's rapidly aging population, the overheated and unsustainable growth levels of China's economy, and the increasing instability in the global energy supply (World Bank, 2004). There is no disputing these structural imbalances, but while the optimistic projections assume that these will be managed effectively, the pessimistic projections conclude that a major upheaval within the very near term is inevitable. What is clear is that if such an upheaval were to occur, it would have a negative impact on a highly interconnected world and would result in combinations of resurging inflation, "stagflation" and probably a new round of trade protectionism. Were this to occur, it would impact heavily on the Asian region and would reduce economic growth rates dramatically.

It is well beyond the scope of this paper to suggest either an optimistic or a pessimistic economic future of the Asia and Pacific region. What is clear is the current pattern of robust economic growth and the increasing interdependence of the economies of the region, both with each other and with the rest of the world (Fig. 2-3 and 2-4). As a result, major external economic shocks will inevitably impact on the region. A further trend within the region is towards increased economic integration and cooperation. The East Asian financial crisis of 1997 launched a process that culminated at the Ninth ASEAN (Association of South East Asian Nations) Summit held in Jakarta in 2003 with agreement to establish the ASEAN Economic Community (AEC) by 2020 as the first free trade area in Asia. In addition, in 2002 the ASEAN established the Framework Agreement on Comprehensive Economic Cooperation<sup>3</sup> with China. A year later, it concluded the Framework for Comprehensive Economic Partnership between the ASEAN and Japan.<sup>4</sup> In 2004, ASEAN leaders agreed with their counterparts from Australia and New Zealand to commence negotiations on a free trade agreement (FTA) in early 2005. The first East Asia Summit that took place in Malaysia in December 2005 bolstered East Asian cooperation on trade, transport, communication, monetary and financial matters in the future.

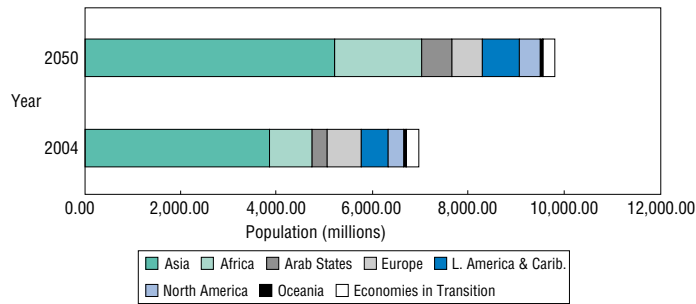
The pattern of robust economic growth in Asia is no longer limited to Southeast and East Asia, as was the case in the 1980s and 1990s. The major economies of South Asia have experienced rapid GDP growth over the past few years. India shares 78 per cent of the total gross national income (GNI) in the sub-region and recorded a 7.8 per cent GDP growth rate in 2003, followed by 6.5 per cent in 2004. India's trade volumes have also surged over the past years, recording a 22 per cent export increase in 2002, mainly to the USA. In 2004, the Associated Press noted that the South Asian Association of Regional Cooperation (SAARC) started negotiations on a free trade framework reached in the SAARC Summit held in Islamabad in January 2004 and agreed to strike a deal expeditiously in order to begin eliminating tariffs by 1 January 2006.

This is not to suggest that all countries in the Asia-Pacific region are benefiting equally from robust economic growth. Growth has varied significantly from country to country over the past years with some countries lagging far behind.

### **Demographic changes**

Although the growth rate is declining, the population of Asia continues to increase and Asia's share of world population will remain high. It was roughly 60 per cent in 2004 and is projected at 58 per cent in 2050 (Fig. 2-5). Asia is also experiencing the most rapid and dramatic growth in urbanisation in history (PRB, 2004). Of the twenty-three cities world-wide with populations that exceed 10 million, nine are in Asia and these will soon be joined by four more. It is projected that more than 300 cities worldwide will exceed a million inhabitants by 2025 and the majority of these will be in Asia (UN-Habitat, 2003).

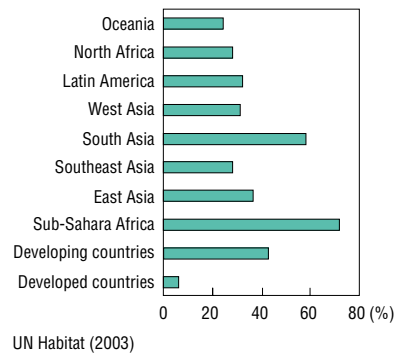
**Fig. 2-5: World population projection**



Source: UNFPA (2004)

It will inevitably increase the demand for natural resources on the planet. The limited Asian inter-governmental conferences and summits have drawn attention to the problems and challenges associated with these demographic changes, including environmental degradation and natural resource depletion, the inadequacy of access to social and reproductive health services and an explosive growth in urban poverty (UNDP, 2004). The number of people living in ghettos world-wide is estimated at about one billion—approximately one-third of the world’s urban dwellers, and a sixth of all humanity (UNDP, 2005). The proportion of ghetto dwellers in the total urban population is 36.4 per cent for East Asia, 28 per cent for Southeast Asia and 58 per cent for South Asia (UNFPA, 2004).

**Fig. 2-6: Urban population of slum dwellers**



UN Habitat (2003)

In addition, for many countries in Asia with positive but modest economic growth rates population growth is impeding the prospects for poverty reduction. Despite the fact that Asia and the Pacific’s share of the world’s poor has been declining recently, it is still estimated to account for roughly two-thirds of the total world figure of 1.2 billion that live on less than one dollar per day (UNDP, 2005). Poverty and unmet basic human needs often drive people to environmentally-detrimental exploitation of natural resources.

### Growing energy demand

The combined factors of economic growth and demographic change in Asia have resulted in a virtual explosion in energy consumption and energy demand (EIA, 2004). For instance, although OECD countries accounted for 58 per cent of total oil consumption in 2002, current trends and forecasts indicate that non-OECD countries will soon account for over half of global demand (IEA, 2005). China, for instance, will require a 3.4 per cent annual increment of oil supply over the next decade, while Indonesia and India will both need a 2.9 per cent oil supply increase. Indonesia, a major oil-producing nation, recently became a net oil importing country. Other developing Asian countries, on average, require a 3 per cent annual oil supply increase under the business as usual (BAU) scenario.

Across Asia as a whole, there is little indication of improvement in energy use efficiency. The carbon intensity of, for instance, China’s economic growth is four times that of the US, and 10 times that of Germany. At the same time, in OECD countries, the reduction rate of carbon intensity has slowed over the past decades and it is expected that the reduction rate for the next few decades will be around one per cent, while developing Asian countries, such as China and India, are expected to reduce the carbon intensity by

around 2.2 or 2.6 per cent (IEA, 2004). Even with a higher pace of carbon intensity reduction, the carbon intensity of developing Asian countries such as China and India is likely to be more than two to three-fold that of developed countries.

### **Some key trends in Asia's ecology**

#### **Threatened forests, biodiversity and land resources**

Asia covers about 24 per cent of the world land mass (Fig. 2-7). It has 14 per cent of the world's forest area, ranking it second from the bottom globally. However, Asia shares 62 per cent of the world's forest plantations, indicating that Asia is a major source of forestry products through forestry plantation and sustainable forestry management. At the same time, non-forest areas carry significant weight in promoting sustainable ecosystem management in Asia.

