REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

UNEP

ENVIRONMENTAL INDICATORS South East Asia

Environmental Indicators South East Asia

United Nations Environment Programme
Regional Resource Centre for Asia and the Pacific

Published by the United Nations Environment Programme

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Definition of an indicator is not uniform across the various publications, organisations and institutions that have been referred to in this publication. Efforts have been made to standardise the data for a particular indicator from the different sources but there still might exist some discrepancies in the data-reporting method. UNEP-RRCAP does not take responsibility for the same.

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FOREWORD

Agenda 21 emphasized the need for developing indicators to provide the solid base for decision making at local, national, regional and global levels. The Johannesburg Plan of Implementation in 2002 reiterated the need for indicators to monitor economic, social and environmental progress for sustainable development. Goal 7 of the UN Millennium Development Goals is set for countries to ensure environmental sustainability through integrating principles of sustainable development into country policies and programmes, and reverse the loss of environmental resources.

This report on 'Environmental Indicators for Southeast Asia' has been prepared to present the trends of twenty five key indicators on air, water, land and biodiversity. It also presents trends on social and economic conditions through the selected indicators. Data have been collected for each indicator for each country in Southeast Asia for 1990, 1995 and 2000. This report provides an assessment of economic, social and environmental conditions in Southeast Asia based on available data and information. Lack of updated scientific database has been a major challenge in preparation of the report.

This report highlights that the 1997-98 Asian economy crisis adversely affected the economies of this region. This lead to decreased GDP growth rate and increased poverty in the countries, which were affected by the crisis. The report also shows that the population growth rate in Southeast Asia was slightly higher than the world average for the same period. Southeast Asia will be home to three of the mega-cities of the world by 2010 - Jakarta, Metro Manila and Bangkok. Deteriorating urban environment is an issue of concern in this sub-region. Smog, low air quality, inadequate sewage and sanitation facilities are some of the problems plaguing urban development in this sub-region.

Southeast Asia remains one of the most heavily forested regions of the world and is home to a wide diversity of animals and plants. But forest area has decreased for all the countries in the sub-region, except Singapore where it has remained constant and Vietnam where it has increased. Forest fires have been a major cause of transboundary air pollution. This sub-region has shown initiative in regional co-operation by signing the agreement on Transboundary Haze pollution. Protected land in Southeast Asia showed slight increment during the 1990s.

UNEP hopes that the 'Environmental Indicators for Southeast Asia' will be a useful document for government, non-government, regional and international organizations in the pursuit of developing policies and action plan. UNEP gratefully acknowledge the contribution of Environment Ministries, agencies, institutes and individuals in the preparation of the report.

Klaus Töpfer
United Nations Under-Secretary General and
Executive Director
United Nations Environment Programme
August 2004

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Director and Staff of Division of Early Warning and Assessment (DEWA), United Nations Environment Programme (UNEP), Nairobi, for their support and suggestions.

Members of the Fourth Collaborative Assessment Network (CAN), for their comments and suggestions.

The Association of SouthEast Asian Nations (ASEAN) Secretariat, for the review of the publication.

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SO_2 Emission
NO_x Emission

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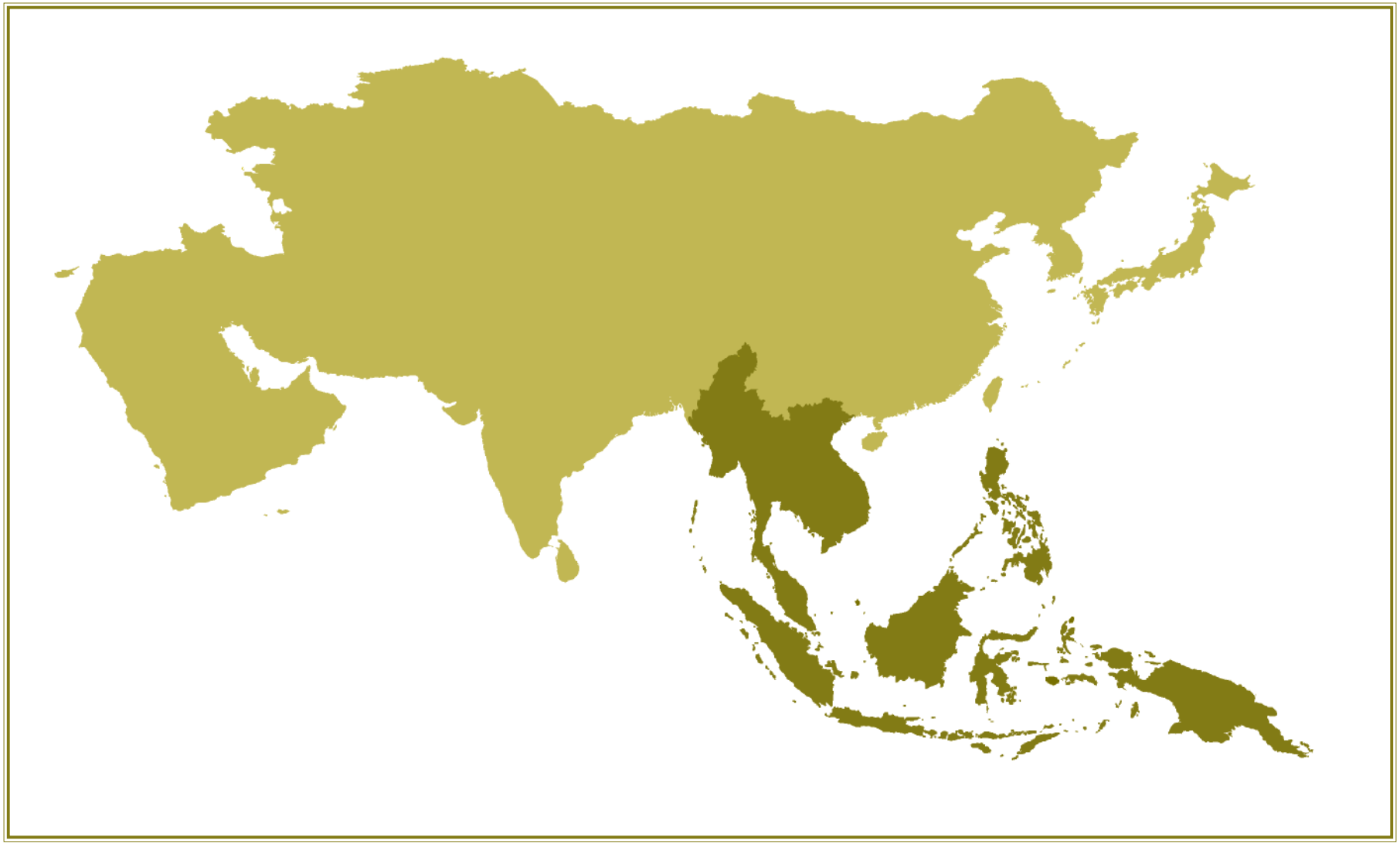
Threatened Birds
Threatened Mammals
Wetlands of International Importance



INTRODUCTION

Southeast Asia is a sub-region of Asia consisting of those continental margins and offshore archipelagos of Asia lying south of China and east of India. Continental Southeast Asia includes Myanmar, Thailand, Lao PDR, Cambodia and Vietnam. Archipelagic Southeast Asia consists of Singapore, Indonesia, the Philippines, Brunei and Malaysia. Overall, Southeast Asia extends more than 3,300 km from north to south and 5,600 km from east to west.

The Southeast Asian countries have a total population of about 522 million. Individual country populations vary from 0.33 million in Brunei to 210 million in Indonesia. Indonesia ranks fifth in world population, accounting for nearly 41 percent of the total population of this subregion.

Southeast Asian countries share a tropical climate greatly influenced by the tropcial monsoons originating in the South China Sea. The coastlines of this subregion border the Andaman Sea, the Gulf of Thailand and the South China Sea.

Indicators

Indicators can be defined as statistics, measures or parameters that can be used to track changes of the environmental and socio-economic conditions. Indicators are developed in synthesizing and transforming scientific and technical data into fruitful information. It can provide a sound base for decision-makers to take a policy decision on present as well as potential future issues of local, national, regional and global concerns. It can be used to assess, monitor and forecast parameters of concerns towards achieving environmentally sound development.

The 1992 UN Summit on Environment and Development at Rio recognized the role of indicators towards promoting sustainable development. Chapter 40 of the Agenda 21 called on countries at the national level, as well as international, governmental and non-governmental organizations to develop indicators in order to provide the solid basis for decision-making at all levels. Agenda 21 specifically called for harmonization of efforts towards developing sustainable development indicators at the national, regional and global levels.

The Commission on Sustainable Development (CSD) in 1995 undertook an initiative to assist countries with developing framework for sustainable development indicators, and building capacity for integrating indicators in policy formulation and decision-making. The overall goal of the programme was to develop country specific indicators that will be used by countries while reporting the progress on sustainable development.

