
PART I:

OVERVIEW OF THE ASIA-PACIFIC REGION

The Asia-Pacific region covers a wide geographical area, with diverse landscapes, climates, societies, cultures, religions, and economies. More than half of the world's population lives in this region, of which close to half live on less than a dollar per day. Hence, the region contains the world's largest number of people living in poverty.

With its diversity as an asset, the region has enjoyed remarkable economic growth in the last four decades. Several countries are experiencing rapid changes in economic development, population growth and urbanisation, social transformation, and technological development, and these countries share common economic drivers. The expanding economy in Asia and the Pacific has brought about increased interdependence among the countries in terms of natural resources, finance, and trade. Consequent environmental problems share common features in their cause, process and impact, while some even have direct trans-boundary implications.

The economic expansion and population growth in Asia-Pacific over the last 40 years was underpinned by the region's rich natural environment. However, human activities associated with such expansion have placed excessive stress on the environment, resulting in severe environmental degradation. Environmental degradation now poses a serious threat to the region's growth prospects, thus constituting a clear obstacle to attaining sustainable development.

Current trends in the Asia-Pacific region are likely to continue, or advance even more rapidly in the next 20 years than in other regions of the world. Asia-Pacific could become the most dynamic region and a growth centre for the world by 2025. Therefore, sustainable development in the region is critical to achieving sustainable development at the global level.

Despite intensive effort at all levels, the region's challenge for sustainable development has yet to be fulfilled. Paradigm shifts are already advocated and practiced to some extent, in particular, for (i) integrating environment and economics policies, including the use of market mechanisms to work for environmental goals, and (ii) increasing bottom-up contributions of civil society for formulating policies towards sustainable development, especially in view of achieving the Millennium Development Goals (MDGs) targeted by 2015. While calling for strengthening of these emerging initiatives, APFED wishes to promote further comprehensive shifts to reflect long-term views and values beyond 2015, which are embodied in the vision of the Asia-Pacific region.

1. STATE AND PERSPECTIVES OF SOCIAL AND ECONOMIC FACTORS FOR CHANGE

The Asia-Pacific region covers an area from Mongolia in the north to New Zealand in the south, and from Central Asia and the Islamic Republic of Iran in the west to Kiribati in the east. The region is generally divided into five subregions, namely South Asia, Southeast Asia, Northeast Asia, Central Asia, and the Pacific. The countries within a subregion often share a natural and socio-cultural background, and experience similar environmental problems. The allocation of countries by subregion is shown in Table 1, following the practice in the State of the Environment in Asia and the Pacific Report².

² United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) and Asian Development Bank (ADB) 2000; State of the Environment in Asia and the Pacific 2000, United Nations, New York.

Table 1: Subregions and Countries

Subregion	Countries
Central Asia	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan
North East Asia	China, Japan, Democratic People's Republic of Korea, Republic of Korea, Russian Federation, Mongolia
South Asia	Afghanistan, Bangladesh, Bhutan, India, Islamic Republic of Iran, Maldives, Nepal, Pakistan, Sri Lanka, Turkey
South East Asia	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, Viet Nam
Pacific	Australia, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

Note: China includes Hong Kong and Macao Special Administrative Regions and Taiwan Province of China.

The region has enjoyed economic growth for the last four decades. In the course of economic development, however, rich natural resources have been degraded and the total number of poor people has increased. APFED has identified the key social and economic factors upon which future directions of sustainable development of the region depend, and the status and perspectives of these factors are outlined below. They include population and urbanisation (population trends, urban population and urbanisation, rural-urban migration, urban poverty, and transforming demographic structures); economic development (growing and transforming economies, economic globalisation and its impacts, rural-urban gaps, energy sources and availability, and production and consumption); major social concerns (poverty, nutrition and health, education and gender discrimination, social cohesion, conflicts, and corruption); and technological development (technological innovation, information and communication technologies, biotechnologies, energy technologies, and cleaner production technologies).

A. Population and Urbanisation

Population Trends

Approximately 3.5 billion people, 58% of the world's population, live in Asia and the Pacific³, an area accounting for only about 30% of the Earth's land space. Several of the most populous countries in the world are found in the region, including China with 1.3 billion people and India with 1.2 billion⁴, together accounting for almost 40% of the world's population. Five of the six countries that account for half of the global annual population growth belong to the region, namely Bangladesh, China, India, Indonesia, and Pakistan.

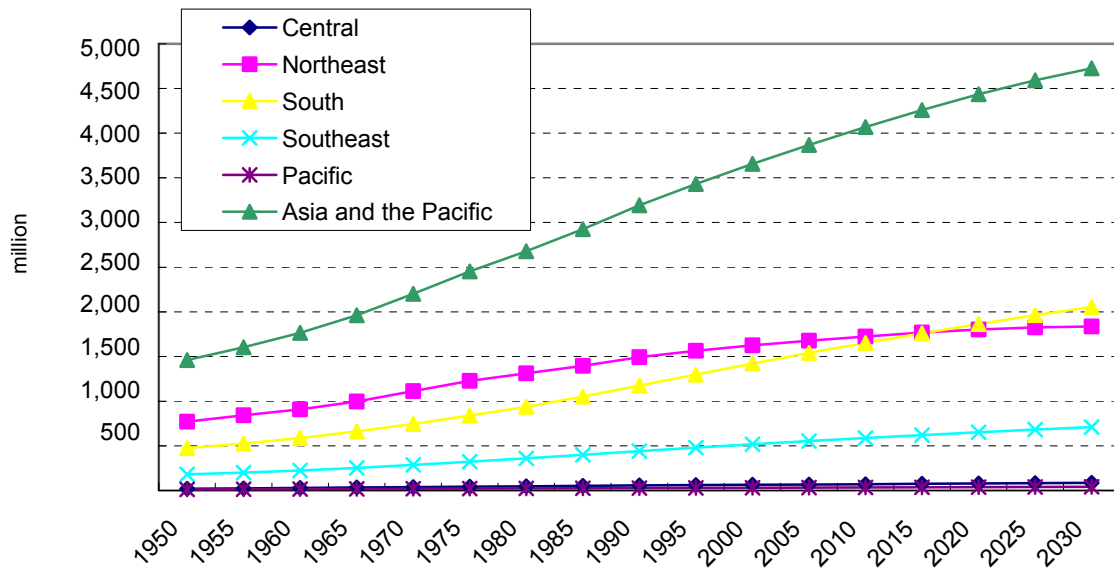
According to population projections by the United Nations⁵, a constant increase in population is expected in all subregions; total population will increase by approximately 700 million in the region between 2000 and 2015, as indicated in Figure 1. The largest increase in population is expected in the relatively poor economies of South Asia, where the total population will increase by 300 million by 2015, and 600 million by 2030.

³ UN-ESCAP, Population Data Sheet 2003 (http://www.unescap.org/pop/data_sheet/2003/index.asp)

⁴ Population in mid-2003, UN-ESCAP Population Data Sheet 2003 (http://www.unescap.org/pop/data_sheet/2003/index.asp)

⁵ United Nations Population Division, World Population Prospects, The 2002 Revision

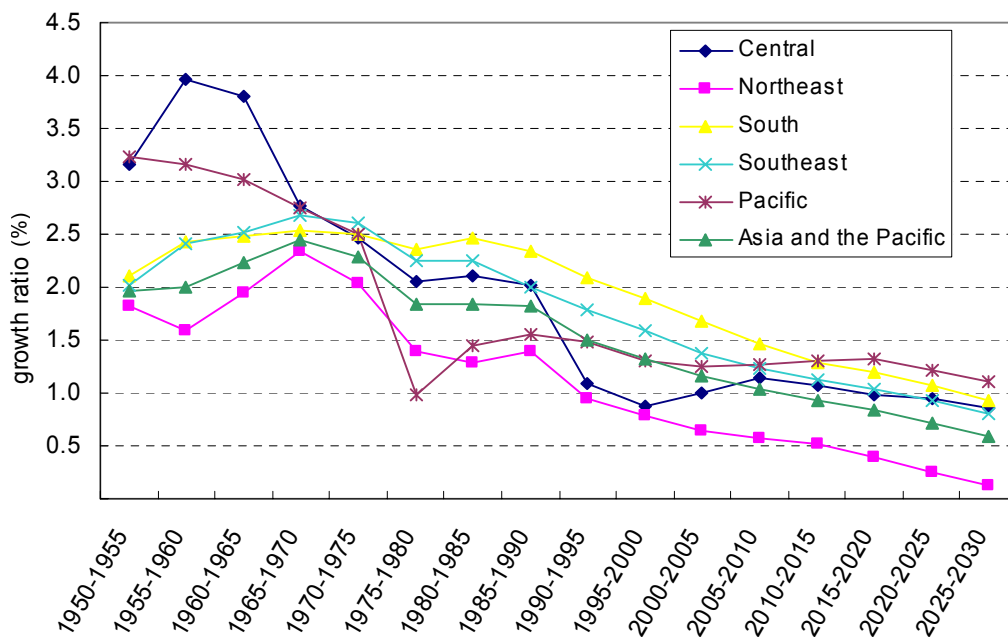
Figure 1: Population Growth by Subregion



Source: United Nations Population Division, World Population Prospects, The 1999 Revision.

The good news is that the population growth rate has slowed down during the past decades (Figure 2). In particular, population growth rates in Northeast Asia decelerated drastically after the 1960s, with the lowest growth rate in the region. According to the population projections mentioned above, the annual rate of population growth will drop from 1.4% (1980-2000) to 0.5% (2000-2015) in Northeast Asia, and from 2.0% to 1.4% in South Asia.

Figure 2: Population Growth Ratio by Subregion



Source: United Nations Population Division, World Population Prospects, 1999 Revision.

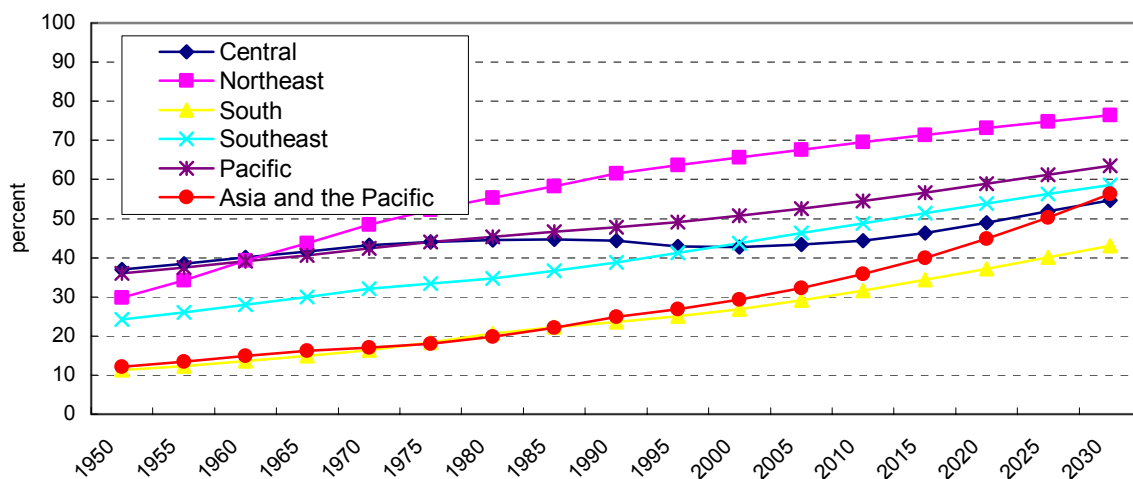
Note: Growth ratios are averages of each five years

Continuous economic growth with dense population concentrations will intensify land use and land use change to open new agricultural areas, leading to a reduction in forest cover. Such population trends will increase energy and food demands, which often result in further pressures on natural resources.

Urban Population and Urbanisation

Urban populations grew rapidly in most parts of the world during the 1980s, but, in fact, grew faster during the 1950s in Asia and the Pacific (Figure 3). The rapid increase in urban population is one of the most important factors in devising appropriate paths toward sustainable development. As indicated in Figure 4, urban populations in South and Southeast Asia grew constantly over the past five decades, with growth rates over 3% per annum. The urban population in the region is predicted to grow at an average of 2.4% per annum between 2001 and 2030⁶. In 2030, approximately 60% of the total population in Asia and the Pacific will live in urban areas. Prospects for sustainable development, therefore, rest with the development of sustainable cities.

Figure 3: Urban Population Rate by Subregion



Source: United Nations Population Division, World Population Prospects, 1999 Revision.

Notes: 1) Australia: includes Christmas Island, Cocos (Keeling) Islands and Norfolk Island.

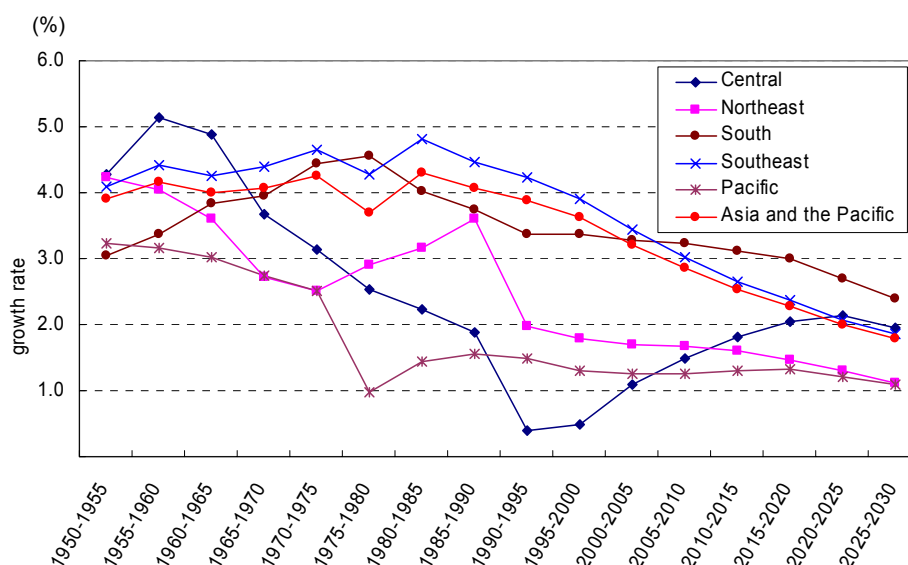
2) China: does not include Hong Kong Special Administrative Region of China

3) Pacific: does not include Tuvalu due to lack of data.

The largest growth of urban populations is in South and Southeast Asia, with a growth rate of over 3% per annum. By contrast, growth rates in the Pacific, Northeast Asia, and Central Asia during the last two decades are relatively low, with growth rates of between 1-3% per annum. In Central Asia, the urban population growth rate is expected to drastically increase in the future, and 55% of the total population in the subregion will live in urban areas.

⁶ United Nations Population Division, World Population Prospects, The 1999 Revision

Figure 4: Urban Population Growth Rate by Subregion



Source: United Nations Population Division, World Population Prospects, 1999 Revision.

Notes: 1) Australia: includes Christmas Island, Cocos (Keeling) Islands and Norfolk Island.

2) China: does not include Hong Kong Special Administrative Region of China

3) Pacific: does not include Tuvalu due to lack of data.

Rural-Urban Migration

Migration from rural to urban areas is a continuing phenomenon in large cities in the region, driven mainly by employment opportunities and better social welfare. According to the United Nations, by 2015, 15 cities in the region will become mega-cities with a total population of at least 10 million, as indicated in Table 2. South Asia already has mega-cities such as Dhaka, Karachi, Kolkata, and Mumbai that are expected to experience sharp population increases due to this type of migration as well as natural growth.

Table 2: Large Cities of the World and Asia and the Pacific

		1955	1975	1995	2015
World	Above 10 million	1	5	14	26
	5 to 10 million	10	17	23	38
	1 to 5 million	82	157	289	463
	Total	93	179	326	527
Asia	Above 10 million	0	2	7	15
	5 to 10 million	3	7	13	20
	1 to 5 million	30	61	160	267
	Total	33	70	180	302
Percentage of Asia in the World		35.5%	39.1%	55.2%	57.3%

Source: United Nations, World Urbanisation Prospects: 1999 Revision (2001)

Note: Data for 2015 are projections.

In addition to rural-urban migration, international migration from developing countries to high-growth, industrialised countries is becoming significant in the region. The scale and nature of such international migration are subject to the immigration policies of developed countries, but are also influenced by government support for rural livelihoods and good environmental management in rural areas in developing countries. Further economic integration of the region, through conclusion of free trade agreements (FTAs), may increase international migration.

Accelerated migration often causes environmental problems due to rapid slum concentration in prosperous urban centres, where the limited land available for housing pushes up house prices. Lower-income groups living in expensive urban areas face increasing difficulties and more overcrowded conditions. For example, in South Asia, almost half of every city and town is becoming a slum or shanty area⁷.

In spite of such migration, rural populations are still increasing, particularly in Northeast and Southeast Asia, resulting in expansion of agricultural land, largely at the expense of lowland forests and their biodiversity. According to the World Bank, increasing agricultural land areas in the last 20 years amounts to 16% of the land area in Asia and the Pacific (170 million hectares)⁸. However, new lands do little to support rural livelihoods, especially where agricultural land and natural resources in rural areas have become degraded, as evident in the case study on land conversion and environmental impacts around Jakarta (Box 1).

Box 1: Environmental Impacts by Rural-Urban Migration in Jakarta

The Jakarta Metropolis now ranks as one of the world's largest urban agglomerations. By 1980, most population growth was taking place on the periphery of the metropolis, with the population in previously low-density areas such as Depok and Cibinong growing at rates of 10% per year. A significant proportion of this population growth is due to migration from other rural areas of Java.