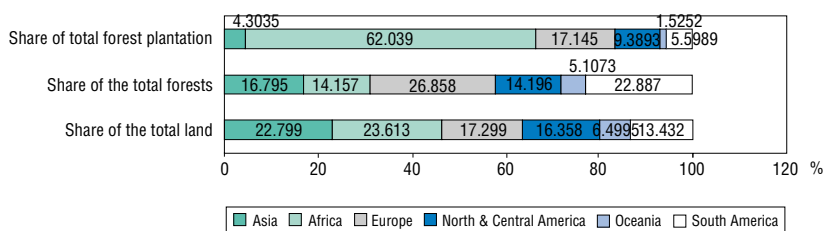
In Asia until 1992, green land and pasture accounted for almost twice as much area as forests and woodlands (Fig. 2-7). Over the past decade, there was a significant conversion of green land and pasture to cropland. While forest land conversions remained marginal, pastureland decreased substantially as pastureland was converted to cropland (Fig. 2-8). It is estimated that about 13 per cent of the land in Asia and the Pacific, or 850 million hectares, is degraded (UNEP, 2005). Large-scale clearance of forested land, coupled with slash and burn and excessive use of chemicals, has caused a decline in soil structure and fertility.

Overall, Asia has increased protected areas to conserve wild life and biological diversity (UNEP, 2003). However, there is a conflicting trend where some countries increase while other countries decrease the size of the protected areas at the national level in the Asian countries. There is also counter-pressure from the mining industry and the agricultural sector to expand areas for their activities. These conflicting interests should be carefully coordinated so that sustainable natural resource use is ensured.

Out of seventeen mega-diversity nations of the world, seven are located in Asia and the Pacific (UNESCAP et al. 2000). At the same time, these countries are also home to a significant number of threatened endemic species of which the habitat is called "hot spots." In addition to the loss of plant and animal diversity as a part of terrestrial diversity, marine ecosystem and freshwater ecosystem diversity is also threatened (WRI, 2005). The genetic diversity is also at a risk and the domesticated landraces have been in substantial decline in recent years. The biodiversity loss has been prompted by the habitat loss and degradation, overexploitation, international trade, population growth and poverty, and bio-invasion.

An extreme consequence of loss of pastureland is desertification and with it the increased frequency and intensity of sand and dust storms. In Northeast Asia, for instance, China has reported in recent years on the increased number of dust/sand storms. Mongolia's record also shows that there is an upward trend in the number of dust/sand storms in Ulan Bator, the capital city of Mongolia. The government of Mongolia issued a warning in the 1990s that the desert in the country's southern region may be advancing northward by as much as 500 m per year. Sand and dust storms have been destroying ecosystems and inflicting damage to human health and hindering ground and air transportation in China, Mongolia, the ROK, and Japan.

Fig. 2-7: Distribution of world land and forests



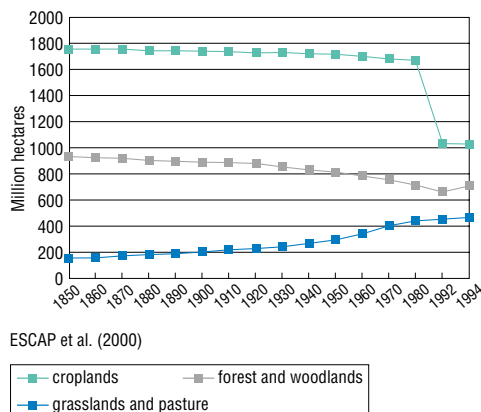
Source: FAO (2003)

## Freshwater depletion and degradation

A number of Asian countries now face constant water shortages. Even for the countries with relatively high levels of precipitation, the annual rainfall is not distributed evenly over the regions, run-off is high and water harvesting very low. Many countries face floods and seasonally arid conditions which hamper land productivity and aggravate land degradation. Excessive extraction of underground water through wells often depletes the aquifer source thereby aggravating the water balance in the long term. The expansion rate of irrigated lands has significantly diminished over the past years.

Water resources in Asia are under threat, both in terms of quantity and quality, and they cast a shadow on sustainable development in the region. Water withdrawal for industry and households is projected to increase in most countries. Deterioration of water quality is recognised as one of the most serious environmental problems throughout the region. Biological oxygen demand (BOD) in Asian rivers is now 1.4 times higher than the world average. Also, the amount of suspended solids in rivers is four times higher than the world average (UNEP, 1999). Asian rivers also contain three times as much bacteria from human waste as the world average and more than ten times the safety level suggested by the OECD guidelines (UNEP, 1999). Water pollution has often seriously damaged local fisheries. Heavy metals and toxic chemicals contained in effluence from industry and agriculture have serious health impacts. It is reported that Asia's surface water contains 20 times more lead than the average of OECD countries (ADB, 1997). Arsenic pollution in groundwater has been a serious threat to the people of Bangladesh and some adjacent parts of India. Agricultural use of fertilisers and pesticides are causing growing concerns in China and countries of the South and Southeast Asian sub-regions.

Fig. 2-8: Trends in land-use changes in Asia and the Pacific (1850-1994)



ESCAP et al. (2000)

Table 2-1: Emissions in Northeast asia by country (mt/y) under BAS scenario

Country	SO <sub>2</sub>			NO <sub>x</sub>		
	1990	2010	2020	1990	2010	2020
Northeast China	11.9	25.3	32.5	6.9	N.A.	26.8
Japan	0.8	1.0	1.1	2.6	N.A.	4.6
ROK	1.7	4.1	5.6	1.1	N.A.	5.1
Democratic People's Republic of Korea	0.3	0.9	1.3	0.5	N.A.	2.4
Total	14.7	31.3	40.5	11.1	N.A.	38.9

N.A.= Values not calculated by van Aardenne (1996)

Source: IPCC (2000)

Such degradation of water resources negatively impacts both human health and natural ecosystems. For example, the economic loss caused by water pollution in the Yellow River is estimated at over US\$500 million per year. It is important to recognise that water pollution reduces the volume of water resources available, since polluted water cannot be used for productive purposes.

### Trans-boundary environmental impacts and the implications to the global environment in an inter-dependent world

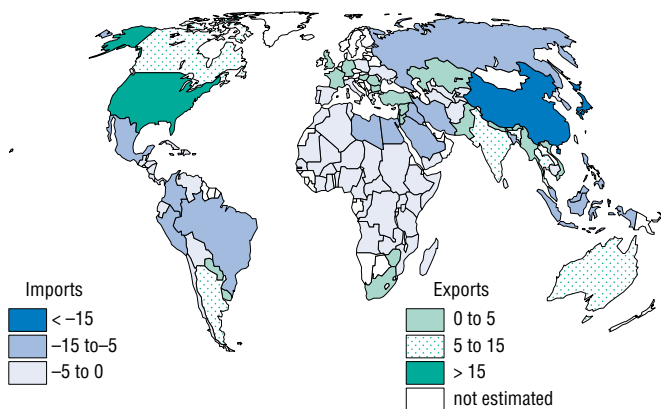
Trans-boundary environmental problems are on the increase in Asia. They include: climate change, international rivers, marine ecosystem, and trans-boundary air pollution. In South Asia, monitoring activities have started to measure the trans-boundary air pollutant movement. In Northeast Asia, acid rain has been a contentious issue. The increased use of coal in Northeast Asia continues to pose the serious threat of acid rain and acidity deposits on the ground and marine ecosystems. SO<sub>2</sub> emission projections for Northeast Asia will continue to rise over the next few decades.