International Development Goals (IDG) were formulated and agreed by the international community at different UN conferences that took place in the last decade. In order to achieve environmental sustainability, goals called upon developing countries to formulate a national strategy for sustainable development by 2005, and to reverse the current trends in the loss of environmental resources, at both global as well as national level, by 2015. These goals are merged into Millennium Development Goals (MDG).

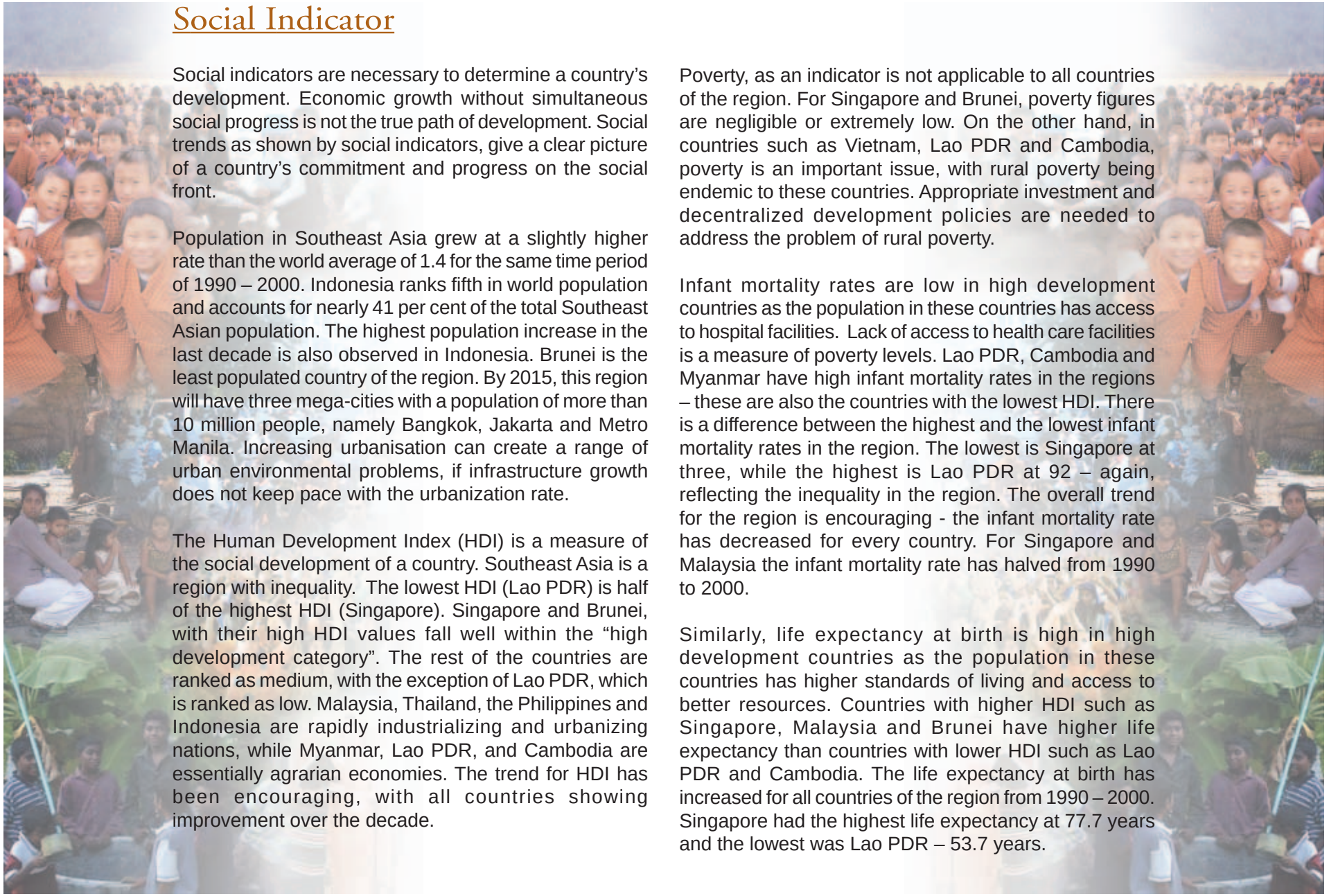
At the UN Millennium Summit held in 2000, Millennium Development Goals (8 goals, 18 targets and 48 indicators) were endorsed by the governments and civil society, in order to improve economic, social and environmental conditions in a specific timeframe. Goal 7 is set for

countries to ensure environmental sustainability through integrating principles of sustainable development into country policies and programmes, and reverse the loss of environmental resources.

The Johannesburg Plan of Implementation (JPOI), 2002 called upon countries to initiate work on indicators in order to monitor progress on sustainable development. Governments in Johannesburg committed to various goals, targets and financial assistance (through ODA and partnership) in order to achieve a measurable positive change. Indicators would be the useful tools to track the economic, social and environmental progress over the timeframe.

Environment is constituted of air, water, land and biodiversity, which are life support systems for human beings. Human activities in the pursuit of economic development have caused immense pressure on environment. Reversal of environmental degradation is the paramount essential in order to safeguard the well being of present as well as future generations. Indicators are means of measuring progress of desired actions. In order to track the progress on implementation of the Agenda 21, and Millennium Goals, there is an expressed need to develop framework for simple indicators on environmental resources, i.e. air, water, land and biodiversity.

To fulfil this need, UNEP-RRCAP has produced the Environmental Indicators report for each sub-region of Asia and the Pacific. We have painstakingly researched and collected data for a list of key environmental indicators. These indicators, which are replicated across each sub-region, were chosen after serious deliberation by our in-house experts, to best reflect the environmental concerns in and across the sub-regions. The indicators can be sub-divided in to the following categories: 1. Social 2. Economy 3. Environment. The category environment is further sub-divided into 1.Land 2.Water 3.Air 4. Biodiversity. Thus, the above categories provide a comprehensive view of the sub-regional progress on environment and sustainability.



Social Indicator

Social indicators are necessary to determine a country's development. Economic growth without simultaneous social progress is not the true path of development. Social trends as shown by social indicators, give a clear picture of a country's commitment and progress on the social front.

Population in Southeast Asia grew at a slightly higher rate than the world average of 1.4 for the same time period of 1990 – 2000. Indonesia ranks fifth in world population and accounts for nearly 41 per cent of the total Southeast Asian population. The highest population increase in the last decade is also observed in Indonesia. Brunei is the least populated country of the region. By 2015, this region will have three mega-cities with a population of more than 10 million people, namely Bangkok, Jakarta and Metro Manila. Increasing urbanisation can create a range of urban environmental problems, if infrastructure growth does not keep pace with the urbanization rate.

The Human Development Index (HDI) is a measure of the social development of a country. Southeast Asia is a region with inequality. The lowest HDI (Lao PDR) is half of the highest HDI (Singapore). Singapore and Brunei, with their high HDI values fall well within the "high development category". The rest of the countries are ranked as medium, with the exception of Lao PDR, which is ranked as low. Malaysia, Thailand, the Philippines and Indonesia are rapidly industrializing and urbanizing nations, while Myanmar, Lao PDR, and Cambodia are essentially agrarian economies. The trend for HDI has been encouraging, with all countries showing improvement over the decade.

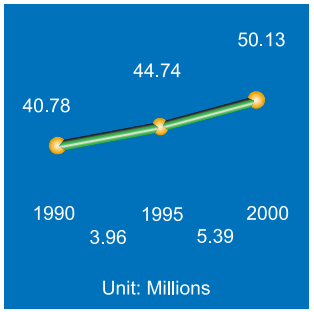
Poverty, as an indicator is not applicable to all countries of the region. For Singapore and Brunei, poverty figures are negligible or extremely low. On the other hand, in countries such as Vietnam, Lao PDR and Cambodia, poverty is an important issue, with rural poverty being endemic to these countries. Appropriate investment and decentralized development policies are needed to address the problem of rural poverty.

Infant mortality rates are low in high development countries as the population in these countries has access to hospital facilities. Lack of access to health care facilities is a measure of poverty levels. Lao PDR, Cambodia and Myanmar have high infant mortality rates in the regions – these are also the countries with the lowest HDI. There is a difference between the highest and the lowest infant mortality rates in the region. The lowest is Singapore at three, while the highest is Lao PDR at 92 – again, reflecting the inequality in the region. The overall trend for the region is encouraging - the infant mortality rate has decreased for every country. For Singapore and Malaysia the infant mortality rate has halved from 1990 to 2000.

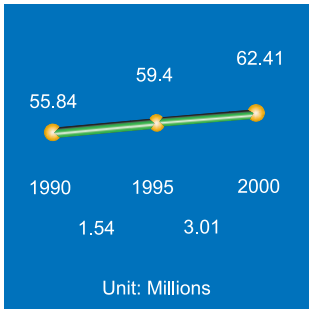
Similarly, life expectancy at birth is high in high development countries as the population in these countries has higher standards of living and access to better resources. Countries with higher HDI such as Singapore, Malaysia and Brunei have higher life expectancy than countries with lower HDI such as Lao PDR and Cambodia. The life expectancy at birth has increased for all countries of the region from 1990 – 2000. Singapore had the highest life expectancy at 77.7 years and the lowest was Lao PDR – 53.7 years.