As the metropolis has expanded, negative environmental impacts of one activity have been magnified by those of another. Water pollution from industrial activities has become a serious issue alongside that caused by the excessive use of fertiliser, pesticides, and herbicides in agriculture, which feed into the same water system.

In mega-cities like Jakarta, emerging environmental problems go beyond controllable situations, and threaten the sustainability of the city itself. One example is extraction of ground water at an accelerating rate by a multiplicity of users. Seawater has intruded 15 kilometres inland, creating a zone of salinised ground water reaching as far as the city centre.

Source: The environmental sustainability of development: coordination, incentives and political will in land use planning for the Jakarta metropolis, Third World Planning Review. Vol. 11 No 2 page 211-238

Urban Poverty

Population growth in mega-cities has outpaced development of essential urban infrastructure and responsive environmental management. Urbanisation has played an essential part towards stronger and more stable economies and has helped underpin improvements in living standards over the past decades. But it has resulted in widening inequality of income between urban dwellers and increased the number of urban poor who lack access to basic public services, such as water supply and sanitation, health care, and education (Figure 5). High population density and economic growth against a background of inequitable distribution of income and productive assets has made sustainable development more difficult to achieve⁹. World Health Organisation (WHO) and United Nations Children's Fund (UNICEF) estimate that by 2015, 595 million more people will be living in urban areas in Asia¹⁰, with about 20-50% in informal housing, slums, and shanties¹¹.

⁷ Development Alternatives, 2003. "South Asian Priority Paper for UNEP"

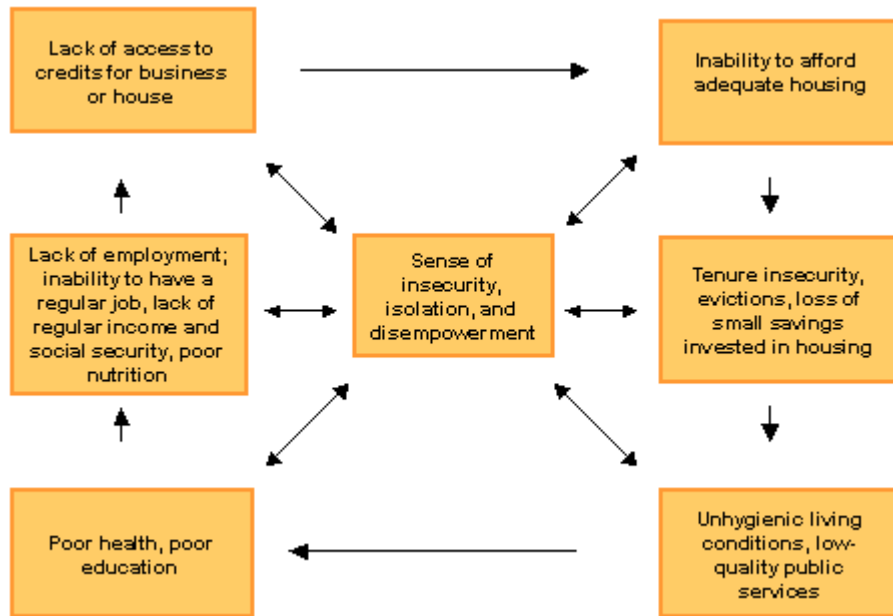
⁸ World Bank, 2002. World Development Indicators 2002. World Bank, Washington D.C.

⁹ UN-ESCAP and ADB, 2000. State of the Environment in Asia and the Pacific 2000, United Nations, New York.

¹⁰ WHO/UNICEF, 2000. Global Water Supply and Sanitation Assessment 2000 Report. Note: WHO and UNICEF's definition of Asia includes Western Asia.

¹¹ ADB, 2001. Beyond Boundaries: Extending Services to the Urban Poor, ADB, Manila.

Figure 5: Cumulative Impacts of Urban Poverty



Source: World Bank (<http://www.worldbank.org/html/fpd/urban/poverty/defining.html>)

Slums or shanty towns are often built on flood-prone, low-lying areas or around city drains. Such sites are often the only cheap land available for housing to the poor, because they are unattractive to other potential users, and land use policies make other locations unaffordable. Though the poor may have less fear of eviction in such marginal areas, they are at a much greater risk from natural and man-made disasters and from pollution at such sites¹².

Many urban poor earn their livelihood from environmentally hazardous scavenging¹³ of solid wastes due to lack of employment opportunities, exposing them to a wide range of health and safety hazards.

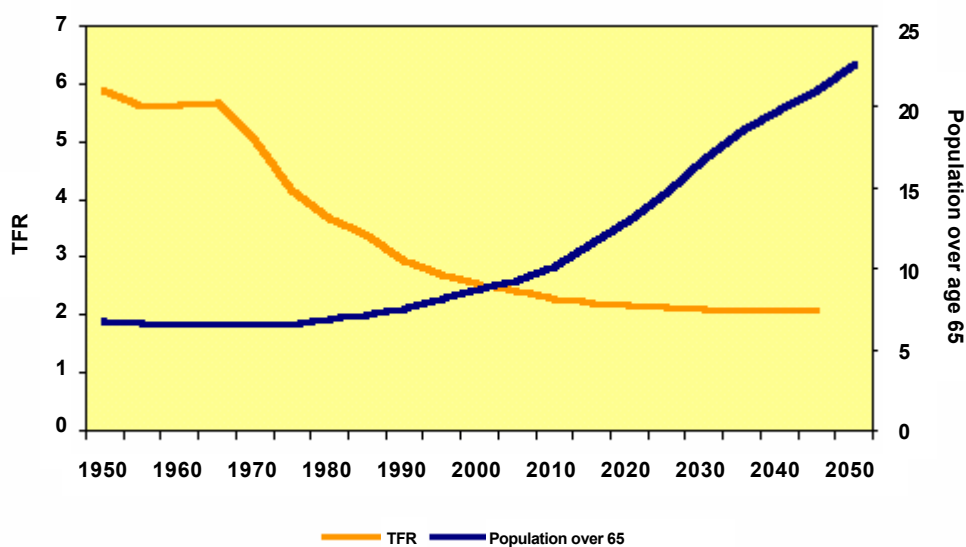
Transforming Demographic Structures

Transformation of the demographic structure due to a decrease in fertility and mortality rates is a key factor in determining the future socio-economic and environmental problems of Asia and the Pacific. Fertility rates as well as mortality rates have been declining in the region, and this trend is expected to continue until 2040 with a decelerating rate (Figure 6). In general, mortality rates dropped before fertility rates, and infant and child mortality rates dropped earlier and faster than mortality rates in other age groups. The result was a surge in population growth and a dramatically larger share of young people in the population.

¹² World Bank, undated. Urban Development. <http://www.worldbank.org/urban/poverty/environment.html> (20/7/2004)

¹³ UN-ESCAP, 2003. Economic and Social Survey of Asia and the Pacific, 2003 <http://www.unescap.org/pdd/publications/survey2003/Survey03-13.pdf>

Figure 6: Total Fertility Rate (TFR) and Percentage of Population Over Age 65 (1950 – 2050)



Source: United Nations Population Division, World Population Prospects: The 2000 Revision.

This structural change has resulted, in the short term, in a greater share of youth in the population and an expansion of the active labour force. An increasing share of young dependents also had positive impacts on economic growth. Northeast Asia, where the working-age population increased by the highest growth rate of 1-2% per annum between 1960 and 2001¹⁴, saw higher positive impacts on its economies than other subregions, as can be observed by the rapid economic growth in Japan. Nevertheless, excessive growth of the working-age population may have significant negative socio-economic implications, particularly in terms of high unemployment rates. In addition, large numbers of young people entering their reproductive years may reinforce the pressure for population growth.

In the longer term, declining fertility and mortality rates lead to an emerging issue of ageing societies—an increase in the older population. Many countries in Asia and the Pacific, such as China, Indonesia and Thailand, are expected to have relatively large proportions of their population in the older age groups early in the 21st century. As the subregional breakdown in Table 3 indicates, Northeast Asia has approximately half of the region's population aged over 65 years, and the portion of aged people in the subregion's total population will increase from 11% in 1999 to 30% by 2050.

¹⁴ Food and Agriculture Organisation (FAO), FAOSTAT <<http://apps.fao.org/default.jsp>>

Table 3: Population Aged 65 Years or Older by Subregion

	1999		2050	
	population (thousand)	% of total population in the sub-region	population (thousand)	% of total population in the sub-region
Northeast Asia	162,560	11	506,694	30
South-central Asia	102,141	7	486,724	20
Southeast Asia	36,510	7	177,513	23
West Asia	13,009	7	67,732	18
ASIA	314,221	9	1,238,663	24

Source: UN-ESCAP, Population Data Sheet 2002 (http://www.unescap.org/pop/data_sheet/2002/index.htm)

Note: Projected figures for 2050 are from the medium-fertility variant of the United Nations population estimates and projections as revised in 1998.

In developing countries with an increasing proportion of older people, it will be difficult to develop responsive social security systems. In many developing countries, unlike Japan and many western countries, ageing of the society may come before sufficient economic development has taken place to pay for such systems. Although many governments in the region prefer policies that encourage family-based or community-based care for the elderly, a smaller younger population results in fewer caregivers per elderly person. In future, the economic burden of social health support for the older population could be a potential cause of social insecurity. A decline in the active labour force is also a critical issue of an ageing society. The total fertility replacement rate, which is the number of children required to maintain the current population is 2.1, but Republic of Korea, Japan and Singapore have an average rate of 1.4.

Lower population growth does not necessarily help slow down the rate of environmental degradation. For example, in Sri Lanka and Thailand, where population growth rates have declined rapidly, environmental degradation still continues, at a pace as fast as that in other countries with higher population growth rates. Increase in the per capita environmental loads in those two countries may have cancelled out the small gain obtained from decelerating population growth rates.

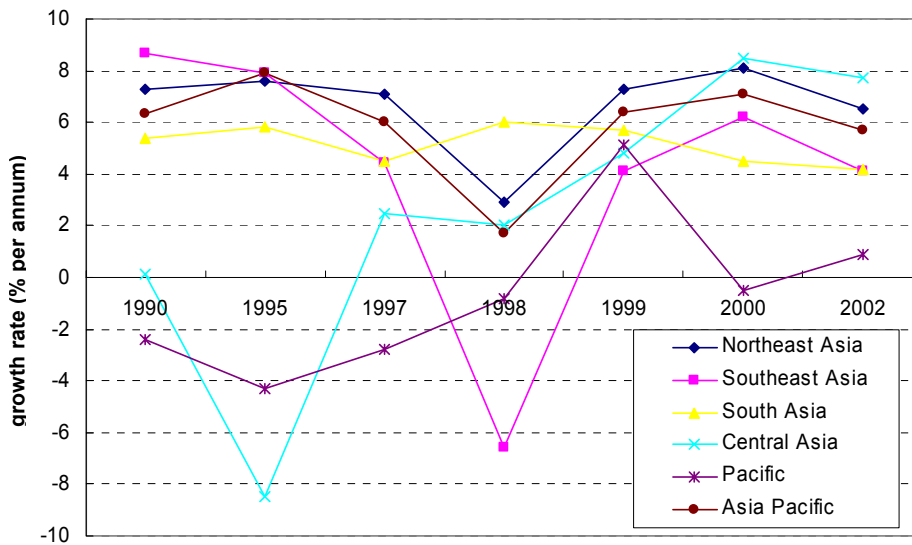
According to the World Bank, an increase in the growth rate of the population under age 15 is closely associated with a decrease in economic growth rates, i.e., young people under the age of 15 contribute negatively to current production.

B. Economic Development

Growing and Transforming Economy

Economic output in Asia and the Pacific quadrupled during the past 20 years. The GDPs of the subregions of Northeast Asia, South Asia, and Central Asia show a high annual growth rate of between 4 and 8% since 1998, largely fuelled by rapid industrialisation and international trade (Figure 7). In Southeast Asia, the annual GDP growth rate which dropped drastically to -6.6% in 1998 due to the Asian economic crisis, exceeded 4% in 2002, recovering successfully from the economic recession. Compared with the rest of the region, growth rates in the Pacific countries were relatively low.

Figure 7: GDP Growth Rate by Subregion

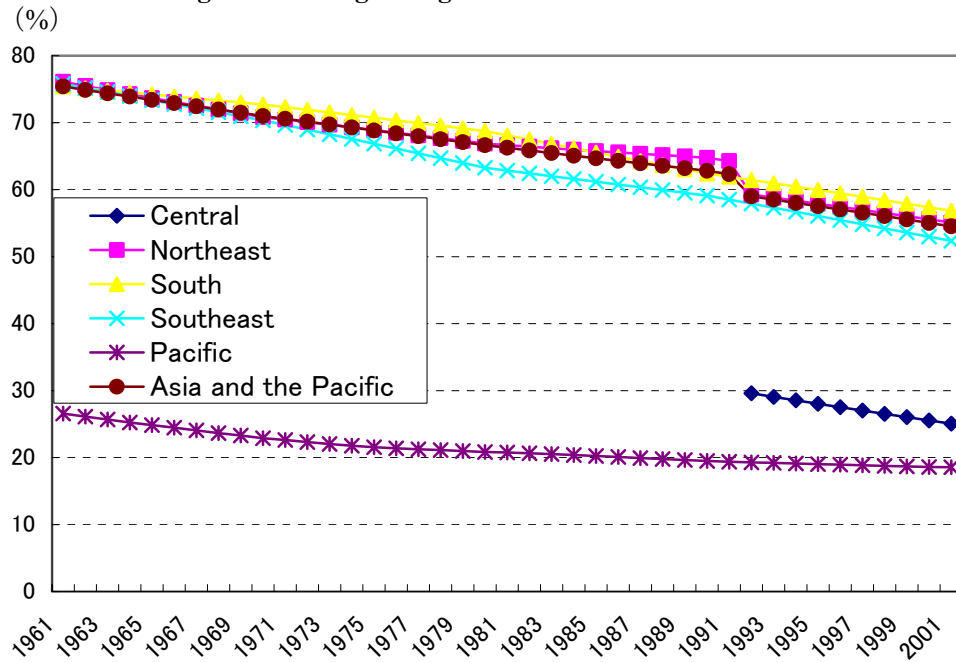


Source: ADB, Asian Development Outlook 1996 and 1997, 2003

The region's economic development has largely been driven by adopting a labour-intensive export-oriented industry development strategy supported by heavy exploitation of human resources as well as natural resources. Such development has brought about significant changes in the social and economic structure of the region over the past 30 years. While the importance of agriculture in the regional economy diminished, the industrial and service sectors grew constantly, attracting labour from within and outside the countries. Even in subregions such as South Asia, whose economy depends on agricultural production to a greater degree than the rest of the region (Figure 8), the contribution of the agricultural sector to GDP fell from 39% per annum in 1980 to 25% per annum in 2001, while that of the service sector increased from 35 to 50% per annum¹⁵. In general, the agricultural labour force in the region is constantly decreasing, with the exception of the small islands of the Pacific where there is little industry, and other countries in the subregion with only small industries related to food or beverage processing, clothing and minor machinery assembly or repair. Such structural changes have impacted on employment opportunities and the structure of the region's labour force, especially in Northeast, South and Southeast Asia.

¹⁵ ADB, 2003. Asian Development Outlook 2003

Figure 8: Change of Agricultural Labour Force



Source: Food and Agriculture Organisation (FAO), FAOSTAT

Note: Northeast Asia includes data of Russian Federation from 1992 only

Economic Globalisation and its Impacts

Globalisation, accelerated by trade liberalisation, has led to economic development in Asia and the Pacific. Countries with open market policies showed significant improvements in economic performance, particularly between 1965 and 1990. A growing share of the world's industrial production now takes place within the region. The region is also a major destination of essential goods such as those produced by industries, agriculture, and mining.

In addition, globalisation facilitates human interaction and information exchange. Development and diffusion of information and communication technologies (ICTs) also enhances communications and information flow. Human and information exchange will enhance technology transfer and cooperation in research and development (R&D) among countries. It also facilitates awareness raising and participation of stakeholders in the sustainable development agenda at local, national and international levels.

However, it cannot be denied that globalisation has certain negative aspects. Worldwide economic activities stimulated by globalisation still largely depend upon natural resources as the main source of raw materials, and also as the sink for negative outputs from industrial activities. Increased export of natural resources, mainly to industrialised countries, has, in some cases, been achieved at the expense of destruction of vulnerable natural ecosystems, especially in tropical countries in the region. In such countries, industrial pollution has intensified, important forest areas have been diminished, and biodiversity of the natural ecosystems has been impoverished, sometimes irreversibly.

Due to accelerated globalisation, with its accompanying growth of global media, the region's lifestyles and consumption patterns are changing, increasingly modelled on the United States and Europe. These trends have resulted in increased consumption of energy and consumer products. For example, Pacific countries have seen improvements in living standards in monetary terms, but also drastic lifestyle changes due to the cash economy. Traditional leadership, decision-making processes, and kinship ties underpinning non-monetary resource management systems in these countries have diminished.

Widening of Gaps

Globalisation has led to income growth, accompanied by deepening income inequality. Global inequality generally includes three types—across countries, across the world's people, and across people within countries (Box 2). Such unequal distribution of wealth often becomes a strong driving force towards increased poverty as can be observed in many developing countries in the region. Some of the region-specific factors behind this income divergence in Asia and the Pacific are i) relatively slow economic growth in rural areas of the populous Asian countries, when compared with the rich industrialised countries, and ii) faster progress in urban China and India relative to rural China and India¹⁶.