Dust and sand storms in Northeast Asia affect not only countries of origin, but also the neighbouring countries. Dust and sand storms threaten air and land transport systems, pose health hazards such as ophthalmic and respiratory disorders and adversely affect marine ecosystems in the sub-region of Northeast Asia.

Increases in agricultural trade are projected to pose stress on resource use in the region. Japan is traditionally highly dependent on food imports, while other Asian countries have, in general, maintained higher self-sufficiency. However, for the last few years China has become a food importing nation and, as such, an importer of “virtual water.” “Virtual water” is defined as water embedded in commodities. It is the water resources that are used to produce the crops. When one looks at food imports, one can imagine the cubic metres of water resources used to produce such a commodity. If, for instance, a grain crop uses about one cubic metre of water to

produce one kilogram of grain, it can be said that importing one kilogram of grain is approximately equivalent to importing one cubic metre of water. Virtual water flows, the flows of water embedded in commodities, have relevance to water stress, water scarcity and food security, as they reduce the need to use water for food production in the importing countries and increase water use in the exporting countries. Fig. 2-9 shows that countries, such as China and Japan, are the net importers of virtual water. The increasing dependency of food imports in the region could imply a change to water use in the trans-boundary context in an interdependent world.

**Fig. 2-9: Virtual water flows**



Virtual Water Flows (1995) (Crop evapotranspiration equivalent in cubic kilometres)  
Source: IUCN (2004)

Copyright: Crop Assessment of Water Management in Agriculture 2003

### The challenge of sustainable development for Asia and the Pacific

Asia faces enormous challenges and difficult choices in pursuing sustainable development. On the one hand, continuing high levels of economic growth are imperative if the region is to raise approximately 800 million of its citizens out of poverty. On the other hand, the current pattern of industrial and energy intensive economic growth,

coupled with continuous growth in population, widening income gaps, urban migration and natural resource depletion have placed Asia on a path towards unsustainable societies. The critical and urgent question is how the interests and needs for economic growth can be combined with the interests of the environment in order to achieve sustainability. The political, strategic and policy challenges involved in responding to this question are daunting, given that an adequate answer would require a fundamental epistemological shift in the application of economics to Asia's development. This would require efforts in three directions: (i) building and disseminating the conceptual framework and a convincing argument for the consideration of environmental linkages in development, including work on environment-economy linkages, and economic valuation and pricing of environmental goods and services; (ii) analysing and revealing the distributional implications of a more comprehensive approach to the treatment of environmental issues, and creating a strong argument showing the need to share the burdens; and (iii) advancing in the operationalisation of different aspects of the concept of sustainability.

This raises the same dilemmas that were confronted almost two decades ago in the Brundtland Report between the interests of the environment and the interests of economic growth, development and material well-being and these dilemmas remain unresolved. It is now imperative for Asia to work carefully through these dilemmas and to address a range of questions, including the following: What approaches to the relations between human activities and ecosystems should be adopted in specific locations and sectors? Is there a progression of approaches to be followed over time? How can natural capital be transformed into other types of capital? What are the most effective ways of incorporating environmental considerations into the design of economic policies? How can the real and apparent tradeoffs involved in poverty reduction and environmental conservation be made explicit and dealt with?

Many efforts are already underway and these provide an important foundation on which to build. The remainder of this chapter examines some of most important of these efforts, looks at their achievements to date, and identifies underlying challenges and a number of critical gaps in policies and institutional arrangements that require attention.

### **Regional actions for facilitating policy implementation and institutional arrangements for achieving sustainable development in Asia and the Pacific**

#### ***(i) Achievements***

The "Regional Action Programme for Environmentally Sound and Sustainable Development: 2001-2005" adopted at the Ministerial Conference on Environment and Development (MCED) in Asia and the Pacific, held in Seoul, in March 2005, provides a renewed framework for regional collaboration on sustainable development in Asia and the Pacific from 2006-2010. It builds upon the preceding Action Plan for 2000 adopted along with the Kitakyushu Initiative for A Clean Environment in 2000. The Action Plan adopted in Seoul advocates a concept of "green growth" and calls for enhanced collaboration to pursue environmental sustainability. The Asia Pacific Forum on Environment and Development (APFED) established with twenty-six prominent personalities in the region, adopted the final report with 119 policy recommendations in December 2004 and provided it as an input for the 2005 MCED.

"Information and Communication Technology and the Environment in Asia and the Pacific (ICTEAP)" of the United Nations Environment Programme (UNEP) is intended to promote information sharing on the environment through information and communication technologies at the regional level. The UNEP Regional Resource Center for Asia and the Pacific (RRCAP) established in the Asian Institute of Technology, Bangkok in 1989, facilitates information dissemination, such as regional environmental outlook reports, national state of environment reports, indicator reports and land cover reports for the region. The Asia Pacific

Development Information Programme Network of the United Nations Development Programme (UNDP) facilitates monitoring and data dissemination on sustainable development-related issues at the regional level. For the Convention on Biological Diversity, the International Union for Conservation of Nature (IUCN) regional office in Bangkok promotes the Regional Programme for Biological Conservation in Asia and the Pacific, supporting capacity development and demonstration projects. Under the United Nations Convention to Combat Desertification (UNCCD), the Regional Action Programme to Combat Desertification and Mitigate Drought Impacts in Asia was adopted in 1997 with the thematic focus on (i) monitoring, (ii) agro-forestry, (iii) rangeland management, (iv) water management, (v) capacity-building, and (vi) local area development initiatives. The renewed action programme for 2003 – 2008 was adopted in 2003.

### *(ii) Underlying challenges*

The UNESCAP sponsored Regional Action Programme has provided an overarching regional policy framework for promoting sustainable development and regional collaboration. It (coupled with its Implementation Plan and a number of related initiatives and declarations) addresses wide-ranging issues on sustainable development and furnishes sustainability concepts aimed at forging regional collaboration. Yet, compared to other regions, the countries in Asia and the Pacific still need to overcome several key challenges with a view to achieving sustainable development and forging regional collaboration.

Regional cooperation in Asia has traditionally relied on the building of consensus by means of a “soft law/programme approach,” pursuing policy goals by declarations, initiatives and action programmes. This is in contrast to a “hard law approach,” in which countries pursue shared policy goals by legally-binding treaties, conventions and agreements. The soft law/programme approach has the advantage of amalgamating the countries with different policy preoccupations and varying socio-economic conditions in a flexible framework. However, the soft law/programme also has the disadvantage of not usually having sufficient permanent institutional support mechanisms or appropriate financing mechanisms for implementing policy measures and activities that are collectively supported by the countries concerned within the region.