Social Indicator - Population

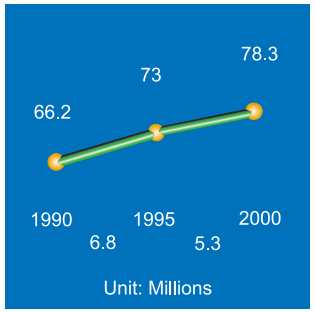
Myanmar



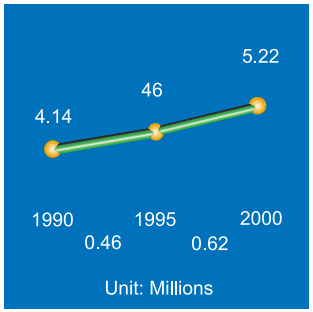
Thailand



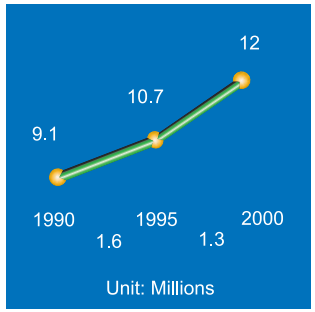
Vietnam



Lao PDR

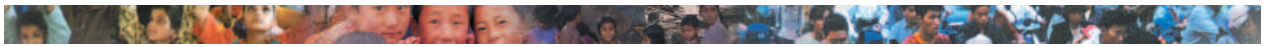


Cambodia



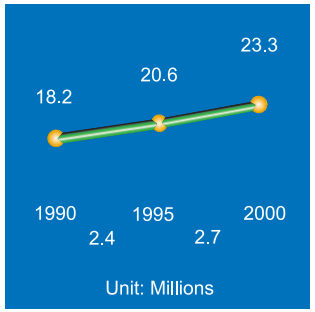
Note: All countries in the region have exhibited an increase in population over the last decade. Indonesia had the highest population – 210.4 million while Brunei had the least – 0.338 million. The 1990s saw a significant increase in urban population in Southeast Asia.

Source: World Development Indicators 2002, Asian Development Bank 2002

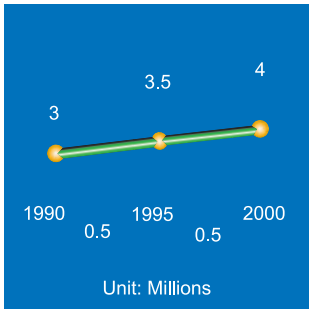


Social Indicator - Population

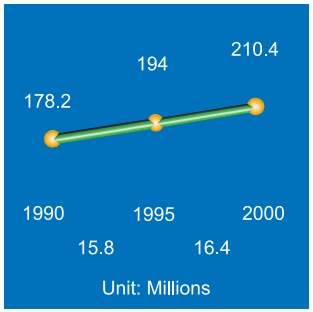
Malaysia



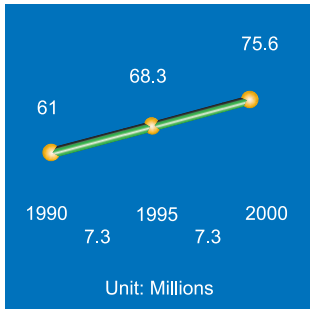
Singapore



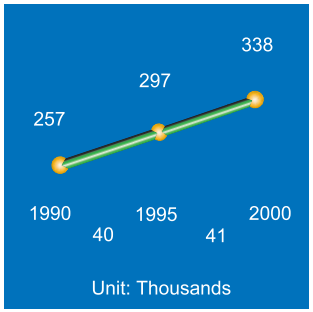
Indonesia



Philippines



Brunei



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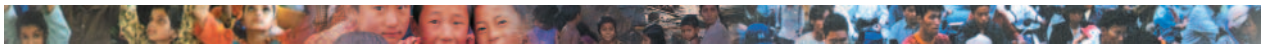
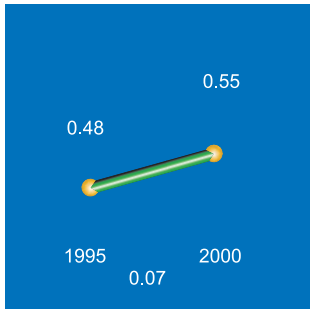


Social Indicator - Human Development Index

Myanmar



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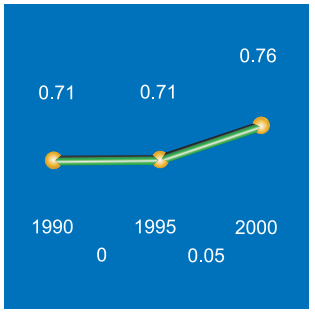

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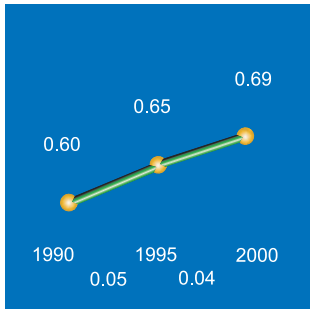
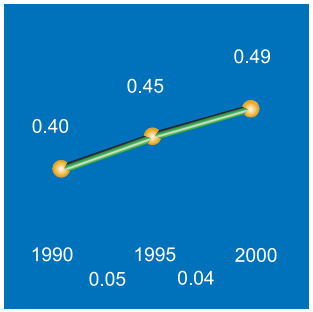
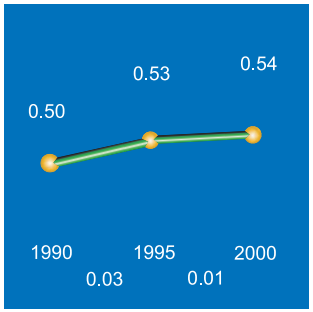


Lao PDR



Cambodia



Note: Singapore and Brunei have high HDI values, with Singapore being the highest in the subregion at 0.89. Lao PDR has the lowest HDI of 0.49, which is nearly half of Singapore's. Singapore is a highly developed country, while Laos ranks low on the development scale. During the 1990s, the HDI for all countries has shown improvement.

Source: United Nations Development Programme. Human Development Indicators 2002

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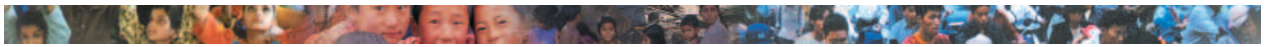
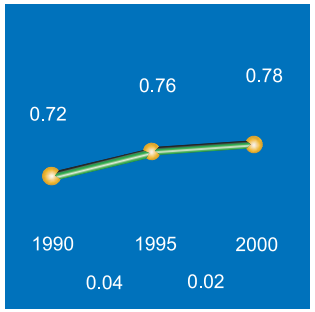
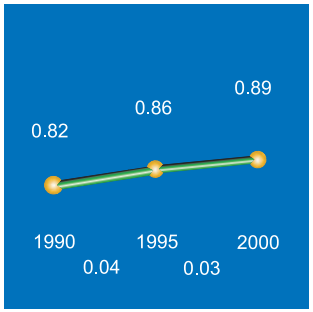