According to key indicators related to the 8 MDGs, which include targets in the fields of income poverty, education, health and so forth, overall progress towards the goals can be observed in the region. Urban-rural divides, however, persist due to skewed development. Urban-rural poverty gaps also relate to uneven progress in public services such as education and health care. Rural areas, particularly in South Asia, have the largest rural-urban disparity in education. In general, South Asia is struggling on more of the MDGs than the other subregions.

Box 2: Widening Gaps Within Countries - China

China is among the few countries generally performing well on the indicators for the Millennium Development Goals. Yet, in recent decades, China has shown large disparities in economic and social outcomes between coastal and inland regions—a trend that also reflects cleavages between urban and rural areas. Coastal areas have consistently experienced the fastest economic growth in the last two decades, with per capita incomes increasing by 11% per annum between 1978 and 1998. Ignoring inflation, annual per capita incomes of \$100 in 1978, would have jumped to \$800 just 20 years later.

In 1999, China's three richest metropolises—Shanghai, Beijing, and Tianjin—stood at the top of the human development index (HDI) ranking. Those at the bottom were all Western provinces. Moreover, the poorest provinces have the highest inequality.

Source: UNDP, 2003. Human Development Report 2003: 62

Energy Sources and Availability

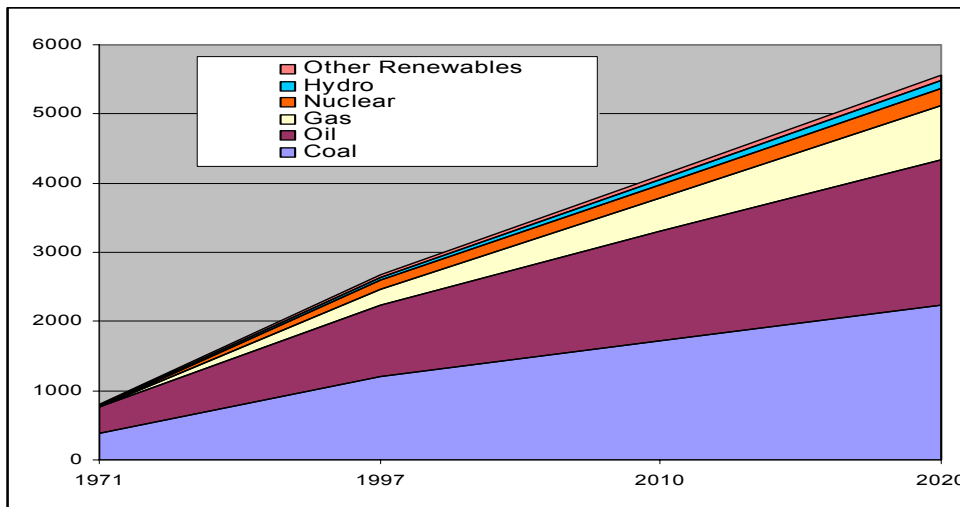
The role of energy is central to social and economic development and is an important dimension of poverty alleviation. As many as two billion people or almost one third of the world's population have no access to modern energy services. A majority of these people live in the Asia-Pacific region (UN-ESCAP: 2001)¹⁷. Providing access to modern energy services to people in rural areas as well as the urban poor is a major challenge faced by the region. As a result of economic growth, the increased population and rising standards of living, energy demand and consumption have significantly increased throughout Asia and the Pacific. Total primary energy supply for the Asia-Pacific region is projected to more than double to 5,569 Mtoe (million tonnes of oil equivalent) in 2020, up from 2,671 Mtoe in 1997¹⁸. Meeting the future energy demand and consumption without significantly changing current electricity generation technologies would have major environmental implications, especially in relation to climate change and global warming, not to mention the huge investment requirements.

¹⁶ United Nations Development Programme (UNDP), 2003. Human Development Report 2003.

¹⁷ UN-ESCAP, 2001. "Bali Declaration on Asia-Pacific Perspectives on Energy and Sustainable Development – Sustainable Energy Development Action Programme, Strategies and Implementation Modalities for the Asian and Pacific Region, 2001-2005", New York: United Nations.

¹⁸ Data aggregated for the Asia-Pacific region from International Energy Association regional energy trends under the reference scenario. International Energy Agency, World Energy Outlook 2000. Asia-Pacific region here includes OECD Pacific, China, East Asia, South Asia and India in the IEA regional classification.

Figure 9: Total Primary Energy Supply (Mtoe) in Asia-Pacific Countries 1971-2020



Source: Aggregation from International Energy Agency (IEA), World Energy Outlook 2000, and IEA regional energy trends under the reference scenario.

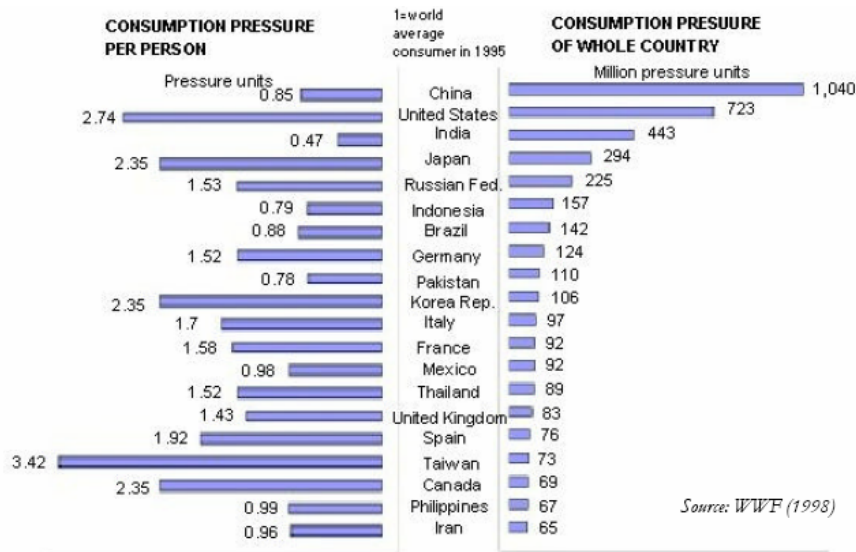
Production and Consumption

Production and consumption patterns and volumes in Asia-Pacific have significantly changed in recent years. Due to rapid industrialisation, economic development, and changing lifestyles, the level of production and consumption in the Asia-Pacific region has rapidly increased. However, the benefits from such economic growth in the region have been based on heavy exploitation of natural resources not only from within the region but also from the whole world, in addition to mostly domestic human resources. Such resource-intensive economic growth has put excessive strain on the regional resource base and the environment. Unfortunately, production and consumption patterns in the region have not learned from experience elsewhere and leapfrogged to a sustainable model, but have followed the old and unsustainable patterns of Western societies. Many countries still believe that the model of growing first and cleaning up later is the best strategy. Therefore, Asia-Pacific is now facing similar problems to solve as the West did during its early stages of industrialisation, which include intensive energy consumption and its associated environmental and health problems, waste generation from heavy use of materials, land degradation, and disease caused by pollution from chemicals and hazardous substances. As well as cleaning up the current degradation problems, the search for a sustainable production and consumption pattern is a critically important challenge for the region.

The Asia-Pacific region reveals a high level of consumption resulting from increasing consumption pressure per person. Figure 10 shows national consumption pressure as a whole and per capita, based on analysis of resource consumption and pollution data to quantify the burden on natural ecosystems by consumers¹⁹. Japan, Republic of Korea, and Taiwan Province of China, show more than double the pressure per capita of the world average, while China shows significantly high pressure at the country level. Economic growth since these estimates were made in 1995 will have increased consumption pressure significantly.

¹⁹ Rachagan, S.S. and Kanniah, R., 2001. Workshop on Sustainable Consumption for Asia Pacific: Background paper. Kuala Lumpur, Malaysia, 13-14 August 2001.

Figure 10: Consumption Pressure - A Measure of the Burden Placed on the Environment (1995)



Source: World Wide Fund for Nature, 1998. Living Planet Report 1998, WWF, Geneva

Several social and economic factors are drivers of the high level of consumption in the Asia-Pacific region. Industrialisation, along with economic liberalisation, brought rapid economic growth in many parts of the region, especially in developing countries and countries in economic transition. Such economic growth contributed to income growth and improvement of living standards. Rapid urbanisation and increasing incomes lead to changes in lifestyles, which are becoming urban-centric and modernised. This change is accelerated by globalisation of culture, communications, and consumerism. Globalisation brought: (i) technological revolutions in transport, communications, and information, which transformed economic activities and communication patterns to become truly global in scale; and (ii) exposure to external forces like liberalisation and reliance on global marketplace²⁰. Increasingly, products and services from all corners of the globe are being promoted in this region. Millions of consumers, even in developing countries, especially the middle-class and younger generation²¹, are attracted to global products and brand name goods, changing their consumption patterns to follow those in developed countries.

Despite the rapid economic growth in the region, many of the economic benefits continue to exclude the poor, leading to a disparity of access to consumption. In addition, due to the rapid consumption of resources accompanied by such economic growth, the region is likely to become more degraded, less forested, more polluted, and less ecologically diverse in future²². Paradoxically, the region, endowed with abundant natural as well as human resources, is still unable to provide a decent living for the majority of its inhabitants. The rich enjoy a high level of consumption, which is unsustainable and contributes to global warming, acid rain, and toxic discharges. The poor bear the brunt of this consumption through loss of life and risks to their health from pollution and toxic materials, and in loss of livelihoods from soil degradation, desertification, deforestation, and biodiversity loss.

Lessons from country experiences in demand-side management, eco-labelling, and product policy would be helpful for the region to tackle the problems of unsustainable production and consumption patterns. Yet still, efforts to achieve sustainable production and consumption in the region remain low. There is a long journey ahead before the region will enjoy a resource efficient society, devoted to reuse, recycling, and a service economy.

²⁰ Rachagan, S.S. and Kanniah, R., 2001. Workshop on Sustainable Consumption for Asia Pacific: Background paper. Kuala Lumpur, Malaysia, 13-14 August 2001.

²¹ *ibid.*

²² UNEP, 1999. Global Environmental Outlook 2000, Earthscan, London

C. Major Social Concerns

Poverty

Poverty is one of the biggest challenges faced in Asia and the Pacific. The first and most important of the MDGs is to halve extreme poverty and hunger by 2015. Poverty is a complex phenomenon and its incidence is determined by many factors, including the level of per capita income, distribution of assets and income, quality of governance, policies, and institutions related to education, health and other aspects of human development. However, high population pressure leading to low per capita income is considered as one of the major causes of poverty in the region²³.

As a result of significant efforts at national and international levels, the absolute poverty rate, or the percentage of the population living below US\$1 per day, decreased in the whole region between 1990 and 1999²⁴. In 1990, about 32% of the people were living on less than a \$1 a day. This figure fell to 22% by 2000²⁵, although approximately 1 billion people in the region still lived in absolute poverty (c.f. Africa (50%) and Latin America (12%)²⁶). In addition to regional differences, significant differences also exist between countries and within each country.

Subregional differences in the state of poverty deserve particular attention. South Asia remains one of the world's poorest regions as 40% of the population lives in absolute poverty, i.e., over 30% in India and nearly 50% in Bangladesh²⁷, a total of 488 million people in 1999²⁸. Although the poverty rate for South Asia has shown drastic improvement since the 1990s,²⁹ and is projected to achieve the target of the MDGs (reduction to 22% by 2015³⁰), the subregion still has more than one-third of its population lacking access to improved sanitation, and mortality rates affecting almost one-tenth of children below the age of five and one-fifth of children by the end of primary school. Poverty rates in Northeast and Southeast Asia have dropped drastically, as the economy grew by almost 6% per year in the 1990s, while poverty fell by about 15%. However, many countries in Central Asia are facing difficulties in poverty reduction associated with the economic transition to market economies during the 1990s, indicating a drastic increase in the poverty rate from 5% to 20%³¹.

While the rural poor tend to have more limited access to basic services such as education and health care, the urban poor also suffer from severe access problems. Unlike the rural poor, the urban poor cannot grow their own food in cities and rely upon the cash economy for survival. Therefore, due to financial, as well as technical and physical barriers, many cannot access even the most essential services such as safe water and sanitation systems. In addition, urban jobs tend to require high levels of education, but most of the urban poor cannot afford higher education. Poverty in many countries of the region is a result of social inequalities and institutional inertia. Urbanisation, the shift to a monetary economy, and rapid population growth without commensurate growth in employment opportunities further compound the problem.

Nutrition and Health

Due to economic growth fuelled by globalisation, standards of health and nutrition have improved enormously in Asia and the Pacific. Despite such improvements, children's health, particularly in the rural areas, is still relatively poor, as in the rest of the developing world. In South Asia (Figure 11), 100 out of every 1,000 children die before reaching five years of age, mainly due to infectious and deficiency diseases. The figure is lower than that of Africa but higher than all other regions in the world³².

Hunger is one of the most obvious manifestations of poverty. The Asia-Pacific region is home to just under two-thirds of the developing world's undernourished people. More than 500 million people—10 times the

²³ UN-ESCAP, undated. Population and Poverty in Asia Pacific in Population and Development: Selected Issues <http://www.unescap.org/esid/psis/population/popseries/apss161/apss161chap1.pdf> (21/7/4)

²⁴ UNDP, 2003. Human Development Report 2003

²⁵ Linden van der Geert, 2004. Poverty Remains Major Challenge in Asia-Pacific. http://www.chinadaily.com.cn/English/do/2004-05/09/content_328939.htm (13/7/2004)

²⁶ UN-ESCAP, Population Data Sheet 2003 (http://www.unescap.org/pop/data_sheet/2003/index.asp)

²⁷ ADB, 2001. Beyond Boundaries: Extending Services to the Urban Poor, ADB, Manila.

²⁸ Development Alternatives, South Asian Priority Paper for UNEP, 2003: 6

²⁹ World Bank, World Development Report 2002/2003

³⁰ UNDP, 2003. Human Development Report 2003

³¹ *ibid.*

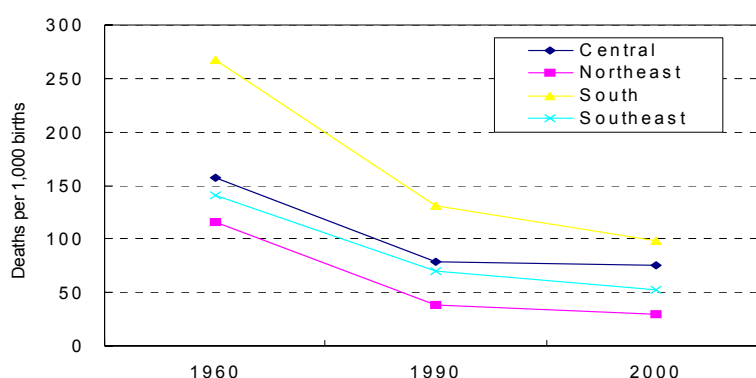
³² *ibid.*

population of Republic of Korea—still do not have enough food to meet basic nutritional requirements³³.

Over 84 million urban dwellers in the developing member countries of the Asian Development Bank (ADB) are without improved water supply, and 255 million are without improved sanitation. About one third of the urban poor do not have access to improved water supplies and most do not have access to adequate sanitation³⁴.

Poor environmental conditions lead to poor health, which aggravates poverty and often results in lower educational levels, as well as loss of income owing to sickness, disease, and increased spending on health care, which may in turn deplete household savings³⁵.

Figure 11: Mortality Rate Under Five Years Old By Subregion



Source: UNICEF, 2002. State of the World's Children.

Note: China not inclusive of Hong Kong, China

As economic transformation continues, so changes the health profile in the region. Chronic, non-communicable diseases and conditions such as obesity, hypertension, diabetes, and heart disease account for a rising share of deaths. In many parts of the region, the diseases of poverty and affluence already coexist. In addition, as more women work outside the family for cash income and traditional extended family ties are weakened, the responsibility to care for the elderly will increasingly shift from in-family support to dependence on public or commercial services.

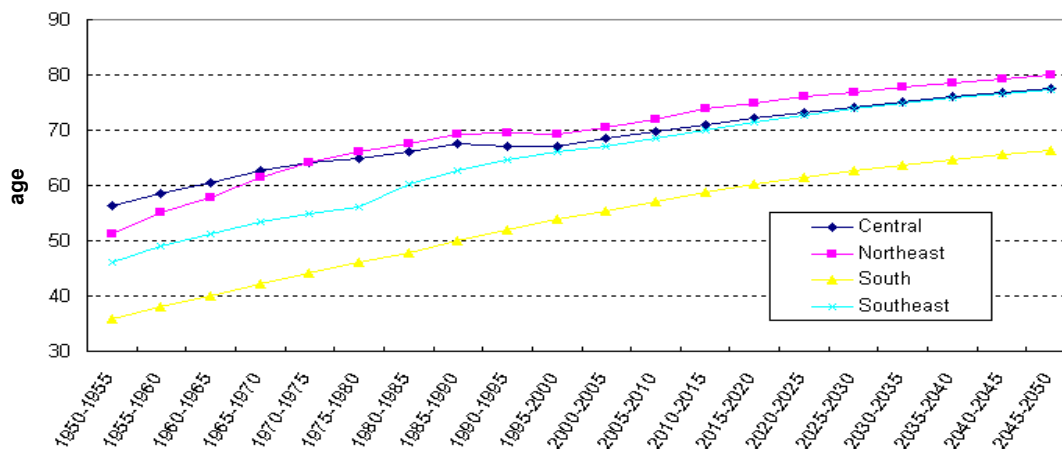
Northeast Asia has seen sustained and rapid progress, while South Asia now lags behind in terms of human development and poverty. Life expectancy at birth has improved throughout Asia and the Pacific (Figure 12). Adult literacy improved from 33 to 55% in South Asia between 1972 and 1999, and from 55 to 84% in Northeast and Southeast Asia during the same period.