The setting of specific targets is always contentious in inter-governmental arrangements, a fact strongly underscored in the negotiations that led to the Kyoto Protocol. Yet on a vast range of environmental issues, the absence of specific targets that are agreed multilaterally makes progress difficult. On information disclosure, for example, despite the fact that some Asian countries have already enacted legislation on information disclosure related to environmental management, there has not yet been a region-wide uniform manifestation of policies that promote information disclosure and people’s participation in the context of pursuing sustainable development. Europe implemented the 1997 Aarhus Convention that binds the governments concerned to disclose information on the environment and related issues. Latin American and Caribbean countries implemented the Regional Strategy on the Access to Environmental Information that was adopted in 2001 under the auspices of the Organization of American States (OAS). The region-wide policy document would orchestrate the national policy development and legislative reform for promoting information disclosure and people’s participation in the process of pursuing sustainable development.

Part of the problem in Asia would appear to be that here is no formal, region-wide policy dialogue forum in Asia at the heads of state and governmental level. This is unlike other regions where summits take place under the framework of the European Union, the African Union and the OAS. The Asia Pacific Economic Forum (APEC) meets at the heads of government-level mainly to discuss trade issues. The ECOASIA meets at the ministerial level for discussing environmental issues each year. Given the fact that Asian countries will have much closer socio-economic relationships in the future, further efforts are necessary to strengthen policy dialogues for sustainable development among Asian countries.



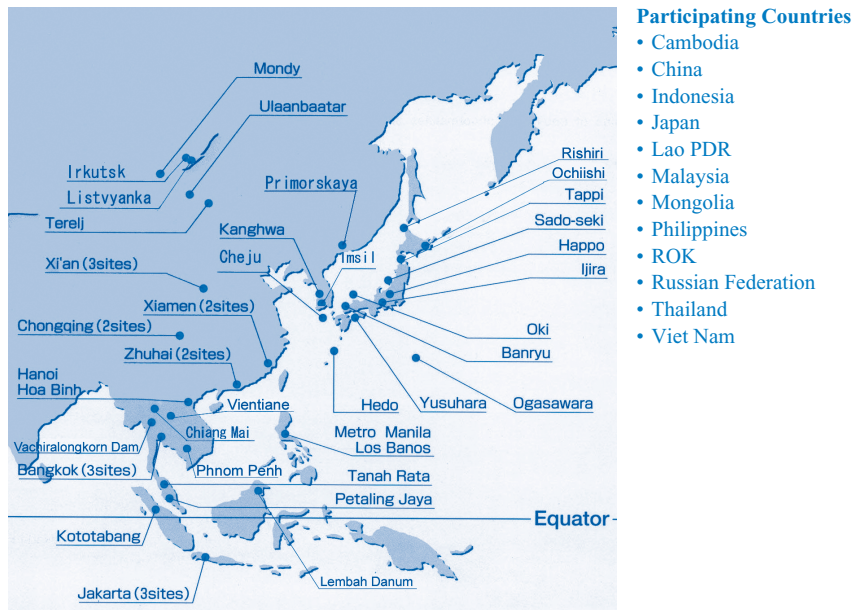
**Sub-regional actions for facilitating policy implementation and institutional arrangements aimed at sustainable development**

**(i) Achievements**

**Northeast Asia**

The Northeast Asian Sub-regional Programme for Environmental Cooperation (NEASPEC), supported by the UNESCAP, has been steering the sub-regional collaboration for tackling environmental challenges in Northeast Asia. In addressing acid rain issues, the Acid Deposition Monitoring Network in East Asia

**Fig. 2-10: Wet deposition monitoring sites (47 sites) of EANET**



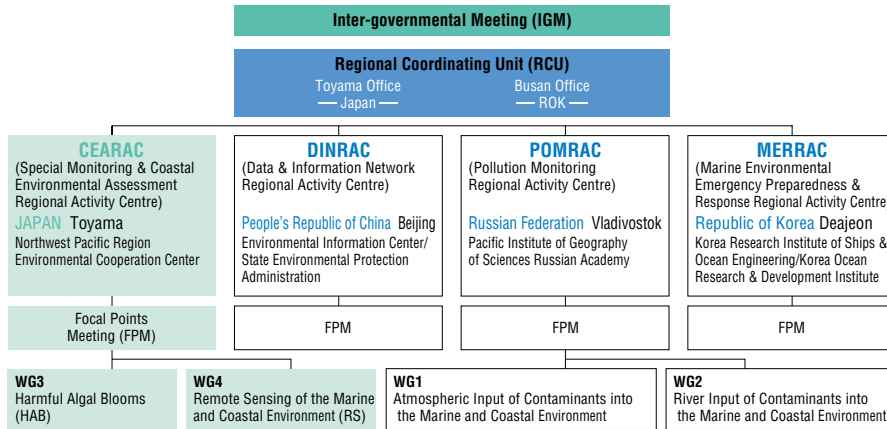
Source: Acid Deposition and Oxidant Research Center, Niigata, Japan

(EANET) was established with the participation of ten East Asian nations. The network monitors acid deposition for developing scientifically-supported countermeasures against acid rain and sulphur dioxide emissions in this region (Fig. 2-10). The EANET will enhance the harmonisation of monitoring methodologies and data analysis in collaboration with other international air pollutant monitoring networks such as the Cooperative Programme for the Monitoring and Evaluation of Long-Range Transmission of Air Pollutants in Europe (EMEP).

China, Japan, the ROK and the Russian Federation have collaborated under the framework of the Northwest Pacific Action Plan (NOWPAP) since 1994. The NOWPAP activities are supported by the network of four Regional Activity Centres (RACs) namely: the Special Monitoring and Coastal Environment Assessment RAC (CEARAC) in Toyama, Japan; the Data and Information Network RAC (DINRAC) in Beijing, China; the Marine Environmental Emergency Preparedness and Response RAC (MERRAC) in Daejeon, ROK; and, the Pollution Monitoring RAC (POMRAC) in Vladivostok, Russian Federation (Fig. 2-11).

In response to the growing concern over dust and sandstorms (DSS) that cause enormous economic losses

Fig. 2-11: NOWPAP



Source: The Special Monitoring & Coastal Environmental Assessment Regional Activity Centre (CEARAC) at the Northwest Pacific Region Environmental Cooperation Center, Toyama, Japan

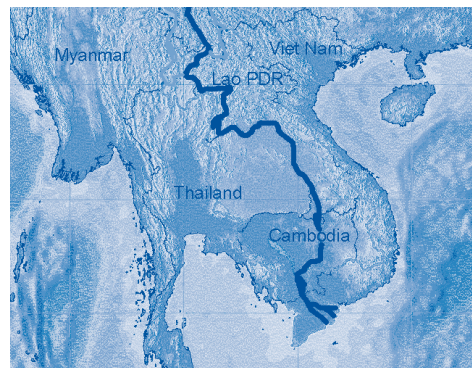
and serious public health concerns, China, Mongolia, the ROK and Japan collaborated and launched a sub-regional project for the prevention and control of dust and sand storms in Northeast Asia. The officials and experts reviewed the status of sand and dust storms, their impacts and counter-measures over the past three years. The countries then adopted the final report that took three years' work to complete and presented it at the 2005 Ministerial Conference on Environment and Development in March 2005. The report consisted of three volumes highlighting (a) a regional cooperation master plan, (b) a regional monitoring and early warning network, and (c) an investment strategy.