Social Indicator - Human Development Index

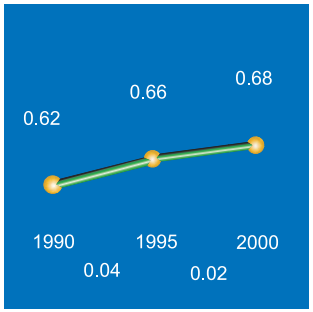
Malaysia



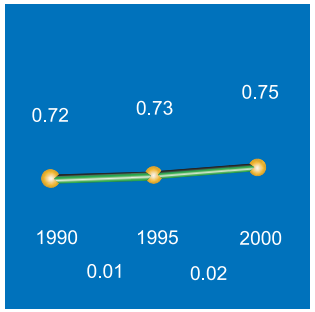
Singapore



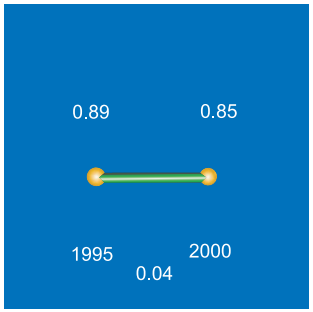
Indonesia



Philippines

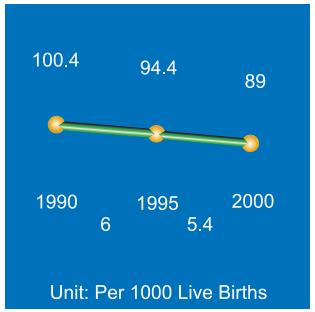


Brunei

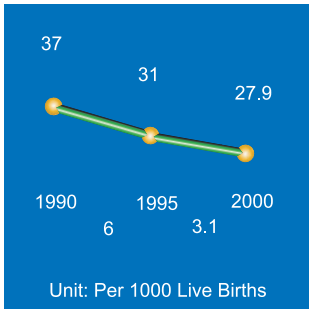


Social Indicator - Infant Mortality Rate

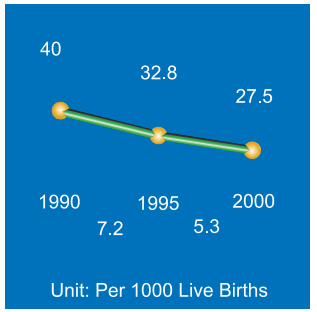
Myanmar



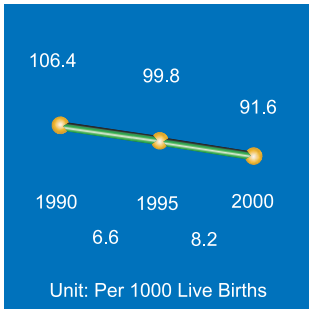
Thailand



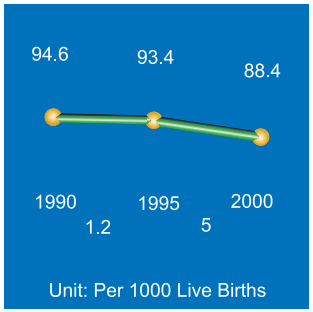
Vietnam



Lao PDR



Cambodia



Note: There is significant difference between the highest and lowest infant mortality rate. The lowest is three (Singapore) while the highest is 92 (Lao PDR). The overall trend is encouraging – the infant mortality rate has decreased for every country. For Singapore and Malaysia, the rate halved from 1990 to 2000.

Source: World Development Indicators 2002

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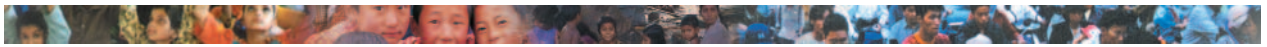
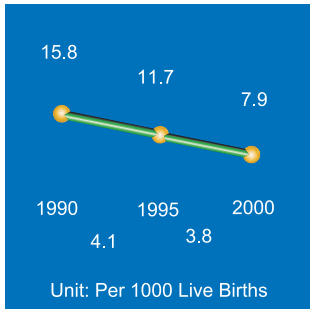
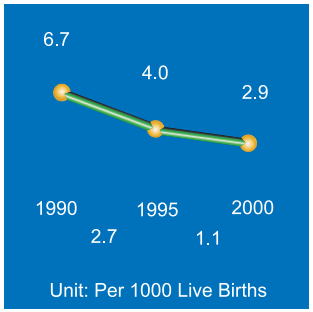


Social Indicator - Infant Mortality Rate

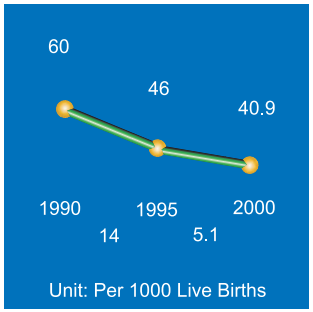
Malaysia



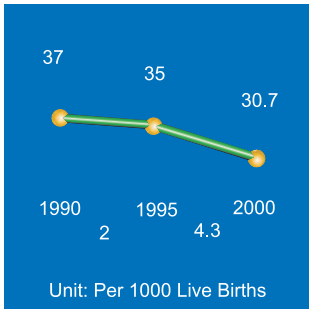
Singapore



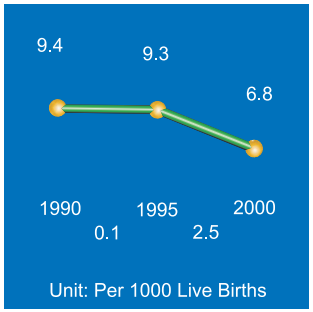
Indonesia

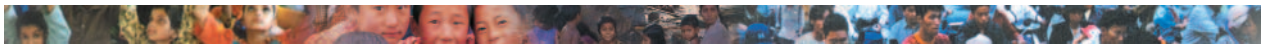


Philippines



Brunei

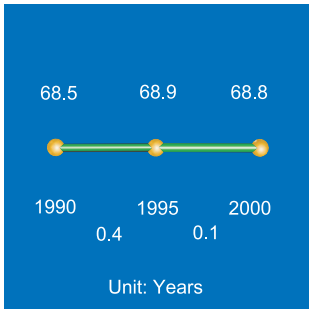




Social Indicator - Life Expectancy at Birth

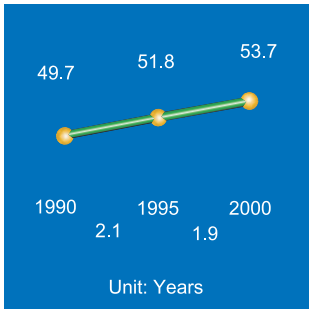
Myanmar

Thailand



Vietnam

Lao PDR

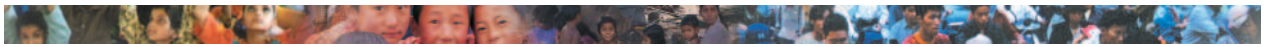


Cambodia

Note: Singapore has the highest life expectancy at birth - 77.7 years and Lao PDR has the lowest – 53.7 years. The life expectancy at birth has increased for all countries of the region from 1990 to 2000. Vietnam has shown the highest increase in life expectancy at birth during the last decade.

Source: World Development Indicators 2002, ASEAN State of Environment 2000 Report

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC



Social Indicator - Life Expectancy at Birth

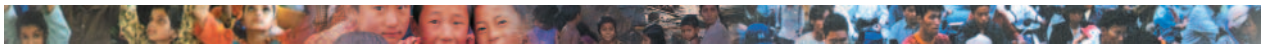
Malaysia

Singapore

Indonesia

Philippines

Brunei



Economy Indicator

Economic growth and poverty are linked. A stagnant or bad economy can exacerbate poverty. This can be seen in the case of the Southeast Asian countries such as Indonesia, Malaysia, Thailand and Philippines, which were the worst affected by the Asian economy crisis. With their economies floundering, countries such as Malaysia, Indonesia and Thailand actually saw an increase in poverty. For instance, the incidence of poverty in Indonesia jumped from 14.7 per cent in 1996 to 23 per cent in 1999. Economic growth is needed to alleviate poverty levels. Benefits of economic growth usually trickle down to even the lowest strata of society. Though economic growth might also lead to greater inequality within society. Care has to be taken that the benefits of economic progress are equitably distributed. Thus, in addition to economic progress, institutional and policy support and intervention is necessary to ensure sustainable and equitable development.

The effect of the 1997-98 Asian economy crisis can be seen in the GDP figures. After a period of high growth in the first half of the 1990s, countries that suffered the economic crisis of 1997 –98 showed a significantly lower growth rate in the latter half of the 1990s. Thailand and Indonesia were two countries whose GDP growth rate halved from 1990 to 2000, as these countries were severely affected by the economic crisis. Myanmar and Cambodia were not that badly affected by the economic crisis of 1997 –98. Agriculture is the dominant sector in the economies of Myanmar and Cambodia. Myanmar showed a good increase in GDP growth rate in the latter half of the decade while Cambodia showed a remarkable increase in GDP growth rate during the first half of the decade.

In the year 2000, Indonesia showed largest Gross National Income (GNI) in the sub-region. Singapore was second, followed by the Philippines. In the latter half of the decade, Indonesia, Malaysia and Thailand showed a decreasing trend of GNI. This again was because of the Asian economic crisis. Thailand showed a decrease in GNI from US$162.3 billion in 1995 to US$40.1 billion in 2000.

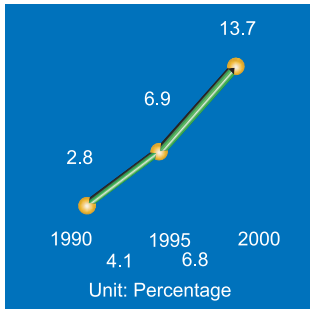
The highest GNI per capita was recorded in Singapore and Brunei. Singapore is an OECD country and Brunei is an oil-rich microstate. Thailand, Malaysia and Indonesia showed a decreasing trend of GNI per capita in the latter half of the decade, again a consequence of the Asian economic crisis. The lowest GNI per capita was observed in Cambodia followed by Lao PDR and Vietnam in 2000. Poverty especially in the rural areas is an urgent issue in these countries. Moreover, as development and investment gets concentrated in and around the urban areas, rural poverty is perpetuated. Rapid urbanization creates urban environmental problems while rural poverty exacerbates environmental degradation. Appropriate development policies are needed, which address the increasing disparity between rural and urban incomes.

Based on GNI per capita, Cambodia, Lao PDR, Myanmar and Vietnam fall in the low-income bracket; Indonesia, The Philippines and Thailand fall in the lower middle; Malaysia in the upper middle and Brunei and Singapore in the high-income bracket.

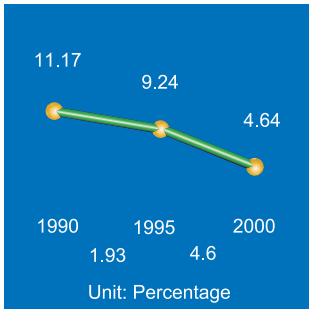
Energy consumption is another indicator of socio-economic development. Energy consumption in a high-income country such as Singapore is much higher than the energy consumption for countries such as Myanmar and Vietnam.