³³ Linden van der Geert, 2004. Poverty Remains Major Challenge in Asia-Pacific
http://www.chinadaily.com.cn/English/do/2004-05/09/content_328939.htm

³⁴ ADB, 2002. Beyond Boundaries: Extending Services to the Urban Poor, ADB, Manila

³⁵ World Bank, undated. Urban Development. <http://www.worldbank.org/urban/poverty/environment.html> (20/7/2004)

Figure 12: Life Expectancy by Subregion



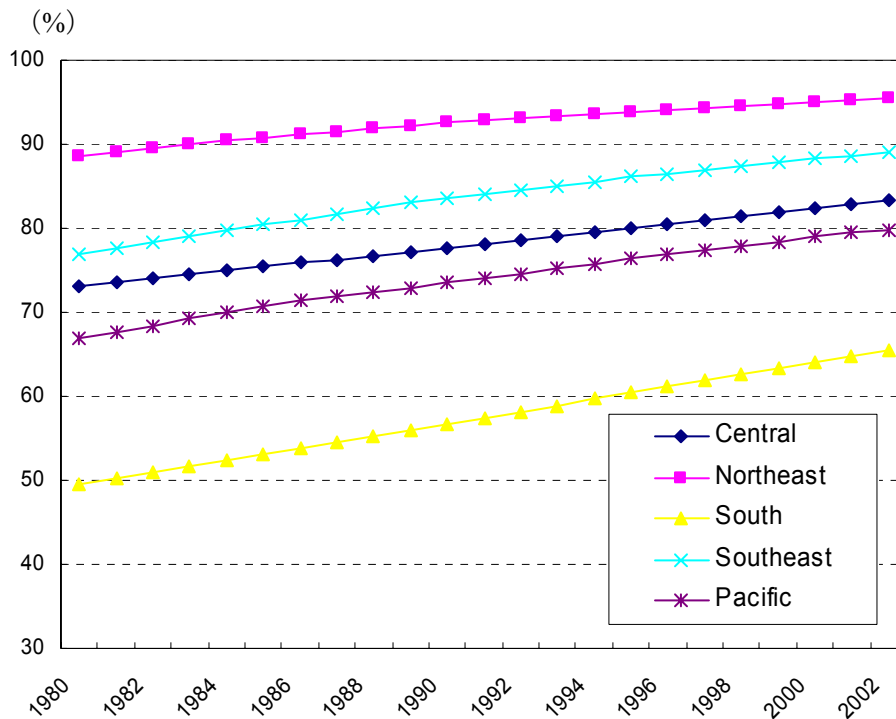
Source: United Nations Population Division, World Population 1950-2050 (1998 Revision)

Education

Economic improvement in a number of countries has brought about a remarkable increase in access to primary education in Asia and the Pacific during the past three decades. Mitigation of certain social discriminations may also be a contributing factor to this increase. A constantly improving literacy rate has been observed in all subregions (Figure 13). More than 95% of children between 6 and 11 years of age now attend school, including those in the three most populous countries of China, India, and Indonesia³⁶. The subregion with the highest adult literacy rate is Northeast Asia, where 95% of adults were literate in 2002. The literacy rate in South Asia is lower than that of the other subregions but has improved during the last two decades with a high growth rate of 1.3% per annum.

³⁶ UNDP, Human Development Report 2003

Figure 13: Literacy Rate of Adults by Subregion



Source: United Nations Population Division, World Population 1950-2050 (The 1998 Revision), United Nations Population Division

Note: Northeast does not include Japan, DPR Korea due to lack of data

South does not include Afghanistan and Bhutan due to lack of data

Southeast does not include Lao People's Democratic Republic due to lack of data

Male school attendance is often higher than female school attendance, mainly due to cultural discrimination within the education system, as well as throughout society. In South Asia, school enrolment rates for girls are behind those of boys, which results in the lowest adult literacy rate in the region, although this rate has improved drastically during the last two decades. In addition, expanding access to education for rural and poor people is a major challenge to increasing literacy.

Gender Discrimination

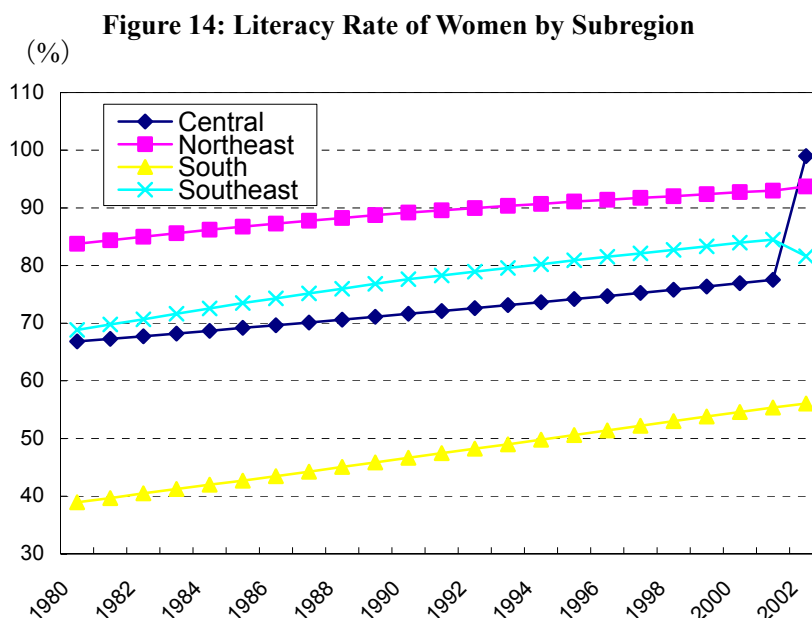
In the Asia-Pacific region, gender discrimination takes different forms—ranging from denial of access to education and health care, longer working hours at lower pay, nutritional deprivation, and discrimination in terms of the right of access to land, credit, and employment, as well as physical and psychological abuse. One clear indicator of the gender crisis in the region is the great difference in mortality rates between men and women. Despite their biological advantage, women in South and Southeast Asia show higher mortality rates than those of other subregions³⁷. This is mainly due to cultural and religious reasons which result in discrimination regarding access to food and health services.

Striving for gender equality is key to the achievement of the MDGs, as women have an essential role to play in the development of sustainable and ecologically sound consumption and production patterns and approaches to natural resources management. It is widely recognised that women play a critical role not only in improving health, reducing poverty and mitigating hunger, expanding education and lowering child mortality rates at different levels, but also in managing the diversity of the ecosystem as well as in making critical impacts on production and consumption patterns of society³⁸.

³⁷ UNDP, 2003. Human Development Report 2003

³⁸ Secretary-General's Note for the Multi-Stakeholder Dialogue Segment of the Second Preparatory Committee Addendum No. 1: Dialogue Paper by Women, Commission on Sustainable Development acting as The preparatory committee for the World Summit on Sustainable Development, First Substantive Session, 28 January – 8 February 2002.

As a result of various efforts at national and regional levels, discrimination against women has improved in some countries such as Bangladesh and Pakistan, yet there has been little improvement in India—and some deterioration in China³⁹. The gender gap in education is a major cause of gender discrimination. The literacy rate of women in South Asia is lower than in the other subregions, at only 55% in 2002 (Figure 14). In many developing countries, gender gaps in primary and secondary education are severe and require urgent improvement.



Source: UNESCO, World Education Indicators

Note: Northeast Asia does not include Japan, Democratic Republic of Korea due to lack of data
 South Asia does not include Afghanistan and Bhutan due to lack of data
 Southeast Asia does not include Lao People's Democratic Republic due to lack of data

Social Cohesion and Conflicts

Social cohesion can be described as the glue that bonds society together, promoting harmony, a sense of community, and a degree of commitment to common values. Beyond the social relations that bridge ethnic and religious groups, vertical linkages in which state and market institutions interact with communities and peoples can further cement the cohesiveness of a society, if they are inclusive, transparent, and accountable.⁴⁰

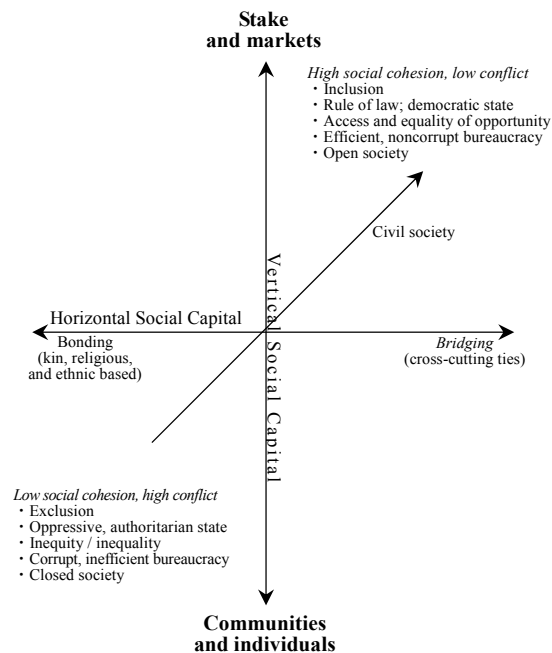
The interplay of kin and communal bonding, and the bridging of social relations (horizontal social capital) with democratic and authoritarian governance (vertical social capital) shape cross-cutting social relations and social cohesion—the bedrock for managing conflict. The greater the degree to which vertical social capital (i.e., the responsiveness of the state to its citizenry) and horizontal social capital (cross-cutting, networked relations among diverse communal groups) intersect, the more cohesive the society will be. It will also be more likely to possess the inclusive mechanisms necessary for mediating and preventing conflict before it turns violent (Figure 15). The weaker is social cohesion, the weaker are the reinforcing channels of socialisation (value formation) and social control (compliance mechanisms). Weak societal cohesion increases the risk of social disorganisation, fragmentation, and exclusion and has the potential to end in violent conflict. The emergence and growth of civil society (i.e., cross-cutting social relations (or associations) focused on issues or causes)—as key mediating agents between communal groups, governments, and markets—is central to a nation's capacity to manage social and economic transformation and to mediate conflict⁴¹.

³⁹ UNDP, 2003. Human Development Report 2003

⁴⁰ The World Bank, 1999. "Social Cohesion and Conflict Prevention in Asia - *Managing Diversity through Development*", June 1999

⁴¹ *ibid.*

Figure 15: Social Cohesion: Integration of Vertical Linking and Horizontal Bridging Social Capital



Source: Colletta, Nat J., and Michelle L. Cullen., 2000. *Violent Conflict and the Transformation of Social Capital: Lessons from Cambodia, Rwanda, Guatemala, and Somalia*, World Bank.

Poverty, social exclusion and inequality are threats to social cohesion. Societies aiming at achieving social cohesion needs to address these fundamental issues. Concern about social cohesion has highlighted the multi-dimensional nature of poverty. Welfare of the society can no longer solely be measured in terms of per capita GDP. Growth may be a necessary condition for development but it is not a sufficient condition⁴². Only when participation of all in economic and social life is achieved can social cohesion be attained.

Social cohesion and conflict are often seen as polar opposites. Conflict, in this light, transforms into increasing levels of violence, as the social bonds in a society are fragmented, and state and market linkages become exclusive in nature, blatantly favouring winners over losers in the society. But a cohesive society is characterised by far more than the absence of conflict, whether latent or overt. A functioning, efficient, and transparent state; respect for human rights and justice; a socio-economic system based on distributional equity; and high levels of social capital, especially social capital that is associational in nature and cuts across traditional societal cleavages—these are fundamental characteristics of a cohesive society. The presence of such characteristics is manifested in various forms of conflict mediation, be it the justice system or an inclusive education system. Even in societies with these ideal characteristics, conflict will occur periodically. However, it is likely to be more frequent, deeper, more violent, and more damaging in societies that lack or lose these characteristics and that operate without such institutional capacity to mediate conflict and manage diversity. Conversely, conflict is more effectively managed when social cohesion is high. If conflicts are more likely to occur, and the consequences are likely to be more deleterious in societies that lack social cohesion, it is also true that post-conflict reconstruction and the establishment of lasting peace require the building or rebuilding of social cohesion⁴³.

Promotion of social cohesion, and eventually the construction of a peaceful society, is essential in achieving sustainable development. Physical conflict destroys not only human lives and built assets, but also damages the natural environment, upon which local people depend (Box 3). Therefore, effective ways to manage and

⁴² European Union, undated, *Social Cohesion in the EU-Latin America/Caribbean strategic partnership* http://europa.eu.int/comm/external_relations/la/sc/sc_en/01_what_en.htm (21/7/4)

⁴³ The World Bank, 1999. "Social Cohesion and Conflict Prevention in Asia *Managing Diversity through Development*", June 1999

prevent violent conflict have to be explored. In this respect, early warning systems and commensurate early action are considered essential. More importantly, it points to the need to deal more urgently and effectively with the underlying causes of marginalisation, exclusion, and violent conflict. Conflicts have often been exacerbated by deficiencies in governance, corrupt and unresponsive political and bureaucratic elites, lack of power sharing among competing groups, insensitivity within the business and private sector regarding matters other than the pursuit of profits, and inadequate participation by the population⁴⁴.

The state has a fundamental role to play in guaranteeing a degree of social cohesion. While the state cannot ignore the need for macro-economic stability and sound public finances, it can make the tax system fairer and more progressive. It can change the way public money is spent to achieve greater redistribution and repair holes in the social fabric (i.e., exclusion). It can also promote social cohesion by focusing on delivering higher levels of social protection for all⁴⁵.

Box 3: Conflicts and the Environment

Armed conflicts, in addition to exacerbating environmental degradation and increasing human vulnerability, also damage invaluable environmental resources, especially wildlife and biodiversity. Armed conflict not only contributes to the degradation of the environment, but also contributes to the breakdown of legal and institutional frameworks, which are critical to environmental management. It also forecloses livelihood options for millions of people who are forcibly displaced to relatively safe areas but which have more limited livelihood options. Large communities may be forced to survive on food handouts or to overexploit their immediate environment to survive. This becomes a vicious circle, where the poor overexploit their resources, limiting the environment's ability to recover.

In response to the growing concern about post-conflict reconstruction in Afghanistan and Iraq, UNEP conducted studies on environmental conditions in those countries to offer a preliminary assessment of the main environmental threats facing the country and recommended actions for immediate relief and long-term recovery. The results highlighted the need for urgent measures to address humanitarian issues. Priorities included restoring the water supply and sanitation systems, cleaning-up possible pollution 'hot spots' and cleaning-up waste sites to reduce the risk of disease epidemics from accumulated municipal and medical wastes. Another priority activity was to conduct a scientific assessment of sites struck with weapons containing depleted uranium. UNEP has recommended that guidelines be distributed immediately to military and civilian personnel, and to the general public, on how to minimise the risk of accidental exposure to depleted uranium.

Source: UNEP, 2002. Africa Environment Outlook – Past, Present and Future Perspectives
UNEP, 2004. Conflict and the Environment in West Asia (Iraq, Kuwait and the region),
<http://www.unep.org/Documents/Default.asp?DocumentID=307>

Corruption

Sensitive political decisions are often influenced by the power of money. The consequent distortion in decision-making is widespread in the region. Bribes and rebates have become common practice among cash-strapped government officials. Corruption is so prevalent that businesses and civil society groups in both developed and developing countries are also not free of it. According to the corruption perception index (CPI), some countries in the region are high on the global list⁴⁶.

Corruption impedes sustainable development, demoralising fair and efficient economic transactions, undermining governmental legitimacy, threatening political stability, and jeopardising socio-economic

⁴⁴ The World Bank, 1999. "Social Cohesion and Conflict Prevention in Asia *Managing Diversity through Development*", June 1999

⁴⁵ European Union, undated, Social Cohesion in the EU-Latin America/Caribbean strategic partnership
http://europa.eu.int/comm/external_relations/la/sc/sc_en/01_what_en.htm (21/7/4)

⁴⁶ Transparency International Corruption Perceptions Index 2003
(http://www.transparency.org/pressreleases_archive/2003/2003.10.07.cpi.en.html)

development in many countries. Therefore, it is deemed essential to address corruption in promoting sustainable development.

Many observers consider corruption as a major cause of the Asian financial crisis, and a growing body of empirical evidence indicates that corruption—the use of public or private office for personal gain—has strong negative impacts on economic and social growth⁴⁷. Corruption has risen to the top of the development agenda in Asia and the Pacific. According to various studies, corruption has added 20-100% to the cost of procuring government goods and services in several countries in the region⁴⁸. Indeed, widespread corruption threatens political stability, undermines the legitimacy of governments, and jeopardises sustainable development in the region.

In view of the serious nature of this problem and the need to unite internationally to fight corruption, the Anti-Corruption Initiative for Asia and the Pacific was launched in 2000 under the auspices of ADB and the Organisation for Economic Co-operation and Development (OECD), with participation of 23 countries of the region. The Action Plan, the Initiative's main instrument, defines the objectives in building sustainable legal and institutional frameworks to fight corruption, as well as the approach to put these goals into practice. It consists of three pillars: (i) developing effective and transparent systems for public service, (ii) strengthening anti-bribery actions and promoting integrity in business operations, and (iii) supporting active public involvement. As the first implementation cycle has ended at the end of 2003, most countries have accomplished the reform projects they had planned, and have assessed their implementation.