### Southeast Asia

Haze control is a priority area in sub-regional collaboration among Southeast Asian countries. The ASEAN Agreement on Transboundary Haze Pollution<sup>5</sup> entered into force in November 2003 is the first legally-binding ASEAN regional environmental accord and is considered a model for tackling transboundary issues. It is contemplating the institutionalisation and enhancement of existing arrangements under the Regional Haze Action Plan (RHAP) and hopes to provide a legal framework to better facilitate regional and international cooperation. The Agreement calls for the parties to undertake, *inter alia*, (a) legislative and administrative measures to prevent and control activities related to land and forest fires; and (b) national and joint actions to intensify regional and international co-operation. The First Meeting of the COP to the Haze Agreement was held in November 2004 and the implementation of the Agreement was reviewed. In total, seven ASEAN member countries have ratified the Agreement and other member countries are expected to follow.

Biodiversity conservation is another major sub-regional collaboration area. The ASEAN Regional Centre for Biodiversity Conservation (ARCBC) was established in 1999 to undertake activities related to research, database management, training and networking. The ARCBC is to be further strengthened with the endorsement by the ASEAN Ministerial Meeting on the

Fig. 2-12: Mekong River and its basin



Developed from Mekong River Commission

Environment (AMME) and the support of the European Union, and will undertake strategic policy work on coordination activities.

The ASEAN Environmental Education Action Plan (AEEAP) for 2000-2005, adopted in October 2000, has made environmental education a priority. It provides the framework for concerted regional and national level activities on public awareness and environmental education and outlined four target areas, namely (a) formal education (b) non-formal education, (c) human resources capability-building, and (d) networking, collaboration and communication. The ASEAN Environmental Education Inventory Database (AEEID) was developed at the ASEAN Secretariat.

### Mekong River basin in Southeast Asia

The Mekong River has an ecosystem-based inter-governmental body established by an agreement among the governments of Cambodia, Lao PDR, Thailand and Viet Nam (Fig. 2-12). The two upper states on the Mekong River Basin, the People's Republic of China and the Union of Myanmar, are dialogue partners. The Mekong Committee (the Committee for Coordination of Investigations of the Lower Mekong Basin), established in 1957, was transformed into the Mekong River Commission (MRC) by the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, signed in April 1995, with a new mandate "to cooperate in all fields of sustainable development, utilisation, management and the conservation of the water and related resources of the Mekong River System in reasonable and equitable manners." The MRC promotes a participatory process with the National Mekong Committees in each country to develop rules and procedures for water utilisation. The MRC monitors the quality of water resources, and is supporting joint basin-wide planning under the Basin Development Plan.

### South Asian trans-boundary environmental challenges

Although non-binding and voluntary in nature, South Asian nations established as early as 1982 the South Asia Co-operative Environment Programme (SACEP) which aims to build collaborative multilateral partnerships in environmental protection and management. SACEP is an inter-governmental organisation whose Articles of Association have been ratified by eight countries, namely Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. The SACEP addresses key environmental issues, such as land degradation and desertification, biodiversity, fresh water, solid waste management, air quality, environmental health, coastal and marine resources, natural disasters and their consequences.

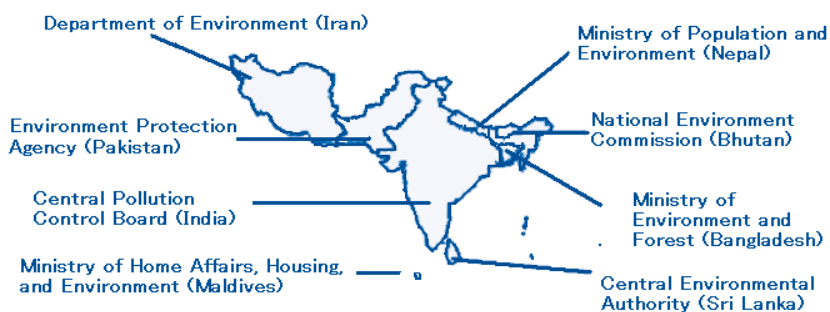
Transboundary air pollution control is an area where notable progress has been made. In pursuance with the Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia, adopted in April 1998 (Fig. 2-13), participating countries have been implementing activities in three phases: Phase I- awareness-raising; Phase II- capacity-building; and, Phase III- information management. In Phase II, implemented from 2001-2004, the countries developed the network of national focal points (NFPs), national implementing agencies (NIAs), the network for monitoring and the integrated assessment models. In Phase III, (2004-2007), the UNEP RRC/SP has been developing a database on pollutant emissions inventories and monitoring pollutant depositions and assessing the risk of impacts to health, crops, materials and ecosystems and suggesting mitigation options. The steering committee meets each year to review the progress made in implementing activities that liaise with the national advisory committees and other related initiatives, such as the Indian Ocean Experiment (INDOEX).

Marine environment protection and resource conservation are addressed in South Asia under the Action Plan of the South Asian Seas Programme adopted in March 1995. The SACEP serves as the secretariat of the Action Plan that promotes capacity-building and field projects in the areas of: (a) the Integrated

Coastal Area & River Basin Management (ICARM), (b) turtle conservation, (c) coral reef management, (d) oil spills, (e) Global International Water Assessment (GIWA) and biological diversity. It has proposed the establishment of regional activity centres for facilitating the implementation of the action plan.

With respect to biodiversity, several sub-regional bodies have been collaborating in South Asia. The South Asian Network for Taxonomy Capacity Building (SACNET) supports the activities to create taxonomic capacity. The IUCN Regional Biodiversity Programme (RBP) for Asia established in 1996 supports the technical cooperation network known as the Locally-Owned and Operated Partnerships (LOOPs) in South Asia. The SACEP houses the South Asia Biodiversity Clearing House Mechanism disseminating information on protected areas and legislative/policy measures for conserving biological diversity in South Asia.

**Fig. 2-13: Malé Declaration—National implementing agencies**



Source: UNEP Regional Resource Center for Asia and Pacific

***(ii) Underlying challenges for promoting sub-regional collaboration aimed at sustainable development***

In contrast to the regional level, sub-regional collaborative activities are generally geared more directly to tackle specific and concrete issues. Yet, successful schemes of collaboration to date at this level have not swiftly been replicated and applied to other areas.

The ASEAN Haze Agreement has made a major breakthrough to institutionalise the sub-regional collaboration on haze control under a legally-binding policy instrument. However, countries in Asian sub-regions in other cases continue to collaborate under soft law policy instruments, such as declarations and action plans. Acid rain in Northeast Asia and trans-boundary air pollutants in South Asia are examples. The ASEAN successes suggest that it is time for Northeast Asia to transform policy statements and programmes into solid, legally-binding policy instruments and institutionalise sub-regional collaboration for a more effective policy implementation. In this regard, the idea of creating a sub-region-based coordinating body for Northeast Asia has been proposed informally.

The Mekong River and basin management has set a prototype for effective ecosystem-based, natural resource management and an alternative sustainable livelihood development. There are several other important international rivers that could benefit from the experiences of the Mekong River Commission. Very few international rivers and water bodies in Asia have been governed by legally-binding agreements, and some are still under the dispute among the countries concerned. It would be beneficial for upstream and riparian countries to establish mutually agreed schemes of water and basin management, not only for environmental protection, but also for socio-economic development and political stability.