Economy Indicator - Gross Domestic Product Annual Growth

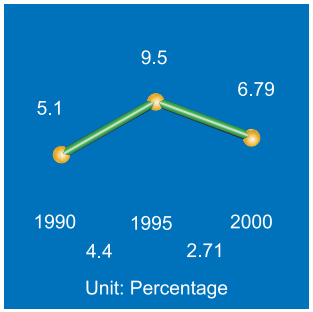
Myanmar



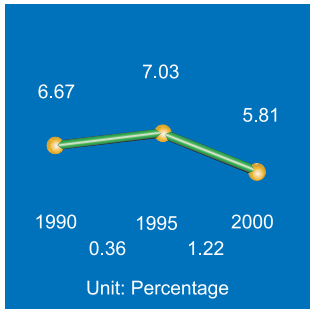
Thailand



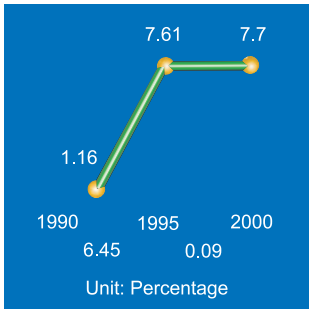
Vietnam



Lao PDR

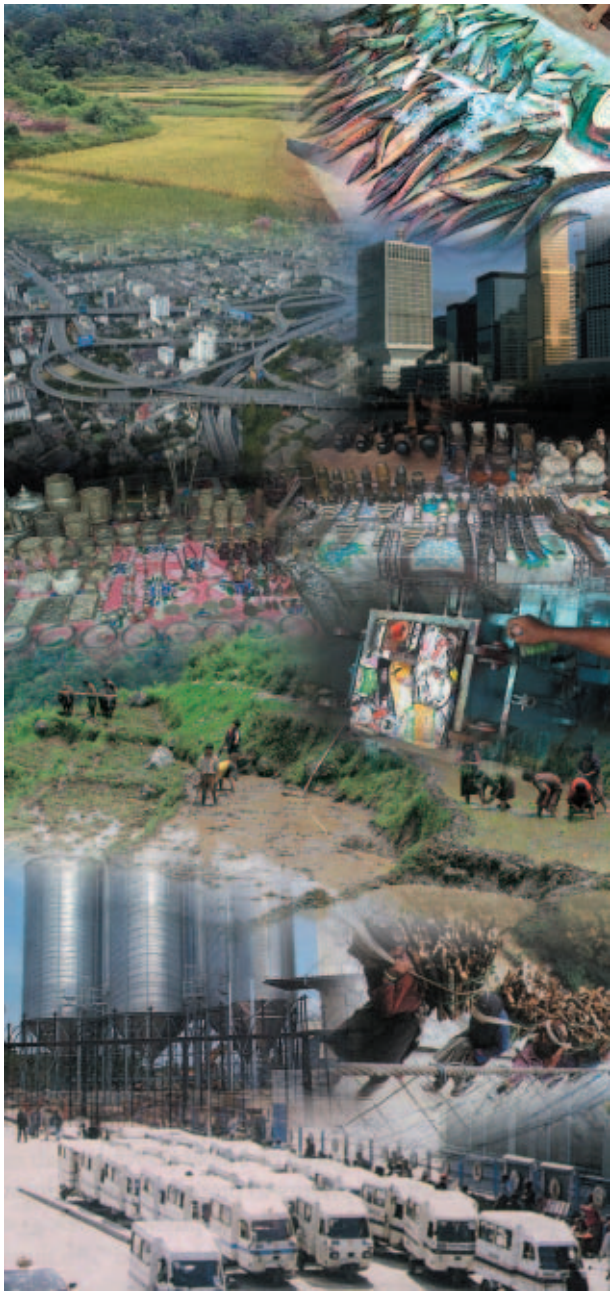


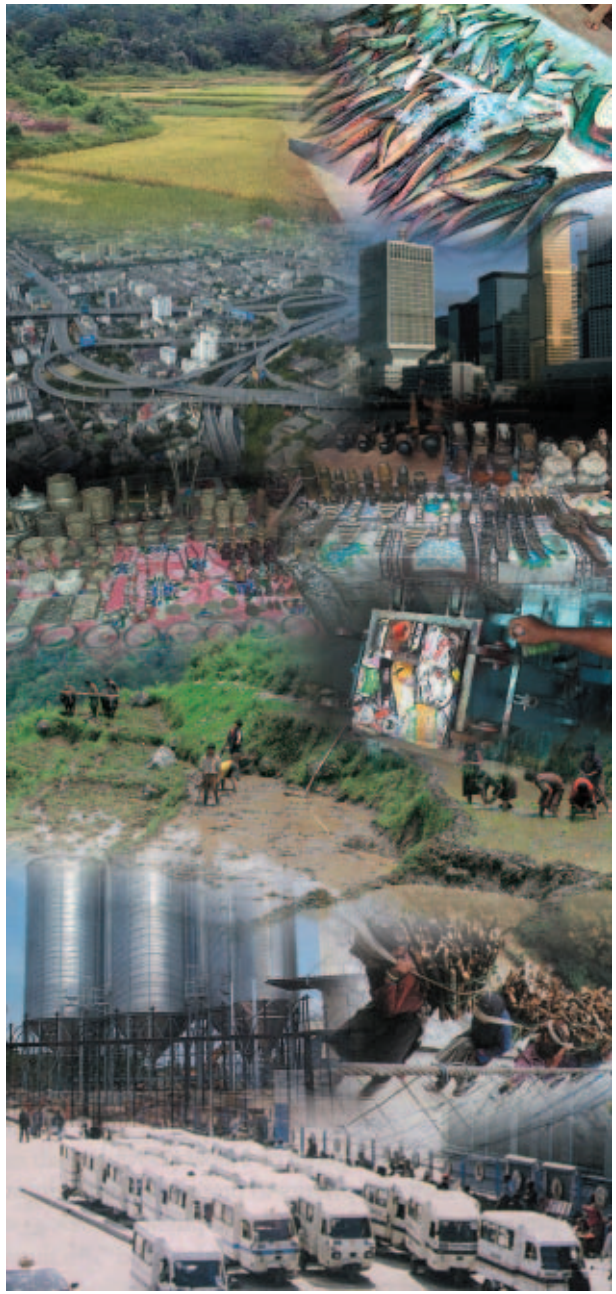
Cambodia



Note: The Asian economic crisis in 1997-98 affected the economies of some of the countries of the region. GDP growth rate in Thailand and Indonesia halved from 1990 to 2000, due to the Asian economic crisis. On the other hand, Myanmar and Cambodia showed high GDP growth rate over the past decade.

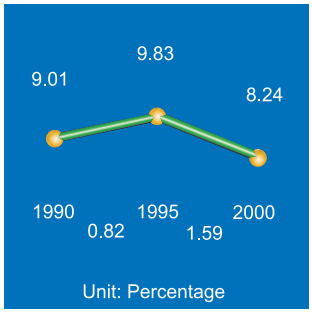
Source: World Development Indicators 2002, World Bank 2003