In October 2003, the United Nations developed the Convention Against Corruption. This is the first United Nations treaty to comprehensively prohibit corruption not only amongst government officials but also civilians. The Convention contains a wide range of provisions that will strengthen international efforts to fight corruption and complement ongoing existing international initiatives in the G-8, OECD, OAS (Organisation of American States), and other multilateral forums. It contributes to a number of general areas relating to a government's efforts not only to deal with corruption in both developed and developing countries, but also with money-laundering.

D. Technological Development

Technological Innovation

Technological innovation has been the major engine of economic and social change throughout human history. With the emergence of new technologies such as ICT, we may be in the midst of a “New Industrial Revolution.” Asia and the Pacific have not been isolated from this rapid technological change but actually play an increasingly important role in the transformation.

During the last half of the 20th century, the total number of scientists and technicians grew by 15 times, with an average annual increase of 6%; three times as high as population growth⁴⁹. According to OECD⁵⁰, patent data show a surge of innovation, and investment in ICT grew twice as fast as GDP in OECD countries between 1987 and 1995.

Current technological innovation is transforming the world into a knowledge-based arena, in which technologies play an even more crucial role. In most developed countries, heavy and chemical industries, once the powerhouse of economic growth, have declined, and the so-called high-tech industries (computers, electronics, pharmaceuticals, and the service sectors, including finance and communications) are surging. The major technological innovations underpinning this economic transformation are ICT, biotechnology, nanotechnology, and new energy technology.

In an attempt to catch up with the rapid development of new technologies, the 1980s saw countries such as Republic of Korea, China, and India, and a few ASEAN countries transform their national technology support institutions to promote effective commercialisation of their research results. Private-public partnerships for technology development and transfer have expanded significantly, and partnership

⁴⁷ ADB, 1998. Annual Report 1998: 26

⁴⁸ *ibid*

⁴⁹ Hammond, Allan, 1998. Which World? Scenario for the 21st Century – Global Destinies, Regional Choices. Island Press

⁵⁰ OECD, 2001. “Technological Change”, *OECD Environment Outlook*.

agreements among private companies have also increased. Notable examples include a Chinese initiative in which several universities (e.g., Beijing University) set up private enterprises to commercialise their research outcomes, and the establishment of the Centre for Research and Development Commercialisation in Republic of Korea in the 1980s.

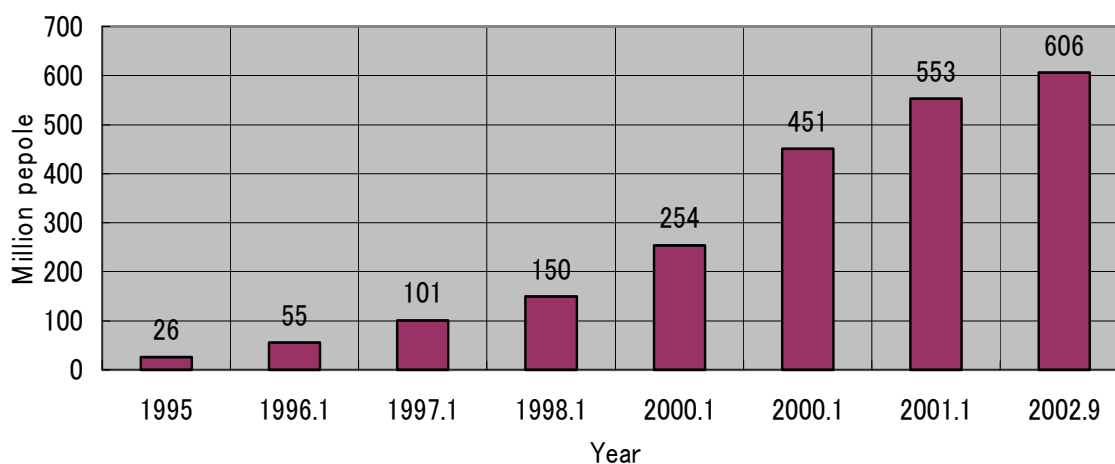
As with old and existing technologies, new technologies can have both positive and negative effects on the environment. For example, ICTs have positive environmental impacts such as reducing the energy consumption, pollution and noise associated with transportation, but also generate negative impacts, such as increase of waste due to the short lifecycle of computers, which sometimes is difficult to handle in developing countries. The risks of introduction of genetically modified (GM) crops may also be significant. This implies a need for appropriate technology policies to internalise the potential environmental costs associated with new technologies.

Information and Communications Technologies

ICTs encompass computers, multimedia devices, and networking technologies. With the expansion of the Internet, spread of mobile phones, and emergence of the global media, regional lifestyles have experienced dramatic changes. ICTs have dramatically improved the productivity of the service sector. Between 1985 and 1997, around two-thirds of GDP growth in the business sector came from services (e.g., transport, telecommunications, wholesale, retail, trade, and finance) in OECD countries⁵¹.

The influence of ICTs is also demonstrable in the Asia-Pacific region (Figure 16). Worldwide Internet use increased from 26 million to 606 million users between 1995 and 2002. By region, Asia and the Pacific accounted for 30.9% of the world total, while the European region accounted for 31.5% and the North American region 30.2%. By country in the region, Japan accounted for 9.7%, followed by China, Republic of Korea, Australia, and Taiwan Province of China (6.7, 4.0, 1.57, and 1.43% respectively)⁵².

Figure 16: Number of Internet Users in the World



Source: eTForecasts Press Releases, December 3, 2002 <<http://www.efforecasts.com/pr/pr1202.htm>>

Several Asian countries have become world production centres of ICT devices. Republic of Korea and Taiwan Province of China, together with ASEAN and China, are now among the top producers of ICs, computers, monitors, and other devices. Most of these products are now produced on a sub-contract basis, but competitive original brands are also appearing. India is now the leading exporter of computer software. The Indian software industry grew an average of 60% annually between 1992 and 2000⁵³. It employs 160,000 professionals and earned \$6.3 billion in 2000-2001, of which \$4 billion was exported.

⁵¹ OECD, "Technological Change", *OECD Environment Outlook*, 2001.

⁵² eTForecasts Press Releases, "USA is #1 in Internet Users with 160M," December 3, 2002 <<http://www.efforecasts.com/pr/pr1202.htm>>

⁵³ National Association of Software & Service Companies (Nasscom, India) <http://www.nasscom.org/default.asp>

On the other hand, ICTs also have negative impacts on the environment. The recent global dialogue on the promotion of ICT, including, in particular, the preparatory process for the World Summit on the Information Society, Geneva 2003 – Tunis 2005⁵⁴, focussed on the importance of actions to reduce negative environmental impacts to foster sustainable development and dissemination of ICT. Highlighting, among other issues, possible problematic increases of energy and material consumption in the use of ICTs as well as solid and hazardous waste problems, the proposed actions include: i) eliminating unnecessary standby losses of ICT equipment and ICT systems; ii) increasing the useful life of ICT equipment, in particular by prolonging the period between updates and new versions of operating systems and applications; and iii) building up a system of local collecting points and central disposal/recycling facilities for used batteries and electronic components.

Biotechnology

Biotechnology is being applied in such fields as pharmaceuticals, agriculture, waste treatment and remediation of contaminated land. Research is also being undertaken on gene therapy in medicine. The advocates of genetic modification believe GM crops can contribute to solving the rapidly increasing demand for food in the region. On the other hand, introduction of GM crops has raised serious concerns on their risks in terms of the environment and human health problems, which need to be more closely looked into generally as well as on a case-by-case basis. Among these potential effects are genetic contamination of non-target plants and non-plant species; the evolution of “super-weeds”; the erosion of biodiversity and effects on human health through the food chain. There is increased awareness of the need for countries to establish effective biosafety measures and systems. The coming into force of the Cartagena Biosafety Protocol under the Convention on Biological Diversity provides an opportunity for developing multilateral and national safeguard measures.

Agricultural productivity improved significantly in the latter half of the 20th century. Productivity doubled every 35 years, with average annual increases of 2%⁵⁵. Accumulation of crop improvements brought about by traditional technology changes, such as the development of new varieties, improvement of plant techniques, and so on may be more acceptable to consumers, given the perceived risks of GM crops. There is also a significant interest among farmers, citizen groups and consumers in the value of and potential and need for developing and spreading sustainable agriculture techniques, including organic farming. Initiatives to promote sustainable agriculture should be encouraged.

International collaboration among private companies in the biotechnology sector has been growing in Asia. For example, a large Malaysian agribusiness firm acquired a rubber research institute in the United Kingdom in the 1980s and has since developed, in partnership with a United States firm, into a biotechnology corporation specialising in genetic engineering of perennial plants⁵⁶. This indicates a potential advantage of locating the biotechnology sector in developing countries, because, among other things, (i) the industry is labour intensive, and (ii) it is conveniently close to natural resources on which to experiment and work. However, as mentioned in the preceding paragraph, there are also several potential risks to the environment and human health. These risks may be higher if the application of genetic engineering takes place in developing countries that do not have adequate risk assessment methods and other biosafety measures and regulations in place.

Energy Technology

In light of growing concerns over climate change, countries have devoted much effort to increasing energy supplies in a way that minimises environmental impacts, while at the same time managing energy demand. Countries in Asia and the Pacific have been playing a leading role in energy efficiency technologies as well as the development of new and renewable energy technologies.

The potential for improving efficiency in the production, conversion, transmission, distribution, and usage of

⁵⁴ EPFL – Working Group on the Impact of ICT and the Environment, “Why and How the Environment has to be Taken into Account at The World Summit on the Information Society, Geneva 2003 – Tunis 2005,” WSIS/PC-2/CONTR/43-E, 18 December 2002.

⁵⁵ Hammond A., *op.cit.*

⁵⁶ Bischoff J., “Technological Conditions and Issues in Promoting Integration of Industrial Activities at the Regional and Global Levels: Prospects and Challenges of Globalisation and Liberalisation, Asian and Pacific Centre for Transfer of Technology.

energy as well as demand side management in the industry, household, commercial, transport, and agriculture sectors have been widely recognised. The United Nations Development Programme (UNDP), UNEP, ADB, UN-ESCAP, and other agencies are promoting projects to assist countries in the region to assess their energy-related emissions and to formulate strategies to mitigate them. For example, countries participating in the Asia Least-Cost Greenhouse Gas Abatement Strategy (ALGAS) project identified a number of mitigation options in the energy sector, most of which represented opportunities for improving energy efficiency.

The Asia-Pacific region has also been playing a leading role in the development of new energy technologies. For example, Japan has become the largest producer of photovoltaics, and was the first country to commercialise hybrid electric cars. It also has cutting-edge co-generation and fuel cell technologies. India is the only country with an independent Ministry of Non-Conventional Energy Sources (MNES) to promote renewable energy technologies. A variety of renewable technologies such as biogas, photovoltaic, wind, and water pumping have been developed, tested, and deployed. Amongst these, wind energy is particularly noteworthy. India is the fifth-largest generator of wind power in the world, the largest in the Asia-Pacific. Interest in renewable energy sources and energy efficiency has led to significant progress in technologies such as co-generation, fuel cells, wind energy, photovoltaics, hybrid engines for vehicles, and electric arc furnaces for steel making. Some of these technologies are now produced on a fully or nearly commercial basis.

The growth of new and renewable energy has been remarkable and is expected to increase rapidly. New and renewable energy (NRE) capacity is projected to increase almost eight-fold, from 5,249 megawatts (MW) in 1999 to 39,948 MW in 2020, a rate increase of 10.1% per annum. This would still only represent 1.2% of total energy capacity in 2020 (Asia-Pacific Energy Research Centre: 2002). Consequently, current and future energy policies need to focus on reducing primary energy consumption by improving efficiency in energy conversion, transportation, and use.

Cleaner Production Technology

Based on current patterns of unsustainable production and its consequent environmental impacts, and the high cost of end-of-pipeline treatments, “cleaner production” and “pollution prevention” have emerged as effective and efficient solutions to industrial pollution. In Asia and the Pacific, starting with various pilot projects and programmes, cleaner production technology has been gradually introduced and promoted. Japan, Australia, and Republic of Korea are playing leading roles in cleaner technology development and have developed environmentally sound technologies of energy saving, material reduction, and prevention of wasteful resource use. Particularly for heavy industries like mining and the metallurgical industry, cleaner production technology has contributed to lowering emissions throughout their production cycles.

Cleaner production technology is not only applied to improvement in production processes, but also to development of environmentally sound products. Examples include technologies which are more energy saving, less material intensive, less hazardous, or easier for recycling. In the Asia-Pacific region, demand for energy-saving products has steadily increased, especially where electricity prices are high and energy is heavily dependent on fossil fuels. Together with increased demands for environmentally sound products in domestic markets, international markets demand less toxic and hazardous products. European markets, in particular, have pressured manufacturers in the region to develop technology that makes their products greener and cleaner. Some manufacturers with a large international market share, especially in Japan and Republic of Korea, have initiated technology development emphasising change in product design. Nevertheless, further investment in technology development should be promoted to find alternatives to hazardous and toxic substances in products, to reduce material use, and to design products that are easily dismantled and recycled. Proactive companies and entrepreneurs will play key roles in spearheading such development towards sustainable and cleaner product development.

Development of recycling technology is still lagging in many countries in the Asia-Pacific region compared to more industrialised countries in Europe and North America. Apart from the secondary pollution from recycling operations, insufficient technological capacity of the recycling industry in the region results in a high volume of resource waste, low-quality recycled materials, and consequently, low demand for recycled materials and products. Recycling technology needs to be improved to optimise resource use in the region and to contribute to more environmentally sound product development.

Starting with the establishment of National Cleaner Production Centres in India and China, there have been a number of collaborative initiatives to promote cleaner production at all levels throughout Asia and the Pacific. One important initiative is the Asia-Pacific Roundtable for Cleaner Production (APRCP) created in 1998 by UNEP, ADB, and other regional and national agencies, with a mission to foster dialogue among industry, government, academia, and non-government organisations in the region to address pollution problems and solutions.

2. SIGNS OF ENVIRONMENTAL STRESS

The environment is one of the three pillars of sustainable development. Expansion of the economy and population over the last 40 years, supported largely by the region's rich natural environment, placed excessive stresses on the environment. The resulting severe environmental degradation has, in turn, become a clear obstacle to current and future economic and social development.

In Asia and the Pacific, the signs of environmental stress are most significant in areas such as freshwater resources, coastal and marine environments, air pollution, climate change, land degradation, forest loss, biodiversity and various types of chemical pollution. While these threats are significant at local and national levels, trans-boundary environmental problems also constitute a major challenge for the region. Such problems include the "haze" and "atmospheric brown clouds" problems in South Asia and Southeast Asia; acid deposition, and dust and sand storms (DSS) in Northeast Asia; pollution and environmental deterioration in the regional seas and international rivers; and trans-boundary movements of hazardous wastes. While usually treated as separate problems, in reality all of these stresses are related, and should be regarded as different facets of one common problem—loss of ecosystem services.

Degradation of Freshwater Resources

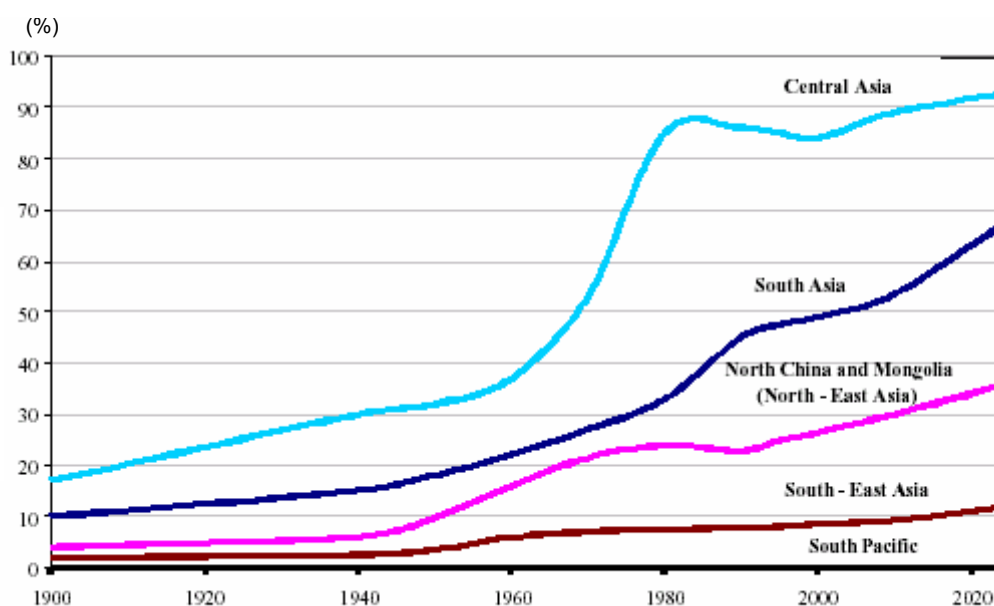
In the past 100 years, the volume of water used in the region increased more rapidly than in any other area of the world⁵⁷. Extensive development of freshwater resources to meet increasing demands has resulted in a significant imbalance between supply and demand, an imbalance that has already led to crippling shortages and depletion of reserves. Moreover, the scarcity of water has been accompanied by deterioration in the quality of available water due to pollution and environmental degradation.

Freshwater use is rapidly increasing in almost all countries of the region and is expected to continue to grow in the future, leading to critical shortages in some areas. There are several areas in the region that are under high water stress, including north China, the Aral Sea Basin in Central Asia, and a number of islands in the Pacific and Indian Oceans. Annual water withdrawal for agriculture (84%) is far more than that for industrial (10%) and domestic (6%) purposes. As illustrated in Figure 17, amongst the subregions, Central Asia will push the upper limits of withdrawals as a proportion of its total available water by the year 2020, whereas South Asia's withdrawal is projected to be about 70% of the total available⁵⁸.