## National level actions for sustainable development

### *(i) Achievements*

#### National Agenda 21 and related policy instruments

National Agenda 21 or equivalent policy documents have been developed in most Asian countries for pursuing sustainable development in accordance with the Agenda 21 adopted at the Rio Summit in 1992. Table 2-2 summarises the preparation of Agenda 21s in Asia. The countries have prepared assessment reports on the implementation of their respective Agenda 21 in the preparatory process for the World Summit on Sustainable Development held in Johannesburg in 2002.

**Table 2-2: National Agenda 21 and equivalent document in Asia**

<b>Country</b>	<b>Name of Visionary Document</b>
Bangladesh	National Environmental Management Action Plan (1995)
Bhutan	National Environment Strategy (Middle Path)
Brunei	Sixth and Seventh National Development Plans
China	China Agenda 21
Democratic People's Republic of Korea	National Environment Plan for Implementing Agenda 21, 1995-2005
India	National Conservation Strategy; Policy Statement on Environment and Development
Indonesia	Indonesia Agenda 21; National Environment Action Plan 1998
Islamic Republic of Iran	National Environment Action Plan
Japan	Basic Environment Plan; Japan Agenda 21
Malaysia	Vision 2020; Seventh Malaysia Plan
Maldives	National Environment Action Plan, 1999-2005
Mongolia	National Action Programme for Sustainable Development for the 21 <sup>st</sup> century (MAP-21, 1995)
Myanmar	Myanmar Agenda 21
Nepal	National Environment Policy and Action Plan I and II
Pakistan	National Conservation Strategy
Philippines	Philippine Strategy for Sustainable Development; Philippine Agenda 21
Republic of Korea	Green Vision 21
Singapore	Singapore Green Plan
Sri Lanka	National Environment Action Plan, 1998-2002
Thailand	Policy and Perspectives for Enhanced Conservation; the Sustainable Development Action Plan
Viet Nam	Environment Vision 2020; Environmental Protection Strategy, 2001-2010; National Environment Action Plan, 2001-2005

Source: UNESCAP (2002); UNEP (2005).

### Constitutional provisions and legislation for the environment and sustainable development

Many Asian countries have enacted basic environmental laws, particularly after the Rio Summit in 1992. Table 2-2 summarises the current situation in Asia regarding basic environmental laws. These basic laws provide an enabling framework in which specific policies and laws concerning pollution control and nature conservation may be formulated.

### Thematic action plans and policy integration

A wide range of thematic policy instruments have been formulated by Asian countries. These include forestry management action plans, national plans of action for biological diversity conservation, national action programmes for combating desertification and mitigating drought impacts. As a part of their international obligations, the countries have prepared national communication/reports on the implementation of national action plans and international agreements to the convention secretariats and related UN bodies.

### National coordinating bodies for sustainable development

Asian countries have established national coordinating bodies for facilitating the implementation of Agenda 21 and sustainable development policy goals since 1992.

There are, however, different modalities of national coordinating bodies for sustainable development. In Thailand, the prime minister chairs the National Environment Board that works closely with the National Economic and Social Development Board. In the Philippines, the National Economic and Development Authority (NEDA) coordinates activities for sustainable development with the representatives from civil society organisations. In Sri Lanka, the Ministry of Environment and Forestry serves as the secretariat for the Inter-ministerial Coordinating Committee. There is an exceedingly wide variability in the functions, powers, authority, autonomy and effectiveness of these bodies (Box 2-1). The function of the national coordinating bodies for sustainable development is a determinant factor for the effectiveness of national level coordination of sustainable development policy implementation and international cooperation. The governments are still on the path for seeking the effective modalities of national level coordinating bodies for sustainable development.

#### BOX 2-1: Variations in National Coordinating Bodies

- Super-ministerial authority versus horizontal coordinating authority,
- Permanent secretariat and staff versus dependent on the ministry of the environment,
- Autonomous budget versus no budget,
- Decision-making authority versus no decision-making authority,
- Extensive issue coverage versus limited issue coverage,
- Representation by civil society organisations versus government agency representation only,
- Authority to coordinate international economic cooperation versus no authority.

### Policy measures

#### (a) Regulatory Policy Instruments

At the early stage of environmental legislative development in Asia, the majority of policy instruments focussed on the point-source solution to mitigate the negative environmental impact of industrialisation. Various point-source pollution controls and emission standards were set and end-of-pipe types of solutions were promoted. Strict regulations and command-and-control (CAC) types of environmental policies have

been rapidly adopted in Asia.

Many of the nations have extensively developed their regulatory structures to include sector-specific laws relating to industrial pollution and environmental quality. In the Taiwan Province of China, legislation and regulations vary depending on the nature of the pollution: water pollution standards are based on the type of industry, while toxic pollution standards are the same for all industries.

(b) Environmental impact assessment

Environmental impact assessment (EIA) law is also important in legislative development in Asia since it has been used as a critical tool to integrate environmental considerations into development projects or into the industrial decision-making process. In Asia, an increasing number of countries are enacting laws that require EIAs for all major projects. Some countries in Asia have applied EIAs to existing and planned industrial activities as a part of industrial environmental pollution control methods. Table 2-3 summarises the development of environmental legislation in Asian countries.

(c) Economic instruments

In Asia, an increasing application of economic instruments<sup>6</sup> has emerged during the 80s and 90s. For instance, China first introduced a pollution charge system in 1982 and it has been an effective economic incentive for pollution control (Zhou, 2001). The use of economic instruments has been widely accepted due to the potential to achieve environmental objectives in a cost-effective way. The first implication of economic instruments in Asia was predominantly on an experimental and small-scale basis. They were primarily applied as end-of-pipe solutions and are designed to support existing regulations. While some limitations of CAC measures reveal a reduction of pollution levels in many countries, economic instruments became widely applied in Asia. Common economic instruments applied in Asia are various environmental taxes, subsidies, emission charges, user fees, custom exemptions and duties to promote clean technology. Other types of economic instruments, such as the deposit-refund (DR) system, strict liability, resource pricing and property rights, have been used in some countries in Asia. Table 2-3 summarises the application of major economic instruments in Asia. While a number of economic instruments have been implemented in Asia, it can be noted that they are applied in a very uneven manner. Table 2-3 states, for example, that measures in Indonesia and the ROK were ineffective. The number of examples of market-based instruments provided in Table 2-3 is deemed as limited. The limited and uneven application of economic instruments needs to be further assessed vis-à-vis the level of other related law and instrument implementation.