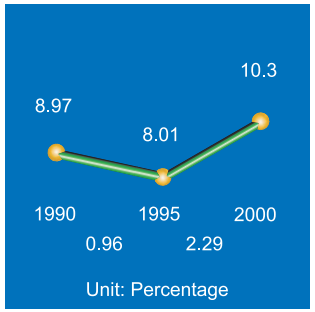


Economy Indicator - Gross Domestic Product Annual Growth

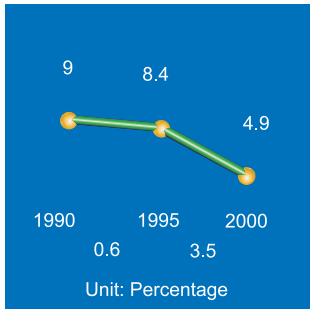
Malaysia



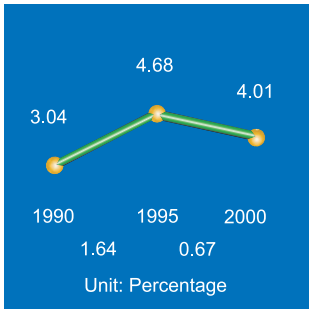
Singapore



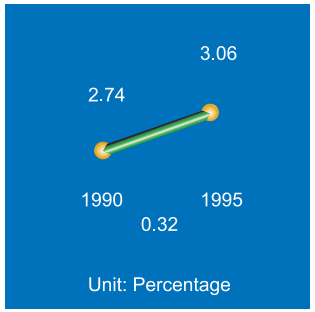
Indonesia



Philippines

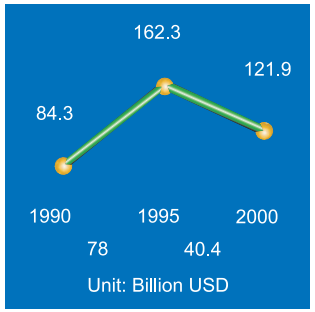


Brunei

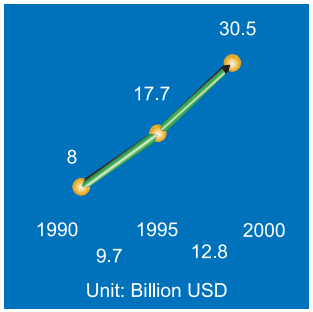


Economy Indicator - Gross National Income

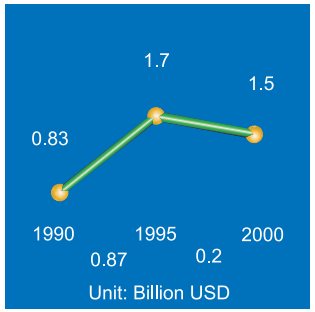
Thailand



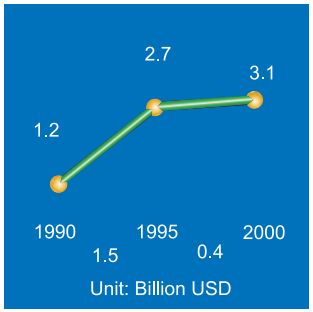
Vietnam



Lao PDR

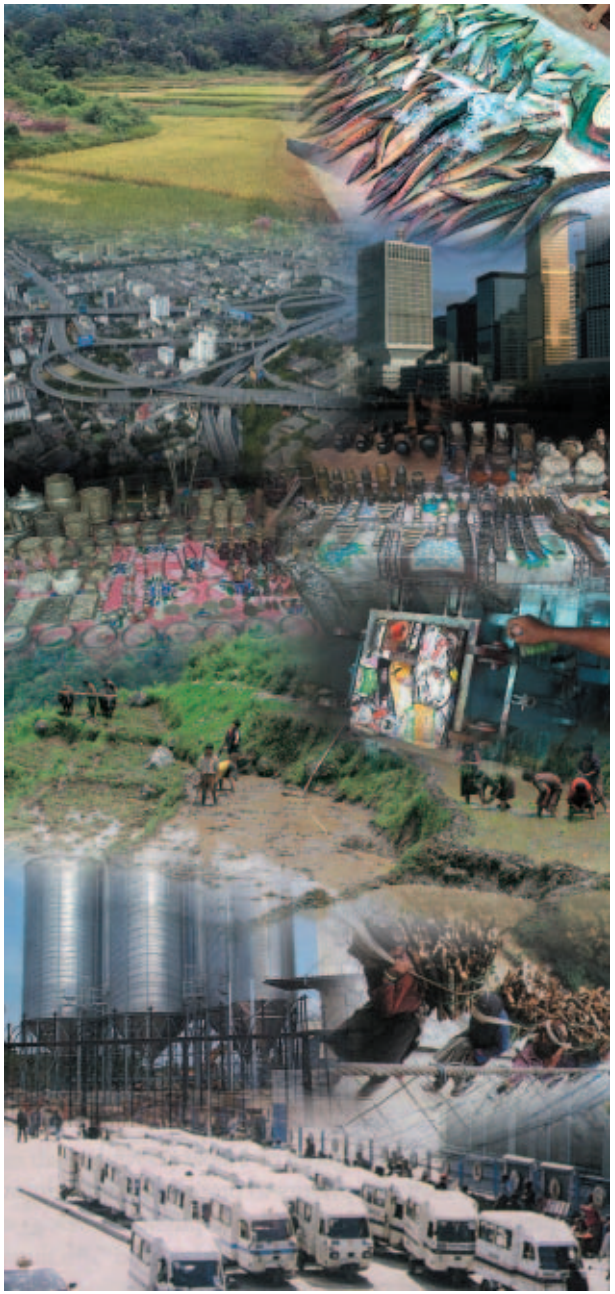


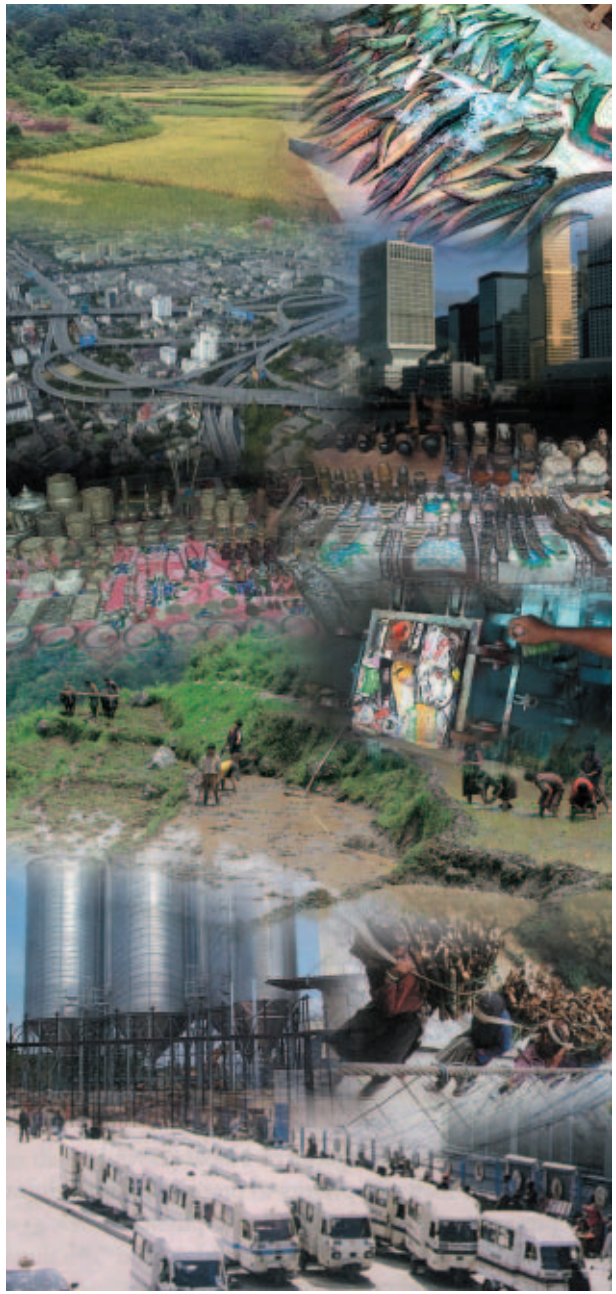
Cambodia



Note: Indonesia had the largest Gross National Income (GNI) in the subregion, followed by Thailand. Lao PDR has the lowest GNI in the subregion. Thailand, Malaysia and Indonesia showed a decreasing trend of GNI during the latter half of the decade, as they were reeling under the Asian economic crisis.

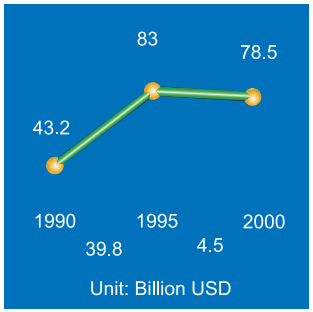
Source: World Development Indicators 2002