⁵⁷ UNEP, 2002. Global Environmental Outlook 3

⁵⁸ UN-ESCAP and ADB, 2000. State of the Environment in Asia and the Pacific (SoE) 2000, United Nations, New York

Figure 17: Water Withdrawals against Water Resources (1900 - 2000)



Source: UN-ESCAP and ADB, SoE 2000

Freshwater resources are progressively polluted by wastewater from industries and households. The average level of suspended solids in the major rivers of the region has rapidly escalated to about 20 times the water quality standard recommended by OECD and the coliform bacteria count is as much as 50 times the permissible level recommended by the WHO⁵⁹. Contaminated water has affected human health. In the Pacific Islands, especially in some atoll communities, the use of polluted groundwater for drinking and cooking has led to health problems such as diarrhoea, hepatitis, and occasional outbreaks of typhoid and cholera.

Depletion of freshwater resources is a constraint on sustainable development in the region. Asia has the largest number of people without access to improved water supply and sanitation, and the lowest per capita availability of freshwater resources among the world's continents⁶⁰. To supplement scarce surface water resources, many countries in the region depend heavily on groundwater exploitation, but this also poses emerging problems of contamination, such as by arsenic and cadmium from natural geochemical sources.

Degradation of Marine and Coastal Environment

Expanding human activities are placing increasing pressures on coastal and marine ecosystems. These include overexploitation of fishery resources, land-based sources of pollution such as industrial and agricultural water discharge and inadequate waste disposal, and sea-based pollution such as oil spills and discharge of ballast water.

With the introduction of modern fishing techniques, the production of marine fisheries in the region increased by an average of 2.9% per year during the period 1975-1995⁶¹. Aquaculture production has also been growing in the region, four times as fast as landings from capture fisheries. By the early 1990s, traditional marine fish stocks were exploited fully in many subregions. Overexploitation of these resources has been a continuing threat to ecosystem integrity and functioning.

⁵⁹ ADB, 2001. Asian Development Outlook 2001

⁶⁰ Ministry of Environment in Japan, 2001. Report of Eco Asia Long-term Perspective Project Phase II

⁶¹ UNEP, 1999. Global Environment Outlook 2000. <<http://www.unep.org/geo>>, citing Food and Agricultural Organisation of the United Nations (FAO). 1997. Review of the State of World Fishery Resources: Marine Fisheries: FAO Fisheries Circular No. 920 FIRM/C920.

Box 4: Fishery Resources in the Northwest Pacific

The Northwest Pacific, including the marginal sea areas of the Sea of Okhotsk in the north and the northern South China Sea in the South, and the Yellow and Bohai Seas, is the second most productive fishery area in the world. Total catches in the Northwest Pacific have increased steadily since the 1950s, reaching a peak in 1988. The catches subsequently declined and, in 1994, the total reported capture fishery landings were 12 million tonnes, 4.7 million tonnes less than in 1988. Most of the decline resulted from the collapse of the two populations with the largest potential biomass: the Alaska pollock and the Japanese pilchard (or sardine).

Source: FAO, 1997. Review of the State of World Fishery Resources: Marine Fisheries: FAO Fisheries Circular No. 920 FIRM/C920.

In many parts of the region, major economic development is occurring in coastal zones, putting additional pressure on coastal ecosystems and resources. Coastal waters suffer from land-based sources of coastal and marine water pollution, such as direct discharge from rivers, increased surface run-off, and drainage from expanding port areas. Inland soil erosion has led to high sediment levels in coastal zones, especially in South Asia; about 1.6 million tonnes of sediment reach the Indian Ocean annually from rivers flowing from the Indian subcontinent⁶². Sea-based pollution—oil spills and other contaminants from ocean activities, such as the oil spill from the Russian tanker “Nakhodka” that occurred in the Sea of Japan in January 1997—has seriously damaged both the environment and socio-economic status of countries over a wide coastal area.

Mangrove clearance for shrimp aquaculture has emerged as a major environmental concern in South and Southeast Asia, with more than 40% of the world’s mangrove forest and the greatest diversity of mangrove species. About 60% of the mangroves in Asia and the Pacific have already been converted into aquaculture ponds. Aquaculture causes pathogenic contamination and discharges excessive nutrients to coastal and estuarine waters, and the development of shrimp farms causes salinisation of coastal lowlands. Remnant mangrove areas are negatively impacted by changes in the hydrological profiles of their surroundings.

The fragile and vulnerable coral reef ecosystems are under stress in many areas in the region, especially the non-oceanic coral reefs near shelves and coastal areas with high population densities. Most coral reefs in South Asia have been impacted negatively by coral bleaching and sea temperature warming due to global climate change threatens all reefs. Coastal coral reefs are affected negatively by changes in sedimentation associated with the degradation of mangrove and sea grass areas that function as sediment traps, reducing the quantity of sediment reaching the coral reefs.

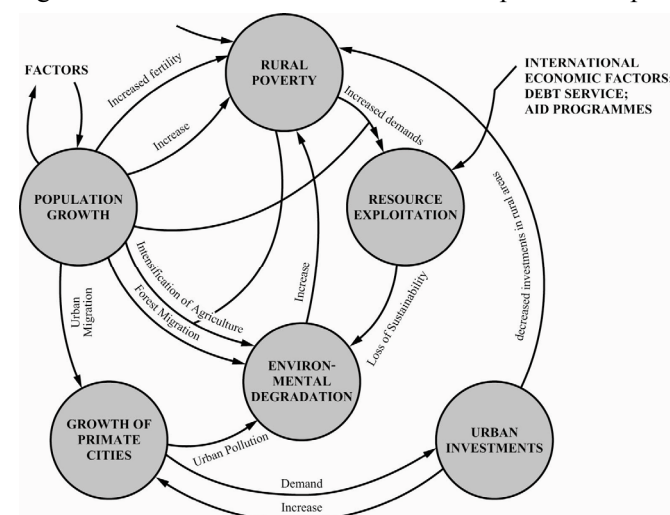
Pressures on the marine environment are often exacerbated by poverty, especially where coastal commons are the last resort for landless people. For example, in Cambodia, poor people have become increasingly dependent on marine resources for their livelihoods and as tourism sites, and significant beach pollution occurs in the vicinities of Sihanoukville and Kep—important tourist destinations.

⁶² UNEP, 2002. Global Environmental Outlook 3.

Box 5: Vicious Cycle of Poverty and Environmental Degradation in Developing Countries

Growing poverty could also lead to growing environmental degradation. While poor people are usually blamed for causing environmental degradation, they are seldom the creators of poverty themselves. Instead, they often have to bear the brunt of environmental degradation. Generally, the people who are wealthiest in lifestyles that are resource-intensive contribute most to resource depletion. However, in some cases poor people are also forced to deplete resources to survive and this degradation of the environment further impoverishes people and leads to what is commonly dubbed

the poverty-environment nexus. Under extreme circumstances people are forced to move to more ecologically fragile land /marginal lands or to cities in search of employment and better amenities.



Source: UN- ESCAP, ADB, 2000. State of Environment 2000, United Nations, New York

Urban Air Pollution

Air pollution has been one of the major environmental problems in Asia and the Pacific, especially in urban areas. The major factor in urban air pollution is burning of fossil fuels such as coal, oil, and natural gas. Fossil fuels are used in domestic heating, power generation, industrial processes, and motor vehicles. Urbanisation, industrialisation, and motorisation trends in major cities of the region, cause more fossil fuel consumption and increase air pollution levels.

The most common pollutants include sulphur dioxides (SO₂), particulate matter (PM), volatile organic compounds (VOCs), ozone (O₃), lead (Pb), carbon monoxide (CO), and nitrogen oxides (NO_x). As indicated in Table 4, ambient levels of PM₁₀ in Japan and Republic of Korea meet the air quality standards of the United States Environmental Protection Agency for health effects, but many other cities are still exposed to levels of PM₁₀ more than double these standards. In addition, some cities exceed the WHO standards for SO₂, although many have achieved a reduction in SO₂ using regulatory measures and installing pollution control equipment. China drastically reduced SO₂ emissions by 3.7 million tons, or 15.8%, between 1995 and 2000⁶³. However, ambient levels of SO₂ and NO₂ in Chongqing and Beijing are still high, exceeding the WHO standards (Table 4). Six of the world's 15 most polluted cities are in this region, including these two cities in China. It should be noted, however, that air pollution monitoring systems in most countries in the region are still weak, which has made cross-country comparison extremely difficult.

⁶³ State Environmental Protection Administration of China, 2000. Report on the State of the Environment in China 2000 (http://www.zhb.gov.cn/english/SOE/soechina2000/english/atmospheric/atmospheric_e.htm)

Table 4: Air Pollution of Major Mega-Cities in Asia and the Pacific

	PM10 ($\mu\text{g}/\text{m}^3$) Annual mean 1999	SO ₂ ($\mu\text{g}/\text{m}^3$) Annual mean 1998 ^a	NO ₂ ($\mu\text{g}/\text{m}^3$) Annual mean 1998 ^a
Bangkok	82	11	23
Beijing	106	90	122
Busan	43	60	51
Chongqing	147	340	70
Guangzhou	74	57	136
Hong Kong, China	NA	NA	NA
Kolkata	153	49	34
Manila	60	33	NA
Mumbai	79	33	39
New Delhi	187	24	41
Osaka	39	19	63
Seoul	45	44	60
Shanghai	87	53	73
Taiwan Province of China	NA	NA	NA
Tokyo	43	18	68
WHO Guideline Value ^b	NA (50 ^c)	50	40

Source: World Bank, 2003. World Development Indicators 2003

Note: a. Data are for the most recent year available in 1990-1998. Most are for 1995

b. WHO guideline values for the "classical" air pollutants (WHO 1999a)

c. US EPA guideline values, 1997

Air pollution adversely affects human health, crops and forests, and materials such as metals, painted surfaces, calcareous stones, polymer materials and paper. Air pollutants are also directly and indirectly related with climate change. Human health effects include respiratory and pulmonary effects (NO₂, O₃, PM, and SO₂), impairment of visual perception (CO), decrements to intelligence quotient (Pb), and premature death (PM). Toxic air pollutants contained in VOC such as benzene have been found to be carcinogenic. The effects vary according to the intensity and duration of exposure and the health status of the population exposed. The high concentration of air pollutants shown in the chart poses very high risks to the health of the cities' residents. The WHO estimates that about 500,000 out of every 800,000 people who suffer from premature death brought about by exposure to urban outdoor air pollution are in Asia. In New Delhi, the concentration of suspended particulate matter (SPM) of less than 10 microns is about four times the WHO standard⁶⁴. Air pollution in New Delhi is estimated to cost 1,385 lives each year.

Trans-boundary Air Pollution

Haze is a commonly observed phenomenon in Asia and the Pacific, especially in the Southeast Asian subregion. Mainly caused by slash-and-burn agriculture, clearance of land for oil palm plantations, and forest fires, the haze incident in 1997-98 affected a large area ranging from Indonesia to neighbouring countries including Brunei Darussalam, Papua New Guinea, the Philippines, Singapore, and Thailand, and resulted in an estimated cost of US\$9 billion, damaging 9 million hectares of land and adversely affecting 70 million people⁶⁵.

⁶⁴ Central Pollution Control Board (<http://envfor.nic.in/cpcb/>) and UNEP, State of Environment 2001 in India

⁶⁵ Development Alternatives, 2003. Sustainable Development Priorities in Southeast Asia- Overview, 2003: 2

The region-wide “Atmospheric Brown Clouds” air pollution problem was originally observed as a South Asian haze—a vast blanket of pollution stretching across the subregion, identified by a UNEP study as originating from biomass and fossil-fuel burning. Although the precise effect this three kilometre-deep pollution blanket may have on the region's and world's climates has yet to be investigated, a preliminary study suggested that this problem could hamper future economic growth in the Asian region, by damaging agriculture, modifying rainfall patterns including those of the mighty monsoons, and putting hundreds of thousands of people at risk. The study further indicates that the build-up of the haze—a mass of ash, acids, aerosols and other particles—is disrupting weather systems, including rainfall and wind patterns, and triggering droughts in Western parts of the Asian continent. The regional and global impacts of this haze are set to intensify over the next 30 years as the population rises to an estimated five billion people⁶⁶.

Air pollutants such as SO_x and NO_x emitted from automobiles, factories and power plants are often transported long distances, transformed into acidic substances, and, in both dry and wet conditions, deposited outside the country of origin. Acid deposition has become a concern in several parts of Asia during the last decade, particularly in Northeast Asia. In China, for example, about half of all the cities monitored had average annual precipitation with pH values less than 5.6, the threshold for acid rain. Central and south western China were the areas most affected, with average pH less than 5.0, and acid rain frequency higher than 70%⁶⁷. Acid deposition seriously damages forest, plants, and marine ecosystems, and the negative impacts of this acid deposition are most significant in Sichuan Basin of China⁶⁸, including damage to forest area of 0.28 million hectares. While there are various causes of acid deposition, about two-thirds of the problem in the Asia-Pacific region is caused by coal-fired power plants with outdated pollution control equipment, using poor quality coal, especially in China and India. Paradoxically, reducing dust in the air may exacerbate acid rainfall, as alkaline dust particles tend to neutralise the acid.

Climate Change

Emissions of greenhouse gases and aerosols due to human activities continue to alter the atmosphere in ways that are expected to affect the climate. Over the past century, the average annual temperature in temperate Asia has increased by more than 1 degree Celsius according to the Inter-governmental Panel on Climate Change (IPCC). IPCC has projected that the average temperature of the ground surface will increase no less than 3 degrees Celsius by the end of the 21st century, and the associated sea level rise is projected to be 0.3-0.5 meters on average by 2100⁶⁹.

Climate change has many implications for sustainable development in the Asia and Pacific region because of its multiple impacts on the environment and society. Extreme events, including floods, droughts, forest fires, and tropical cyclones, have increased in temperate and tropical Asia, resulting in a decrease of agricultural productivity, and diminishing food security in many countries. Human health would likewise be threatened by possible increased exposure to vector-borne infectious diseases and heat stress. Sea-level rise and tropical cyclones would displace tens of millions of people in low-lying coastal areas. Himalayan glaciers are likely to melt at ever-faster rates, causing devastating glacial lake dam outbursts, which could inundate a numbers of villages. Melting of the Antarctic ice shelf will also contribute to rising sea levels. Climate change would also exacerbate threats to biodiversity due to land-use and land-cover change as well as increased population pressure in the region⁷⁰.

Small island states of the Pacific are likely to be among the countries most seriously impacted by climate change. The projected sea-level rise would increase coastal erosion, dislocate people, reduce resilience of coastal ecosystems, and cause saltwater intrusion into freshwater resources. Costs to respond and adapt to these changes would be enormous. Climate change and sea-level rise would also negatively impact those relying on reef fisheries for their livelihood, and severely disrupt many island economies that are dependent on tourism as an important source of foreign exchange income. It is predicted that in lowland countries, in particular those in the Pacific, the cost of damage caused by climate change will exceed 10% of the GDP within 50 years.

⁶⁶ UNEP and C4, 2002. The Asian Brown Cloud: Climate and Other Environmental Impacts, (<http://www.cleanairnet.org/caiasia/142/article> (14/10/2004))

⁶⁷ UN-ESCAP and ADB, SoE 2000

⁶⁸ UNEP, 2002. Global Environmental Outlook 3.

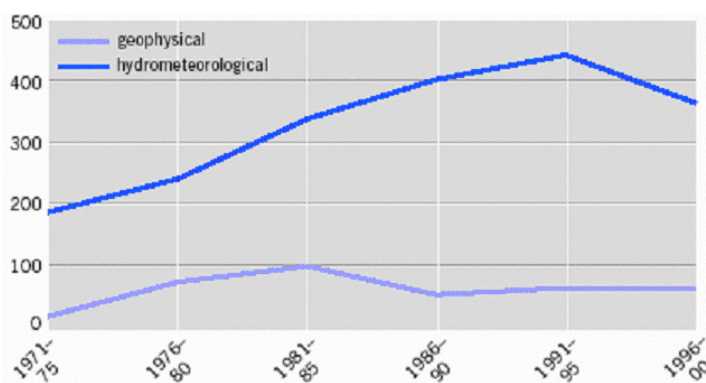
⁶⁹ Inter-governmental Panel on Climate Change, 2001. IPCC Third Assessment Report: Climate Change 2001

⁷⁰ UNFCCC Secretariat, 2002. Climate Change and Sustainable Development: Asia and the Pacific Region (<http://www.rrcap.unep.org/wssd/documents/Report-Asia.doc>, October 2004)

Natural Disasters

People and the environment are increasingly suffering from the effects of natural disasters, for a number of reasons such as high population growth and density, migration and uncontrolled urbanisation, environmental degradation and possibly global climate change. In the Asia-Pacific region, there has been a general upward trend in the number of natural disasters due to hydro-meteorological events (such as cyclones and flooding) in the region, while geophysical disasters such as volcanic eruptions, earthquakes and tsunamis have remained fairly steady. In 1997 the region had 33% of the world's worst catastrophes, 67% of total casualties and 28% of the global economic losses due to disasters. The economic losses due to extreme floods (1997-1998) in Bangladesh, China, the Democratic People's Republic of Korea, India and Viet Nam were estimated at \$23 billion. The 2004 tsunami that caused more than 160,000 deaths across South and Southeast Asia, due to the devastating earthquake off Sumatra (according to UN, as of 10 January 2005), could have been less devastating if an adequate warning system had been installed across the Indian Ocean. The establishment of early warning systems, managing disaster situations and mitigating their effects therefore constitute important issues for making development sustainable⁷¹.