**Table 2-3: Environmental legislation in Asia**

<b>Country</b>	<b>Environmental protection in a national constitution</b>	<b>Environmental framework laws</b>	<b>EIA: laws</b>
Bangladesh	No provision on the environment	1995 Environmental Protection Act	1992 National Environmental Policy, 1994 Forestry Policy, 1995 National Environmental Management Action Plan, 1995 Environmental Conservation Act, 1997 Environmental Conservation Rules (ECR), 2000 Environment Court Act stimulate EIA
Cambodia	The Constitution of Cambodia, “the State shall protect the environment and balance of abundant natural resources and establish a precise plan of management of land, water, air, wind, geology, ecological system, mines, energy, petrol and gas, rocks and sand, gems, forests and forestry products, wildlife, fish and aquatic resources”	1996 Law on Environmental Protection and Natural Resources Management	1996 Law on Environmental Protection and Natural Resources Management, Articles 6 and 7 “An environmental impact assessment shall be done on every project and activity, private or public, and shall be reviewed and evaluated by the Ministry of Environment before being submitted to the Royal Government for decision.”
China	1982 The Constitution of China, “the State protects the environment and its natural resources and prevents and eliminates pollution and other hazards to the public”	1979/1989 Environmental Protection Laws	1992 Managing ordinances on protecting environments of construction project.: Chinese government ensured to utilise EIA tool for construction projects
India	1950 The Constitution of India, “The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country”	1986 Environmental Protection Act	1994 Notification on Environment Impact Assessment
Indonesia	No provision on environment	1982 Act no.4/1982 on the Basic Provision for Environmental Management 1997 Environmental Management Act	1986 Government Regulation no.29 established Indonesian EIA system, AMDAL (Analisis Mengenai Dampak Lingkungan) 1999 Government Regulation no.27: Analysis on Environmental Impact Aspects of EIA



Japan	No provision on the environment	1993 Basic Environmental Law	1997 EIA Act
Lao PDR	1991 The Constitution of the Lao PDR: “All organisations, all citizens must protect the environment and natural resources: land, subterranean, forests, fauna, water source and atmosphere”	1999 Environmental Protection Law	No EIA law
Malaysia	No provision on the environment	1974 Environmental Quality Act	1987 Environmental Quality (Prescribed Activities) (EIA) Order
Mongolia	No provision on the environment	1994 Environmental Law of Mongolia	1998 Law on EIA
Nepal	No provision on the environment	1996 Environmental Protection Act	1996 Environmental Protection Act, 1997 Environmental Protection Regulation, 1992 National Environmental Impact Assessment Guidelines 1992 support EIA. Other measures supporting EIA include 1991 Forestry Act, 1995 Forestry Sector EIA Guidelines, 1992 Water Resources Act, and 1992 Electricity Act
Pakistan	No provision on the environment	1997 Environmental Protection Act	1992 National Conservation Strategy, 1997 Pakistan Environmental Protection Act (PEPA) support EIA
Philippines	The Constitution of the Philippines, “it is the duty of the State to protect and advance the right of the people to a balanced and healthful ecology.” (This duty had earlier been codified in the Philippine Environmental Policy Presidential Decree no. 1151.)	1977 Philippine Environment Environmental Code-Presidential Decree no.1152	1978 Presidential Decree (PD) no. 1586 established Environmental Impact Statement (EIS) System; Section 7 of Executive Order no. 192/87, 1996 Revising Department Administrative Order (DAO) no. 21/92 (DENR AO no. 37) strengthened EIS/EIA system

Republic of Korea	1948 Korean Constitution, "All citizens have the right to a healthy and pleasant environment. The state and all citizens shall endeavour to protect the environment"	1990 Basic Environmental Act	1993 EIA Act
Singapore	No provision on the environment	No environmental framework law	No EIA law, but EIAs are required on an ad hoc basis at the discretion of the Ministry of Environment
Sri Lanka	No provision on the environment	1980/1988 National Environmental Act	1988 National Environmental (Amendment) Act no. 56, 1981 Coast Conservation Act, 1993 Fauna & Flora Protection Ordinance (Amendment), 1996 National Policy on Industry and Environment support and stipulate EIA
Thailand	1997 Thai Constitution, "the government shall conduct public hearing and seek the views of local communities before it embarks on development projects that will have an effect on the environment."	1975 Improvement and conservation of national environmental quality act 1992 Enhancement and Conservation of National Environmental Quality Act	1992 EIA Notification (issued under Sec 46-47 of the Enhancement and Conservation of Nation of National Environmental Quality Act 1992)
Viet Nam	1992 Constitution of the Socialist Republic of Viet Nam, "State organs, units of the armed forces, economic and social bodies and all individuals must abide by state regulation on the rational use of natural wealth and on environmental protection. All acts likely to bring about exhaustion of natural wealth and to cause damage to the environment are strictly forbidden."	1994 Law on Environment Protection	1994 Government Decree no. 175/CP on Providing Guidance for the Implementation of the Law on Environmental Protection requires submission of EIAs; 1996 Decree no. 26/CP on Sanctions against Administrative Violations in Environmental Protection supports EIA implementation

Source: UNESCAP (1997), IDE-JETRO (2003), UNESCAP (1992), TERI. (website), Legislative Department of India (website), HelplineLaws (website), Mekong Region Law Center (website), South Asia Regional Environmental Assessment Association (website), APCEL (2002). JICA (1999d).

**Table 2-4: Market-based instruments in Asia and their environmental effects**

	<b>Instruments</b>	<b>Remarks on Effectiveness</b>
Fees, prices and subsidies	Elimination of pesticide subsidy (Indonesia)	
	Volume-based waste fees (ROK)	
Environmental charges and taxes	Emission taxes on industrial emissions and fuels (Taiwan Province of China).	
	Charges on a wide range of emissions, including pollution charge (China).	A significant decline in pollution, for example a reduction of 80 per cent in SO <sub>2</sub> .
Subsidies and environmental funds	Concessions on depreciation for investments in environmental technology and low waste production processes/ No capital assets tax on environmental technology plant investment (Japan).	Japan is leading in cleaner production technology development.
	Tariff reduction on imported environmental protection plants (Thailand).	
	'Environmental Fund' (Thailand)	
	Pollution Control and Abatement Fund (Sri Lanka)	
Deposit-refund systems and performance bonds	Deposit-refund system on packaging (Taiwan Province of China)	
	Recycling performance bond (ROK)	The deposit value per product was lower than actual recycling costs, the system did not create any motivation for industries to recycle their end-products.
	A performance bond for re-afforestation (Indonesia)	The value of the deposit per hectare was well below the re-afforestation costs, the charge was simply passed on without having any effect.
Liability laws	Strict liability laws (80's, Japan)	It motivated companies to reach agreements at local level on environmental protection measures which went far beyond the statutory minimum requirements.
	'Public Liability Insurance Act' requires all companies using hazardous substances to take out liability insurance which will pay provisional compensation to victims of accidents (1991, India).	

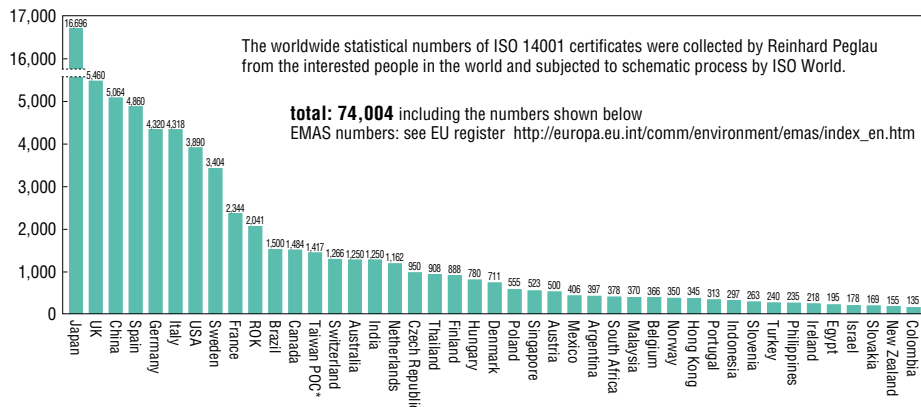
Property rights	5-25 years non-transferable exploitation rights for farmers (Thailand)	Previously, a further 47 per cent of agricultural land is subject to exploitation rights for a limited period only. In many areas, the risk of eviction leads farmers to neglect investment in soil improvement and erosion protection. Since the new exploitation rights for farmers was introduced, farmers increase ownership and improve their land protection.
	In the <i>Phani Panchayat</i> model, exploitation rights for irrigation among farmers were agreed which set upper limits on the cultivation of water-intensive sugar cane and quantities of water per hectare (India).	Hectare yields were increased for all farmers, at the same time, the water shortage has been decisively reduced.