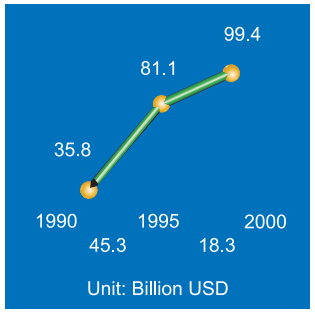


Economy Indicator - Gross National Income

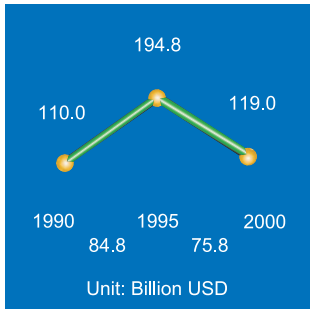
Malaysia



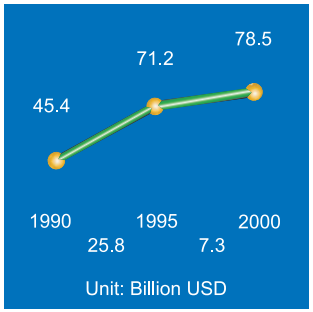
Singapore



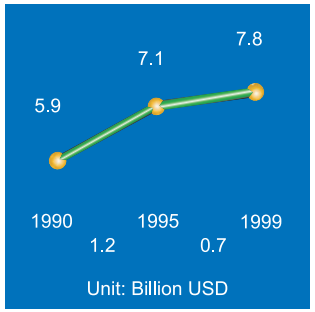
Indonesia



Philippines

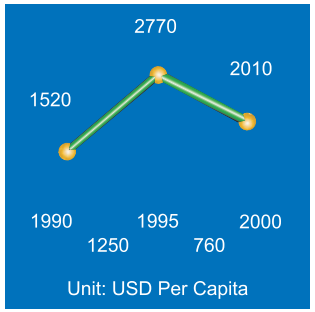


Brunei

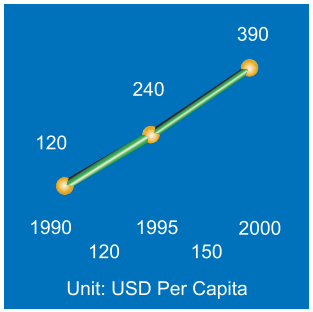


Economy Indicator - Gross National Income Per Capita

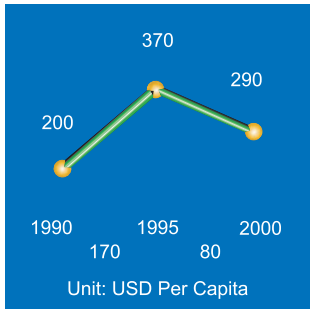
Thailand



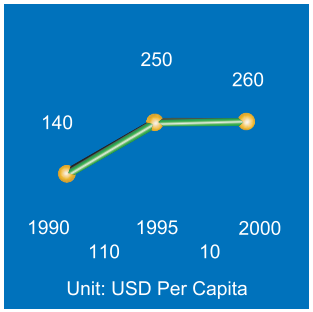
Vietnam



Lao PDR

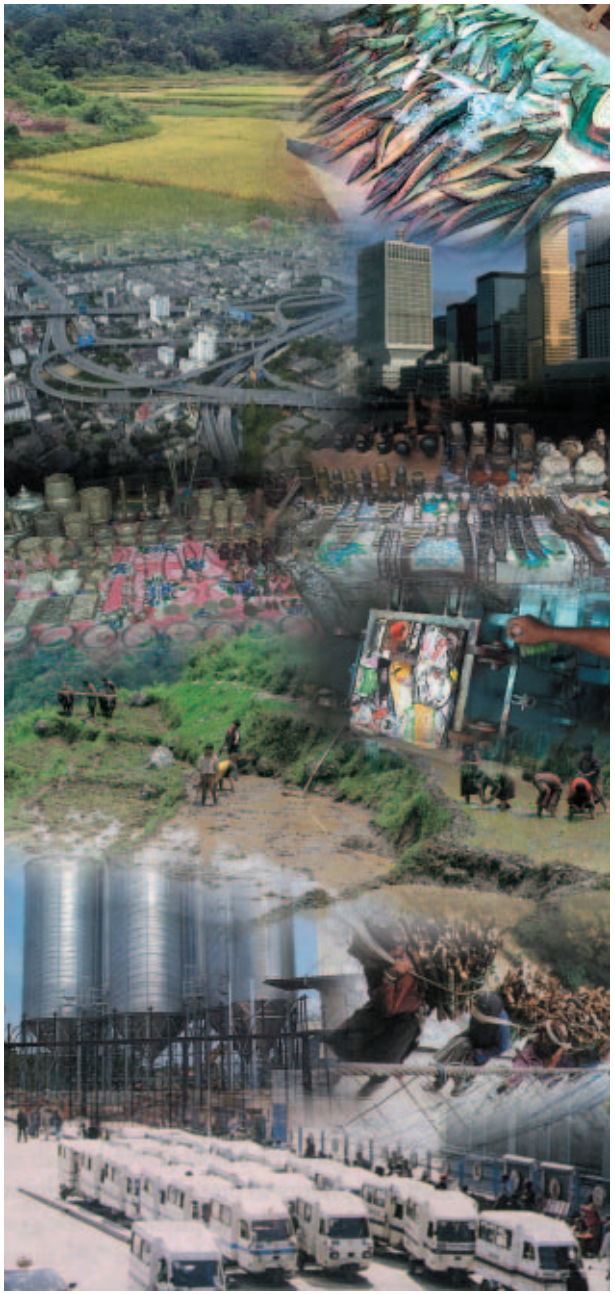


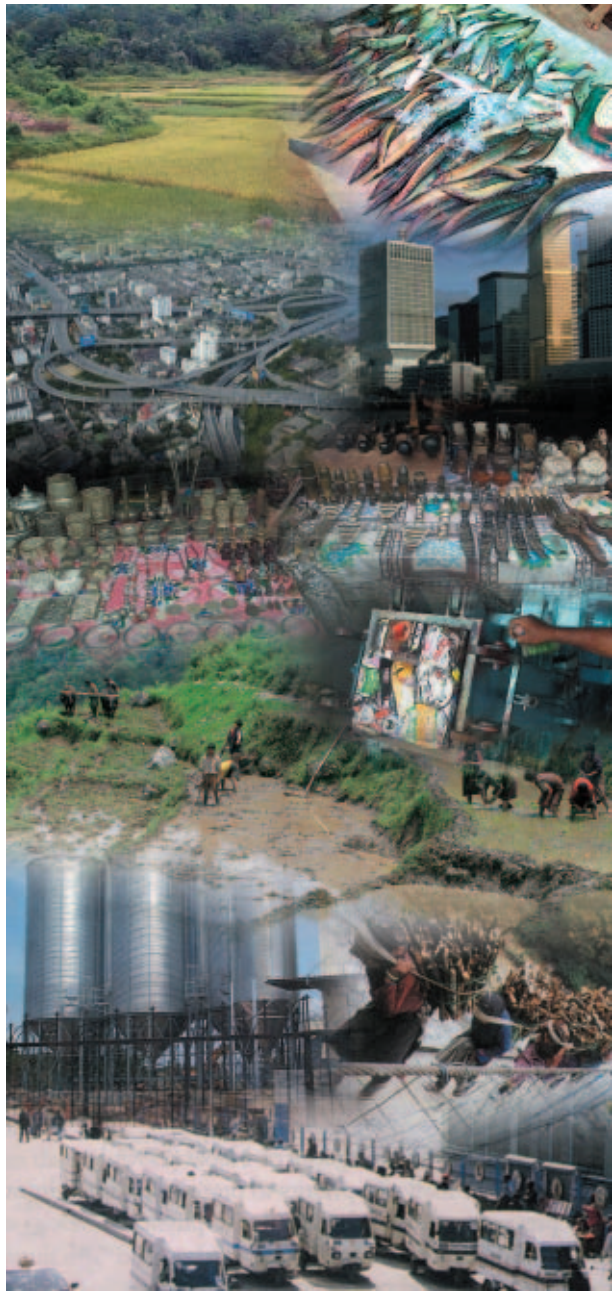
Cambodia



Note: Singapore and Brunei had the highest Gross National Income (GNI) per capita, in the region, while Cambodia had the lowest followed by Lao PDR and Vietnam. There is significant difference in the high and low GNI per capita of the region, Singapore is US$24190/capita while Cambodia is US$260/capita.

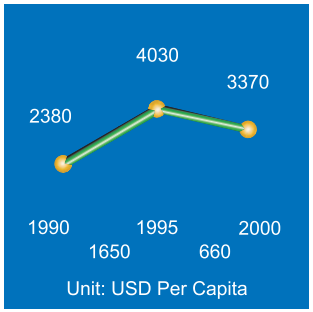
Source: World Development Indicators 2002