Figure 18: Trends in Disasters in Asia and the Pacific (number/year)



Source: UNEP, 2002. Global Environment Outlook 3

Land Degradation

Land has long been used intensively in the Asia and Pacific region. Pressure on the land has increased in proportion to population growth and economic development, and has resulted in land degradation. About 70 to 90% of natural land has been converted to agricultural and urban areas. Until 1990, approximately 28% of the region's overall land area, or about 850 million hectares of land, had been affected by some degree of soil degradation. As many as 1.32 billion people (i.e., 39% of the entire population of the region) live on land where soil degradation, such as desertification, has reached advanced stages. In recent years, damage from recurrent dust and sand storms has become more serious in Northeast Asia. Intensification and enhanced inputs of water and chemical substances, and also urbanisation and industrial development, including the construction of dams and mining, have contributed to the process of degradation.

The impact of desertification is worst in Central and South Asia, and is also serious in China and Mongolia. In Central Asia, salinisation has affected 60 million hectares of the total agricultural land. In extreme cases, land degradation is either irreversible and beyond restoration or requires major engineering work to restore productivity. Such losses amount to a total of 460 million hectares (13% of all used land)—equivalent to the size of India⁷². Further population growth in South Asia will lead to the increased use of marginal land, destabilisation of traditional farming systems, and increased migration to urban areas. From 1990 to 2025, available land per capita in Pakistan is projected to fall from 0.17 to 0.07 hectares, and in India from 0.20 to

⁷¹ UN-ESCAP, 2002. "Phnom Penh Regional Platform on Sustainable Development for Asia and the Pacific – Background Document", United Nations

⁷² World Bank, 2003. World Development Report 2002/2003

0.12 hectares⁷³.

Degradation of Forests

As Asia and the Pacific have rich and diverse forest resources accounting for 18% of the global forest cover, deforestation and forest degradation are critical issues threatening biodiversity, ecosystem stability and the long-term availability of forest resources. The region lost 6.2 million hectares of forest, an annual deforestation rate of 0.14%, between 1990 and 2000. The highest rate was recorded in Southeast Asia, with a 10.5% loss of forest area, while an increase of forest area by 12% per annum during the same period⁷⁴ was observed in Northeast Asia mainly due to afforestation in China.

Heavy dependence on fuel wood and timber products, as well as the conversion of forest to agricultural, urban and industrial areas, are the underlying factors of deforestation in the region (Box 6). Deforestation and forest degradation are also caused by overgrazing and shifting cultivation in South Asia.

Table 5: Forest areas of Major Countries in Asia and the Pacific in 2000

Country	Area (ha)	%
China	163,480,000	23
Australia	154,539,000	22
Indonesia	104,986,000	15
India	64,113,000	9
Total areas (four countries)	487,118,000	68
Asia and Pacific	717,870,000	
World	3,869,000,000	

Source: FAO, State of the World's Forests, 2001

Box 6: Recent Major Proximate Causes of Forest Loss in Southeast Asia

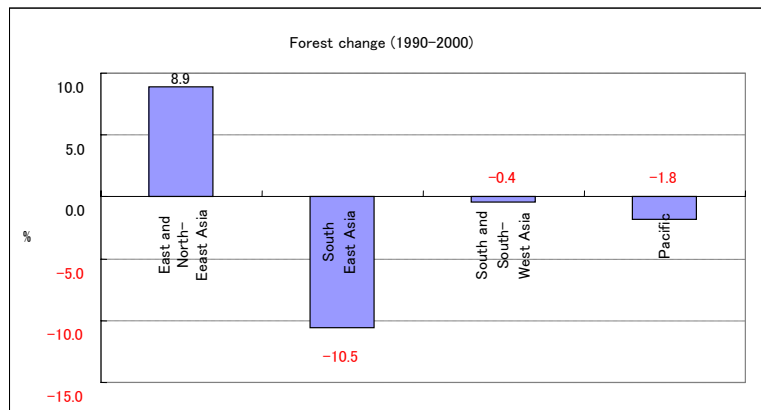
- Philippines: Export-oriented unsustainable commercial logging, the failure of industrial plantations, frequent forest fires caused by local people, mining operations, forest conversion for agricultural expansion, upland farming, and government projects such as dams, land clearing for the landless.
- Indonesia: Export-oriented unsustainable commercial logging, logging for domestic plywood, industry transmigration projects and paddy field development projects, non-traditional shifting cultivation, industrial tree plantations, frequent large-scale forest fires and oil-palm plantation development.
- Thailand: Logging, forest clearance for cash crops, shifting cultivation, rubber plantations, shrimp farming, land zoning and expansion of protected area.
- Lao People's Democratic Republic: Direct and indirect impacts of the Second Indochina War, land clearance for rice self-sufficiency, shifting cultivation, hydropower development, and commercial logging.
- Viet Nam: Direct and indirect impacts of the Second Indochina War, land clearance for rice self-sufficiency, in-country migration, coffee plantations, shifting cultivation, financial resources for the military from logging.
- Cambodia: Land clearing for crops, logging under the protection of powerful people and the military.

Source: Ministry of Environment in Japan, 2001. Report of Eco Asia Long-term Perspective Project Phase II.

⁷³ ADB, 2001. Asian Development Outlook 2001

⁷⁴ FAO, FAO STAT

Figure 19: Forest Area Change (1990-2000)



Source: UN-ESCAP, Statistical Yearbook for Asia and the Pacific 2000/2001

Loss of Biodiversity

The biological diversity of Asia and the Pacific is extremely rich, found in all types of ecosystems from mountains and forests to grasslands, deserts, wetlands and islands, and ranging from the tropics to the sub-arctic. The potential market value of medicinal plants and derived pharmaceutical products from this biodiversity could be several billion dollars. Unfortunately, Asia’s biodiversity is under great stress as a result of human activities to sustain growing populations, and in particular, international trade. Two-thirds of the region’s natural areas and wildlife habitats have already been destroyed and many wild flora and fauna species are now threatened by extinction (Box 7).

Box 7: Loss of Biodiversity in Asia – Estimation of Species Loss

Populations of big mammals such as elephants, tigers, bears, antelopes and wild cattle have continued to decline over the past decade. Populations of marine turtles, freshwater fish and amphibians continue to slide, and many primate populations are in serious decline. About 97% of the Bornean orang-utans have been eradicated during the last century and 33% of the survivors have been lost in the last four years. Bird Life International’s 1994 review of globally threatened species showed that four of the world’s top five countries in terms of numbers of threatened species were in Asia. A total of 323 species are included in the new Bird Red Data Book for Asia.

The Philippines holds the dubious distinction of having more endangered species per unit area than any other country. In Thailand, 554 vertebrate species were identified as nationally threatened compared with 88 listed as globally threatened. The Vietnamese Red Data Book lists 290 threatened vertebrates, and the rate of change is huge. The wild bird trade may involve two to five million specimens per year and the largely undocumented trade in Chinese songbirds, mainly to East and Southeast Asian destinations, may add another one to three million birds to the total.

Source: International Centre for Environmental Management, 2003. “Status of Biodiversity in Asia”

In the coming decade, increasing pressures from population growth, liberal economic policies and land use changes are likely to further threaten the region’s biodiversity. Despite ongoing initiatives at national and international levels, weak policies and poor management at both levels will continue to cause strain on biodiversity resources. Inadequate coordination between neighbouring countries regarding the protection of natural areas and wildlife habitats is particularly unfortunate, despite the trans-boundary nature of many natural ecosystems.

One of the major threats to biological diversity is biological invasion caused by alien invasive species. The impacts of alien invasive species are immense, insidious, and usually irreversible. They may be as damaging to native species and ecosystems on a global scale as the loss and degradation of habitats. International trade and the expansion of global travel, accompanied by intentional and accidental introductions, have inadvertently ended millions of years of biological isolation. Hundreds, possibly thousands, of extinctions have been caused by alien invasive species, an effect that is most conspicuous on small islands in the Pacific Ocean.

Solid Waste Problems

Among other problems associated with increasing urbanisation, solid waste management problems have worsened over the past 30 years in the region. Solid waste has increased rapidly with industrialisation in many countries, and is not properly treated nor disposed of, mainly because of improper planning and management systems, lack of technologies, and the limited number of landfill sites (Box 8). In Metro Manila, approximately 6,000 tonnes of garbage are generated daily, but only about 65% of this is collected and disposed in landfill sites by municipalities. Uncollected waste is dumped in open municipal dumpsites, in vacant lots, and alongside roads, burned illegally, or disposed of in waterways such as creeks, estuaries and rivers⁷⁵.

Illegal dumping of solid waste, especially industrial waste, is observed frequently in many countries. Teshima, an island in the Seto Inland Sea of Japan, became an illegal dumping ground for 500,000 tons of motor vehicle shredder dust and other wastes despite opposition by local citizens⁷⁶. Illegal dumping seriously contaminated the island's environment including its soil and surrounding marine area; the cleanup costs have amounted to at least \$250 million⁷⁷. It is reported that 500,000 people in South Asia and as many as one million in Southeast Asia die from diarrhoea each year due to improper waste management.

Box 8: Solid Waste Management in Cebu City, the Philippines

Like other growing cities, Cebu City has problems managing its solid wastes. The major problems in solid waste management of the city are: weak institutional and organisational systems, insufficient waste collection and recycling, improper waste reduction treatments, and improper management of medical waste.

With the help of, among others, its sister city of Haarlemmermeer of the Netherlands, Cebu has (i) undertaken institutional capacity building, (ii) increased public information on the matter, (iii) improved the working and health conditions of waste pickers, and (iv) reached a better management of medical waste. Furthermore, the compost/organic fertiliser facility at the city nursery, has allowed the city to practice waste segregation and organic farming.

Focusing efforts on the upper waste stream, Cebu City has achieved waste minimisation activities such as recycling, composting, proper management of medical waste, and a good landfill system.

Source: City Administration, Cebu City, APFED BPP

Hazardous Substances and Wastes

Asia and the Pacific is producing increasing quantities of hazardous substances and consuming them in agriculture, industry, commerce, and hospital and health-care facilities. This has resulted in chemical contamination, accumulation of hazardous materials stockpiles, and the generation (and often unsafe management) of hazardous wastes containing those substances.

Due to globalisation and lower labour costs, production of basic chemicals has significantly shifted from

⁷⁵ Environmental Management Bureau, Department of Environment and Natural Resources, the Philippines (<http://www.emb.gov.ph/nswmc/news/News%20and%20Releases.htm>)

⁷⁶ Japan Environment Council (JEC), 2003. *The State of the Environment in Asia 2002/2003*, Springer-Verlag Tokyo

⁷⁷ JEC, 2003. *The State of the Environment in Asia 2002/2003*, Springer-Verlag, Tokyo

developed countries to developing countries in the region during the past two decades, mainly to China and other countries in Northeast Asia. Most developing countries in the region have insufficient capacity to monitor, control and dispose of hazardous substances, resulting in contamination of the environment with accompanying risks to human and animal health. Apart from ground and surface water arsenic contamination, which is largely of natural origin, the region's chemical contaminants of particular concern are toxic metal compounds and persistent organic pollutants (POPs) that are known, or suspected, to adversely affect humans and/or animals, such as inducing cancer or endocrine disruption.

Hazardous wastes are increasingly produced as by-products of a broad spectrum of industrial and agricultural processes, nuclear establishments, and hospitals and health-care facilities in the region. In addition, the region is under considerable pressure as a possible dumping ground for hazardous wastes such as plastics and medical wastes from other industrialised countries. The increase in hazardous waste has not been accompanied by a commensurate expansion in the provision of waste treatment and management facilities. The uncontrolled dumping of biomedical waste has the potential for transporting pathogens, whilst the indiscriminate disposal of oils, used batteries, discarded paints, spent chemicals and carcinogens, such as asbestos, can cause significant adverse impacts on human health and the environment. Management of hazardous wastes such as medical wastes, e-wastes (electrical and electronic wastes), car batteries (for example in Kathmandu in Nepal), and mobile phone batteries (for example in Thailand) has become a serious region-wide concern. Various pollution incidents have been reported from industrial waste, abattoirs, or food processing plants, along with biocides and toxic effluents from sawmills and timber processing areas.

In spite of international and regional efforts, the illegal traffic of hazardous wastes continues, posing a serious threat to the region's environment and human health. The international trade of used commodities as raw material is significantly increasing – an emerging concern of the region (Box 9).

Box 9: Transfer of hazardous waste to Asian Countries

In Guangdong province, China, about 100,000 poor migrant workers are employed to break apart and process obsolete computers imported primarily from North America. Men, women and children work under appalling conditions, unaware of the health and environmental hazards involved. The open burning, acid baths and toxic dumping pour pollution into the land, air and water. Many tonnes of e-waste are being dumped along rivers, in open fields and beside irrigation canals in the rice-growing area. Already, well water is no longer drinkable and water has to be trucked in from 30 kilometres away; river sediment samples had lead levels 212 times higher than liquid that would be treated as hazardous waste in the Netherlands; barium levels in the soil were almost 10 times higher than the threshold for environmental risk in the US; tin levels were 152 times the US threshold; and chromium in one sample was at levels 1,338 times the US threshold. Other toxic ingredients, such as lead, beryllium, mercury, cadmium and brominated flame retardants also pose both occupational and environmental health threat.

The preliminary investigation of the situation in India and Pakistan revealed conditions even worse than those found in China. The report emphasises: "E-waste exports to Asia are motivated entirely by brute global economics. Market forces, if left unregulated, dictate that toxic waste will always run 'downhill' on an economic path of least resistance. If left unchecked, the toxic effluent of the affluent will flood towards the world's poorest countries where labour is cheap, and occupational and environmental protections are inadequate."

Source: The Basel Action Network (BAN) and Silicon Valley Toxic Coalition (SVTC), 2002. "Exporting Harm – The High-Tech Trashing of Asia", February 2002

3. RESPONSES TO SUSTAINABLE DEVELOPMENT CHALLENGES

Regional Responses Addressing Sustainable Development

To promote sustainable development in the Asia-Pacific region, a wide array of actions has been taken at local, national, subregional and regional levels. A comprehensive review on the region's efforts to achieve sustainable development took place along with the regional consultation processes for preparation of WSSD. The regional review meeting was held in Phnom Penh, Cambodia, in November 2001, following a series of subregional consultations, with participation of high-level government officials as well as a wide range of stakeholders⁷⁸.

The same process identified the efforts of many regional and international organisations and United Nations bodies contributing to the promotion of sustainable development, including the implementation of Agenda 21 in the region. To cite a few: (i) ADB and World Bank projects on poverty alleviation, natural resources conservation and pollution control; (ii) UNEP programmes on environmental legislation, regional seas and environmental education, information, and awareness; (iii) UNDP initiatives on poverty alleviation and capacity-building through its Capacity 21 programme (and now Capacity 2015); (iv) the UN-ESCAP Regional Action Programme for Environmentally Sound and Sustainable Development; (v) the FAO integrated approach to planning and management of land resources and national forestry action plans; (vi) ILO technical assistance projects on employment, skills training and the work environment; (vii) the work of the United Nations Centre for Human Settlements (UNCHS) in the area of human settlements; (viii) UNESCO activities in environmental education; (ix) UNICEF programmes on needs assessment, advocacy and empowerment, and provision of water and sanitation facilities; (x) the UNIDO programme on cleaner production; and (xi) the WHO programme on environmental health and WMO support for the implementation of the United Nations Framework Convention on Climate Change.

These regional initiatives address issues of population and urbanisation, economic development, major social concerns, and technology development factors that are outlined in the previous chapter. Notwithstanding the significant achievements made in a number of areas, institutional and policy failures continue to be major causes of unsustainable development and environmental degradation. While regional and subregional cooperation on several priority areas of concern has been strengthened, many areas still need to be addressed adequately. Additionally, limited financial and technical resources continue to be a major constraint. Given the comprehensive nature of Agenda 21, a great deal of work remains to be done. The regional meeting in 2001 adopted the Phnom Penh Regional Platform on Sustainable Development for Asia and the Pacific. Seven new initiatives for the region's sustainable development were identified through the consultation process, namely: capacity-building; poverty reduction; cleaner production and sustainable energy; land management and biodiversity conservation; protection and management of and access to freshwater resources; oceans, coastal and marine resources; sustainable development of small island developing states; and action on atmosphere and climate change.

WSSD was convened in Johannesburg, South Africa in August/September 2002, as a high-level global forum to identify ways and means to fully implement the earlier decisions and commitments for achieving sustainable development. WSSD made several recommendations and commitments for further action and issued the Johannesburg Plan of Implementation (JPOI). While JPOI adopted the essential policy elements to promote sustainable development at the global scale, it also recognised the seven "Asia-Pacific Initiatives" and suggested follow-up actions through the existing (such as the Regional Action Programme for Environmentally Sound and Sustainable Development and the Kitakyushu Initiative for a Clean Environment) and new regional and subregional action programmes.

Mechanisms and Initiatives for Improving Environmental Governance

JPOI placed particular importance on strengthening of the institutional framework for sustainable development. In Asia and the Pacific regular mechanisms have been developed for intergovernmental and multi-stakeholder dialogue for policy coordination addressing environmental protection and environmentally-sound development.