(d) Information-based instruments

Many Asian countries have increased their use of information-based instruments. One good example is the eco-labelling schemes that are emerging in many of Asian countries. The eco-labelling schemes in Japan, the ROK, and Thailand are applied to various products, including organic food products. Environmental auditing, reporting, and award and recognition programmes are also emerging information-based tools. Many Asian countries have practiced awarding and recognition programmes.

Environmental management systems (EMSs), especially ISO 14001, have been promoted in many Asian countries. ISO 14001 and other types of EMSs provide a standard for industry to learn how to monitor and evaluate their environmental performance, thus encouraging a strong commitment, in theory, to improve it. According to Fig. 2-14, the number of ISO certified companies in Asia, especially Japan, China, and the ROK, dramatically increased. With recognition of the importance of clean technology and cleaner production concepts, the regional interest in ISO 14000 standards has been amplified. National organisations to certify these standards have been established in Malaysia, Singapore and Thailand.

**Fig. 2-14: The numbers of ISO14001 certificates in the world**  
October 2004



Source: ISO World Inc. (2005)

(e) Voluntary and social pressure measures

Voluntary approaches taken in various environmental policy measures have expanded in Asia. For instance, in Japan, between local governments and businesses, voluntary agreements at the local level have been widely used for pollution control for many years. At present, more than 30,000 local Pollution Control Agreements (PCAs) are in use in Japan (OECD, 2003). Factory-by-factory emission levels are decided in detailed written agreements after intensive discussions among business, local governments and residents. The potential for enforcement also was considered so that these voluntary agreements function as if they are legally-binding. As a result, pollution levels have been significantly reduced and behaviours have been changed. Environmental performance and activities by Japanese business have improved through strong support from environmentally-conscious local governments and communities (World Bank, 2002). It is not at all clear, however, that these voluntary and social pressure measures would transfer easily or effectively from Japan to other countries in the region.

(f) Financing

The ADB has warned that environmental degradation is still accelerating and that neglecting the environment will cost the Asian economies around 8 per cent of their national growth. China is believed to be losing as much as 10 per cent of its national income due to pollution and India 5 - 6 per cent. The direct cost of water and air pollution alone in India is believed to be as high as US\$10 billion annually (Boyd, 2002). Direct government spending on environmental protection, on the other hand, is generally very modest, especially for the poorer developing countries of the region. For instance, Japan's average annual outlay is around 1.8-2 per cent of GDP, which has been spent mostly on environmental protection, followed by the ROK with 1.3-1.6 per cent, Singapore with 1.2-1.5 per cent and the Taiwan Province of China with 1-1.2 per cent of GDP. However, in most of the developing countries of Asia, it amounts to less than 1 percent of GDP. Viet Nam spends only about 0.1-0.3 per cent of GDP, and China, Indonesia and the Philippines 0.5-0.7 per cent. Malaysia and Thailand both invest about 1 per cent of GDP on the environment (Boyd, 2002). National environmental funds were established in the 1990s in several Asian countries, but most of these have remained chronically underfinanced. In other Asian countries, such funds have not yet materialised.

(g) Local governments and other stakeholders in environmental policies and management - decentralisation and local governments in environmental management

A significant, emerging trend in the Asian political arena is the "decentralisation" movement. Around the 90s, many Asian countries which had long histories of highly-centralised governance systems, attempted to introduce decentralisation. For instance, the Philippines stipulated decentralisation in its 1987 Constitution, and a law concerning local autonomy was enacted in 1991. Indonesia promoted decentralisation and legislated "regional governance" and the "fiscal balance between the central government and the regions" acts in 1999. Thailand passed the "Tambon Administrative Act" (1994), allowing Tambons (sub-district) to draw up a local development plan that covered various policy areas, such as education, natural resource management, welfare, and infrastructure by establishing "Tambon Administrative Organisations."

Decentralisation is applied to the environmental area as well. In principle, decentralisation may be a sound policy, as many environmental issues require solutions suitable to local conditions. However, in many cases decentralisation involves local governments and other local authorities that lack the required human resources, institutional, and financial capacities to function effectively. The results are often a deflection and diffusion of responsibility and a lessening of policy effectiveness over environmental matters.

(h) Civil society empowerment

Partly supported by more flexible legal arrangements and governmental financial measures like tax exemptions, donations, grants and loans, the number of NGOs and community-based organisations

(CBOs) in Asia is rapidly growing. The NGO/CBO involvement in policy implementation is broadly directed at increasing societal capacities and improving socio-economic conditions. Civil society is increasingly active in information access, press freedom, radio and information/communication technologies and these constitute a part of the policy and institutional framework conducive to promoting sustainable development. Other related governance issues are also salient to the creation/reinforcement of the policy and institutional framework that enable individuals and communities to achieve common policy goals (WRI, 2003).

(i) Public-private partnership

Recently different configurations of PPP have been receiving considerable attention in Asia. In the water and sanitation sector alone, the ADB reported 215 recent initiatives in water and sanitation partnerships involving the private sector. Given the recent nature of these initiatives, it would appear to be too early to judge the extent of their effectiveness and benefits. In some cases at least, positive outcomes have been reported in the form of better quality services at lower prices.<sup>7</sup> But it is also noteworthy that, of the 215 projects reported by the ADB, 56 remain in the planning stage and 14 have been postponed or cancelled (ADB, 2002).

*(ii) Underlying challenges*

While there is evidence of considerable and important progress in Asia in exploring, enacting policies and applying environmental instruments, this is uneven across countries and in the quality and thoroughness of the instruments chosen. In some respects, this is to be expected, as Asian nations struggle to balance the multiple demands of economic growth and material well-being with dramatic shifts in demography and with the long-term needs of the environment. Yet as we have seen in this chapter, while many Asian countries are members of multilateral environmental conventions, have enacted environmental legislation and undertake EIAs as a matter of standard practice, implementation and follow-through remain very problematic. Enacting legislation that mandates EIAs is one thing; enforcement of EIA and the disclosure of the EIA's outcome information are often entirely different matters. The overview provided in this chapter also suggests that adequate progress towards sustainable development in Asia will require an intensification of efforts, including further diversification and broadening of policy measures, especially those involving economic/incentive instruments and information-based measures.

To achieve this would seem to require a considerable strengthening of and increase in the status of national coordinating bodies for sustainable development. As a first step, these might be attached directly to the offices of heads of state with their own permanent staff and sufficient fiscal support to ensure leverage with economic line ministries.

A further measure that is suggested on the basis of the analysis in this chapter would entail increasing the solvency and scope of national environmental funds, perhaps in new partnership arrangements with non-governmental organisations and the private sector.