⁷⁸ UN-ESCAP, UNDP, UNEP and ADB, 2002. "Phnom Penh Regional Platform on Sustainable Development for Asia and the Pacific", United Nations

The five-yearly MCED has provided a regular mechanism to periodically review the state of the environment and development in Asia and the Pacific, as well as to adopt the region's action agenda for the subsequent five-year period. The Ministerial Conference in 2000 adopted "The Regional Action Programme for Environmentally Sound and Sustainable Development (RAP) 2001-2005", which provides a focused and concrete framework for action to reinforce efforts towards sustainable development in Asia and the Pacific. Together with "the Kitakyushu Initiative for a Clean Environment", RAP's priority is the implementation of its programme area on environmental quality and human health, with special focus on urban areas.

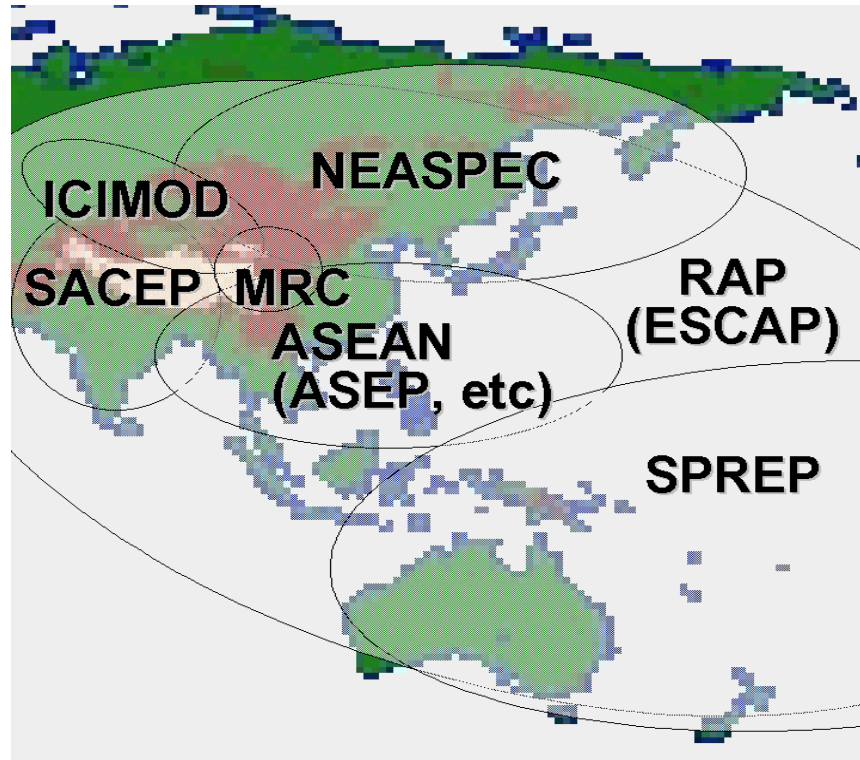
ECO ASIA (Environment Congress for Asia and the Pacific), an informal annual forum consisting of high-level government officials and experts in Asia and the Pacific, aims to assess the region's efforts toward sustainable development and to discuss future directions of cooperation in the region.

Trans-boundary environmental problems cause national and regional conflicts, but progress in establishing and implementing regional and global MEAs in Asia and Pacific has been slow, a result of a lack of institutional, administrative and financial capability, and lack of linkages between different MEAs. Although national plans and programmes exist in many countries, institutional arrangements for implementing MEAs are poorly developed because of the difficulties of coordination between the concerned ministries and their departments. Environmental NGOs and research institutes in several countries are helping to ensure the implementation of MEAs by exerting pressure on governments and other concerned bodies. Similarly, in the context of the Convention on Biological Diversity and the Ramsar Conventions, regional and subregional NGO networks are working, with varying degrees of success, on developing awareness and providing policy support to national governments.

International NGOs are active in the region. For example, the International Union for Conservation of Nature (IUCN), in close collaboration with the member countries, has a regional programme, composed of seven technical programmes: biodiversity, environmental economics, environmental law, forests, marine and coastal, protected areas, and water and wetlands. Emerging themes include climate change, environment impact assessment and mountain landscapes. IUCN has carried out several activities for training, capacity building and field projects related to biodiversity, climate change, environmental law education, community-based natural resource management and policy issues through its thematic programmes.

NGOs have played a major role in monitoring and tracking the trans-boundary movement of hazardous wastes. For example, WALHI (The Indonesian Forum for the Environment) publicised the name of the company that imported wastes into Indonesia and abandoned them in ports, while Greenpeace and other organisations, such as the Basel Action Network (BAN) and Silicon Valley Toxic Coalition (SVTC), keep close watch on wastes headed for China.

Figure 20: A Map of Major Environmental Cooperation Initiatives in Asia and the Pacific



Source: Ministry of Environment in Japan, 2001. Report of Eco Asia Long-term Perspective Project Phase II

Subregional Mechanisms and Initiatives

In light of commonalities that exist among countries in each subregion, various subregional initiatives have been launched to promote subregional cooperation for sustainable development. CSD11 noted that subregional cooperation should be the norm in this region, as differences at the regional level are significant.

The South Asia Cooperative Environment Programme (SACEP) has been promoting protection of the natural and human environment in the subregion since its establishment in 1982. Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka and Islamic Republic of Iran participate in the programme. SACEP initiated a variety of activities regarding capacity building and technology transfer. The South Asian Regional Seas Programme, coordinated by SACEP, is a major success. Collaborative efforts to mitigate trans-boundary air pollution were also promoted. The Malé Declaration on Control and Prevention of Air Pollution and Its Likely Trans-boundary Effects for South Asia is a good example of subregional collaborative efforts (Box 10).

**Box 10: Malé Declaration on Control and Prevention of Air Pollution
and Its Likely Trans-boundary Effects for South Asia**

The Declaration endorsed by ministers of environment of the South Asian countries in April 1998 aims to achieve intergovernmental cooperation to address the increasing threat of trans-boundary air pollution and consequential impacts due to concentrations of pollutant gases and acid deposition on human health, ecosystem functions and corrosion of materials. Besides laying down the general principles of intergovernmental cooperation for air pollution abatement, the Declaration sets up an institutional framework linking scientific research and policy formulation. The Declaration also calls for the continuation of this process in stages, with mutual consultation, to draw up and implement national and regional action plans and protocols based on a fuller understanding of trans-boundary air pollution issues.

Phase I implementation of the declaration was completed in 2001 with the establishment of the network and identification of gaps in the existing capacity to study the trans-boundary air pollution. Activities are being implemented to put in place expertise, equipment and information for quantitative monitoring and analysis.

Source: UNEP RRC.AP 2002/2003

Southeast Asia has a long history of environmental cooperation that can be traced back to 1977. Since that time, countries in Southeast Asia have been working on such issues as the introduction of uniform environment standards and development of various environmental action plans, through Southeast Asian Environment Ministers Meetings and the establishment of the ASEAN Senior Officials on Environment Meetings (ASOEN). ASEAN has diverse cooperative activities: (i) effective institutional linkage between Subregional Action Plans (SRAP) implementing agencies and the ongoing "Partnerships in Environmental Management for the Seas of East Asia" (PEMSEA), "Coordinating Body on the Seas of East Asia" (COBSEA) and ASEAN programmes for integrated coastal zone management; (ii) Regional Haze Action Plan (RHAP) covering all aspect of prevention, monitoring and mitigation; and (iii) the Greater Mekong Subregion (GMS) watershed protection. In addition, an ASEAN regional initiative for promotion of environmentally sound technologies (EST) is expected to be established in the near future. For GMS, the Working Group on the Environment (WGE), consisting of six countries in the subregion, has been convened every year since 1995, as a part of a subregional economic cooperation programme started in 1992. The Mekong River Commission (MRC) was established in 1995, by agreement between the four countries sharing the Lower Mekong Basin: Cambodia, Lao People's Democratic Republic, Thailand and Viet Nam.

In Northeast Asia, subregional cooperation mechanisms on environmental issues have been promoted since 1992. The North-East Asian Sub-regional Programme of Environmental Cooperation (NEASPEC) has been developed as a comprehensive intergovernmental framework for policy dialogue on environmental issues of common concern to the six countries of the subregion (China, the Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, and the Russian Federation). It has also provided a useful vehicle for environmental cooperation projects in such fields as environmental monitoring, air pollution management and capacity building. The Northeast Asian Conference on Environmental Cooperation provides a yearly forum for dialogue among the environmental ministries, academics, NGOs and other environmental practitioners in five countries in the subregion. China, Japan and Republic of Korea, co-organise the annual Tripartite Environment Ministers Meetings (TEMM) as a higher level mechanism to exchange views on subregional environmental priority issues to be tackled and to discuss cooperation among the three countries. On specific environmental issues, initiatives such as NOWPAP (Action Plan for the Protection, Management and Development of the Marine and Coastal Environment of the Northwest Pacific Region) and TRADP (Tumen River Area Development Programme) were launched. As the first step in addressing acid deposition problems in East Asia (Cambodia, China, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Philippines, Republic of Korea, Russian Federation, Thailand and Viet Nam), the Acid Deposition Monitoring Network in East Asia (EANET), was launched in 1997 and started regular monitoring to measure

acid deposition in those countries from January 2001.

Environmental cooperation in the Pacific has been facilitated by the South Pacific Regional Environment Programme (SPREP). SPREP was established in 1981 and includes 22 Pacific Island countries and territories. It acts as the subregion's interface with international agencies and in global environmental negotiations. SPREP executes specific programmes to build national capacity and it has recently encouraged strategy development and capacity building with regard to the environmental priorities of the region, including waste management and climate change. The South Pacific countries, through the subregional preparation process for WSSD, identified the following as the emerging issues and challenges for the subregion: (i) biodiversity conservation (through establishment of protected areas and gene pools); (ii) protection of the coastal environment including reefs and lagoons; (iii) management of solid wastes in urban areas; (iv) disposal of sewage in urban industrial areas; (v) the growing scarcity of land; (vi) contamination of scarce ground water; (vii) improper management of liquid wastes; (viii) intensification of agriculture; (ix) overfishing of inshore areas; (x) need for alternative sources of energy; (xi) climate change, natural disasters and sea-level rise; and (xii) human resources development. The UNEP regional strategy, along similar lines identified the following six priority areas for the South Pacific subregion: (i) climate change and sea level rise; (ii) water scarcity and degradation; (iii) soil degradation; (iv) deforestation and biodiversity loss; (v) degradation of the marine environment; and (vi) increasing vulnerability to natural disasters.

The countries in Central Asia laid the foundation for subregional cooperation by establishing the Interstate Coordination Water Commission (ICWC) in 1992, which was later merged into the International Fund for the Aral Sea (IFAS), which coordinates and manages programmes devoted to ecological, social and economic development of the Aral Sea basin. In 1998, a ministerial conference for Central Asia decided to develop a regional environmental action plan and establish a regional environmental centre for Central Asia in Almaty. The centre (CAREC) has been active as an independent, non-commercial and non-partisan international organisation, in developing programmes to facilitate the endeavours of all stakeholders towards environmental conservation and sustainable development in Central Asia. A list of priority concerns were identified by an expert meeting in 2000: degradation of the ecosystem of the Aral Sea basin, problems caused by oil and gas production, and problems with global impacts (climate change, ozone layer). There are proposals to develop and conclude a Central Asian framework agreement on environmental protection and sustainable development, encompassing, in particular, the Recommendations and Statement of the Finance Ministers and Environment Ministers at the Almaty Subregional Meeting on the Preparation for the World Summit on Sustainable Development, 2001, and Invitation to Partnership on Implementation of the Central Asian Sustainable Development Initiative, submitted to the Fifth Ministerial Conference on Environment for Europe, held in Kiev, Ukraine, in May 2003.

NGOs based in Asia and the Pacific have also stepped up their environmental efforts at the subregional level. In South Asia and the Pacific, NGOs have begun to cooperate at the subregional level, as exemplified by the Pacific Islands Association of Non-Governmental Organisations (PIANGO). The Third World Network (TWN), with its headquarters in Penang, Malaysia, has been conducting research on environmental problems and social issues in developing countries and has made various proposals at international conferences from the perspective of developing countries.

National Mechanisms and Initiatives

Considering the need to strengthen the environmental governance of central governments, many countries in the Asia and Pacific region have established separate ministries or agencies responsible for environmental management. Their functions are in some cases not clearly defined, while in other cases an integrated ministry or agency has been created, which is composed of many sections in charge of various environmental matters. In addition, many central governments in the region have devolved powers to local authorities with a view to taking local needs and initiatives into account more in addressing environmental problems. Although there are many forms of environmental governance at both central and local levels, developing countries suffer, in general, from insufficient financial and human resources. Consequently, environmental governance in these countries is still too weak to implement proper environmental management and to solve the most pressing environmental problems.

Since the Earth Summit in 1992, the structure of environmental governance in the Asia-Pacific region has changed drastically, especially at the national level. Major developments in environmental governance have

been the establishment of a new set of environmental principles agreed upon at the Summit, the development of an overall coherent policy, and the establishment of a constitutional and legislative framework within which various stakeholders operate. For example, several countries in the region have only recently concluded a conventional commitment to environmental protection. In countries such as Republic of Korea, Japan, Indonesia, the Philippines, Thailand, Bangladesh, Pakistan, Tajikistan and many Pacific countries, basic environmental laws were introduced after 1992.

In addition to the development of a legislative framework for sustainable development at the country level, strategies and action programmes such as Agenda 21s at various levels were developed. The Earth Council operates the National Commission for Sustainable Development (NCSD) programme, which has co-sponsored an annual event for NCSDs during the annual sessions of the United Nations Commission on Sustainable Development (CSD). Through playing actively in the global sustainable development arena, a few NCSDs, such as those in Mongolia and the Philippines, have played key roles in translating the global Agenda 21 into national strategies for sustainable development. Participation of relevant stakeholders has been promoted in the process of developing Agenda 21s at national and local levels.

Among other instruments, environmental impact assessment (EIA) has now become a legal requirement in most countries of the Asia-Pacific region, (e.g., China, Japan, Republic of Korea, Thailand, Malaysia, the Philippines, Indonesia, Viet Nam, India, Sri Lanka, and Kazakhstan). Most EIAs are conducted at project level, and thus have become an important tool in integrating environmental concerns into planning of specific projects. In addition, EIAs have involved stakeholders and the public significantly in the decision making process for various development projects.

Judicial institutions have served as agencies to resolve environmental conflicts, which in many cases are very complex due to causality uncertainties and interpretation of relevant laws. To deal with complex environmental litigation consistently and swiftly, a few countries in the region have set up specialised environmental courts. The Supreme Court of India has established High Court benches known as Green Benches. Pakistan has set up Environmental Tribunals to resolve disputes concerning the 1997 Environmental Protection Act. Bangladesh set up Environment Courts in 2000, to take prompt legal action against environmental pollution⁷⁹. The National Arbitrary Council of Japan has long served to facilitate swift agreement among concerned parties to resolve environmental disputes. Court rulings have, in many countries, contributed to enhanced implementation of environmental laws by penalising polluting industries and giving explicit directives to the government.

Apart from those legislative approaches described above, subtle signs of “paradigm shifts” are emerging in countries’ policy in integrating environmental and economic policies, especially by guiding the market to work for environmental goals. Despite most early environmental regulations being based on the command and control approach, several countries in the region have started to introduce market-based instruments to improve implementation and to provide incentives and flexibility in environmental management after 1992. China has recently introduced a nationwide pollution levy system to reduce pollution loads, and reduced subsidies on the use of coal to reduce air pollution. Malaysia achieved reductions in pollution discharge from the palm industry by applying a levy system. Japan drastically reduced its SO₂ emissions by enacting a law of compensation for health damages caused by pollution. Thailand and Malaysia successfully curtailed the use of leaded gasoline by introducing a differentiated price system. The list of such efforts to internalise environmental costs into product prices continues to expand. Use of economic instruments generally increases transparency and reduces the bureaucratic burden (e.g., through less compliance monitoring).

Significant contributions are being made by the private sector. According to an OECD study, the environmental market in the Asia-Pacific region continues to grow and is predicted to reach \$110 billion by 2010. The region exhibited the most positive response to the ISO14001 standards adopted in 1996 to introduce a consistent environmental management system in private companies. The region has seen a shift from traditional end-of-pipe type solutions to those based on clean technologies. In addition, several companies have committed to adopting zero emissions and introducing environmental accounting systems. National industry federations in Japan and Australia have voluntarily established country-specific business charters for sustainable development.

⁷⁹ Department of the Environment, Bangladesh, <http://www.doe-bd.org/2nd-part/167-177.pdf> (accessed on September 2004)

Partnership among different groups of civil society, which is certainly an indispensable element of the emerging paradigm shifts in improving the whole system of environmental governance, could also play a critical role in application of market-based instruments, in particular in implementing the demand-side management to achieve eco-efficiency. Enhancing policy transparency, information disclosure and empowerment of civil society groups, including consumer organisations in particular, are all important measures to be taken by governments.

Despite intensive effort at all levels, the region's challenge to achieve sustainable development has yet to be fulfilled. In particular, governments are under pressure from all levels of society to undertake more progressively the steps towards a sustainable society. International support should therefore concentrate on the development of institutional capacity in formulating and implementing sustainable development policies, and on the mobilisation of financial resources required for such efforts. APFED, through its function of dialogue facilitation and action coordination, wishes to stimulate the strengthening of these existing initiatives, as well as to promote further comprehensive shifts to reflect the long-term views and values which are embodied in the vision of the Asia-Pacific region beyond 2015.

Many countries in the region have implemented population control policies. For example, in China the "one child per family policy" started in 1979, and other birth control programmes have contributed to reducing the growth rate. Creating awareness amongst women is another effective method for birth control that has been used in other countries in the region. The changes in the economic structure from agriculture to industry are also regarded as providing an opportunity for slowing down population growth.