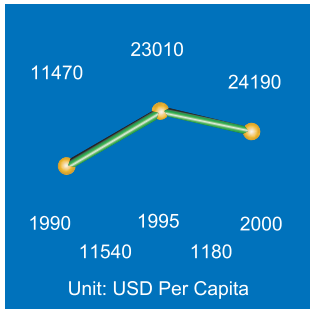


Economy Indicator - Gross National Income Per Capita

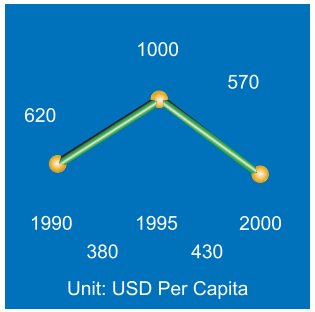
Malaysia



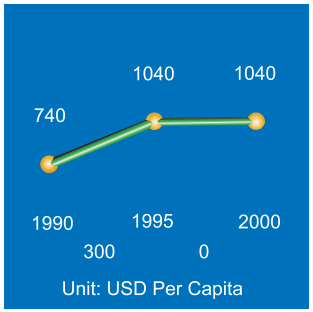
Singapore



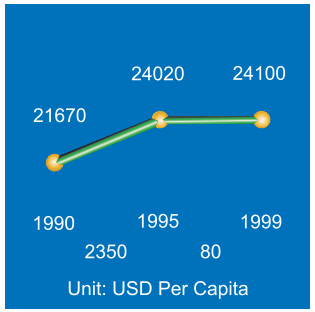
Indonesia



Philippines

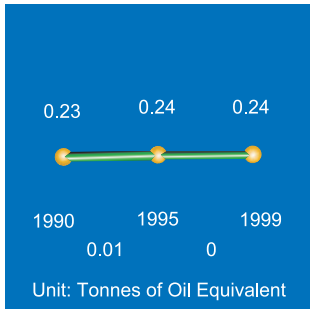


Brunei

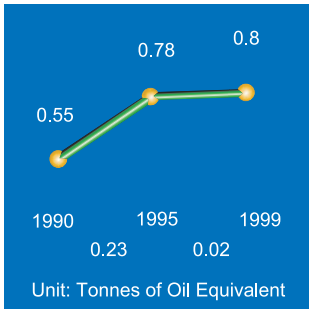


Economy Indicator - Energy Consumption Per Capita

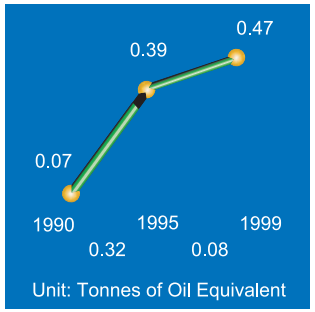
Myanmar



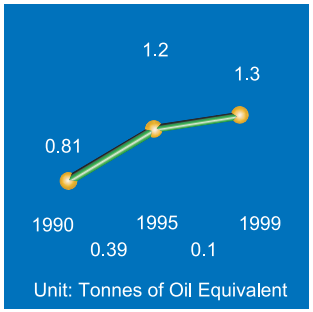
Thailand



Vietnam

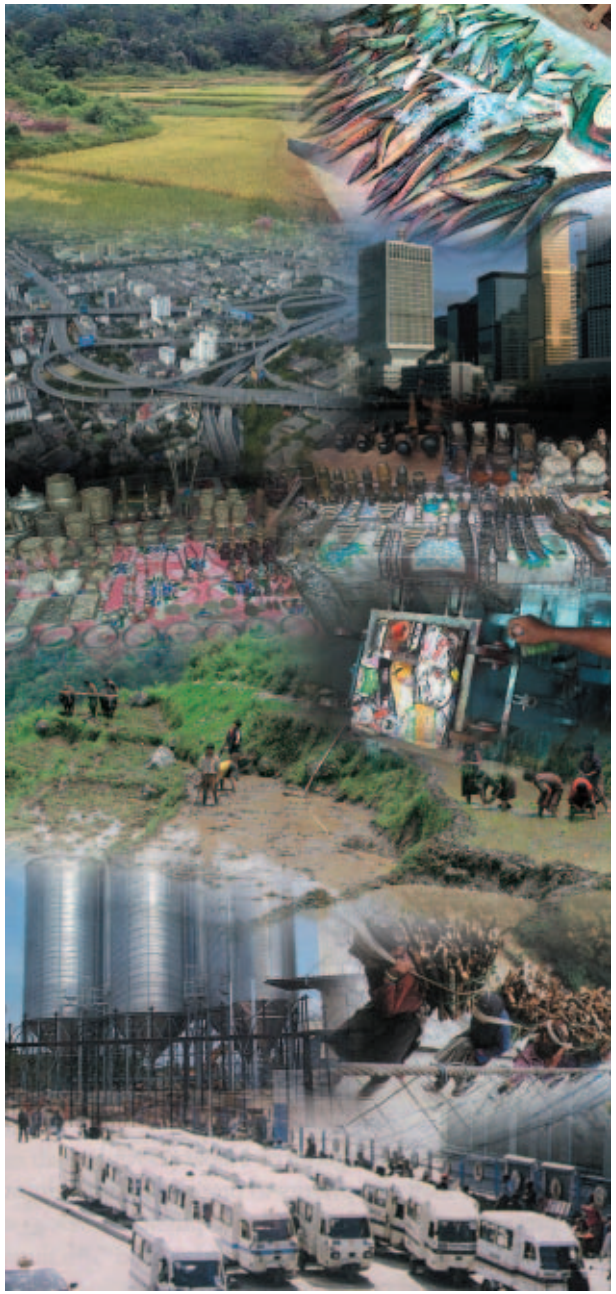


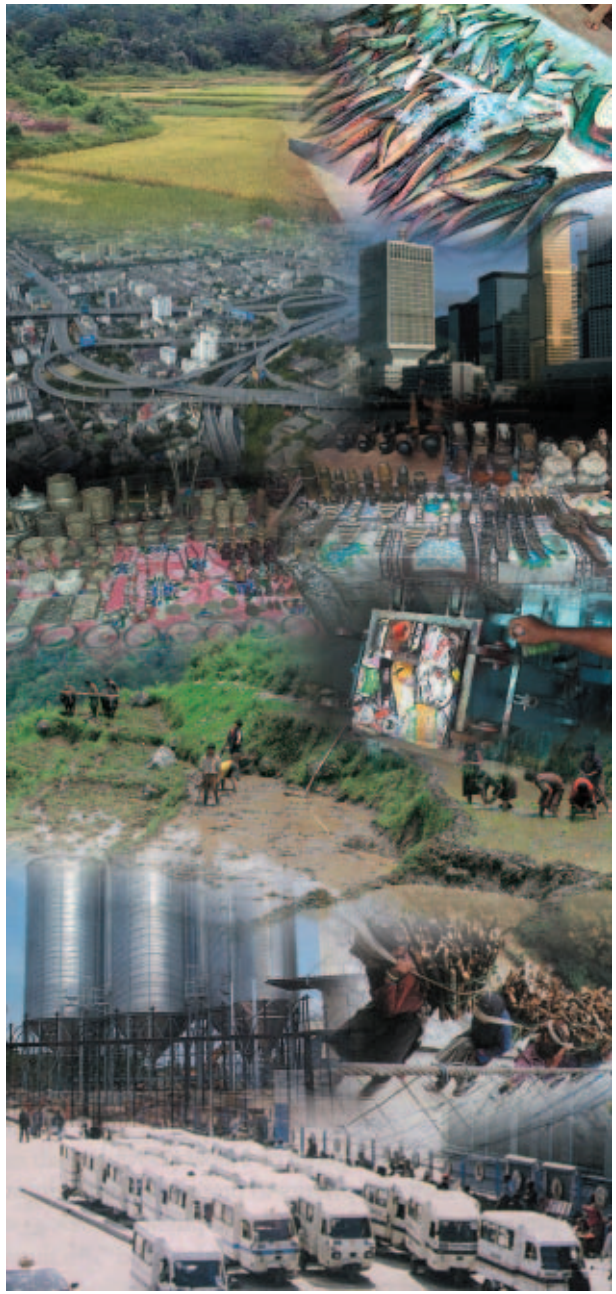
Malaysia



Note: Singapore has the highest energy consumption per capita (2.59 tonnes of oil equivalent) in the region followed by Brunei. Singapore and Brunei are the richer countries of the region, hence they have higher energy consumption. Myanmar has the lowest energy consumption – 0.24 tonnes of oil equivalent.

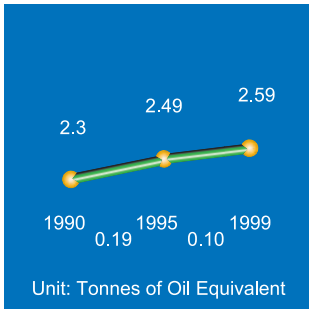
Source: GEO III Grid date UNEP, Asia Development Bank



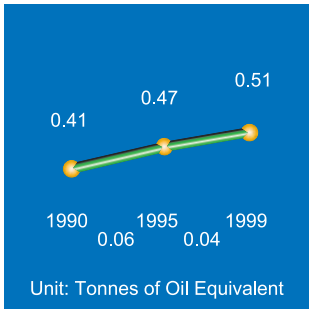


Economy Indicator - Energy Consumption Per Capita

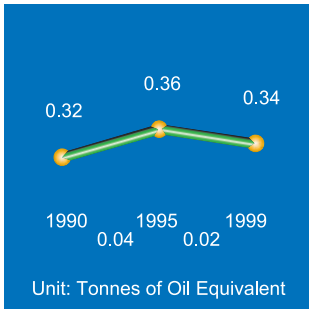
Singapore



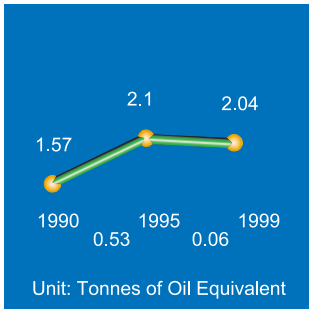
Indonesia



Philippines



Brunei



Land Indicator

Southeast Asia occupies 3.3 per cent of the world's total land area and remains one of the most heavily forested regions of the world; over 48 per cent of the land area is under forest cover compared to only 18 per cent for Asia overall and less than 30 per cent globally. More than half the countries of the region have more than 50 per cent of their land area under forest cover. But growing population, urbanization, logging and increasing agricultural pressure has lead to deforestation in the region. Latest available figures show an average deforestation rate in the region of 1.8 per cent, rendering a total loss of original forest cover of around 2.4 million hectares between 1990 and 1997. Forest area has decreased for all the countries of the region, except for Singapore where it has remained constant and Vietnam where it has increased. Brunei is the most forested country in the region with more than 80 per cent of its land under forest cover. Brunei is dependent on its oil and natural gas resources for economic growth and has not needed to exploit its forest cover for agricultural and other purposes. Thus, the percentage of forestland remains high.

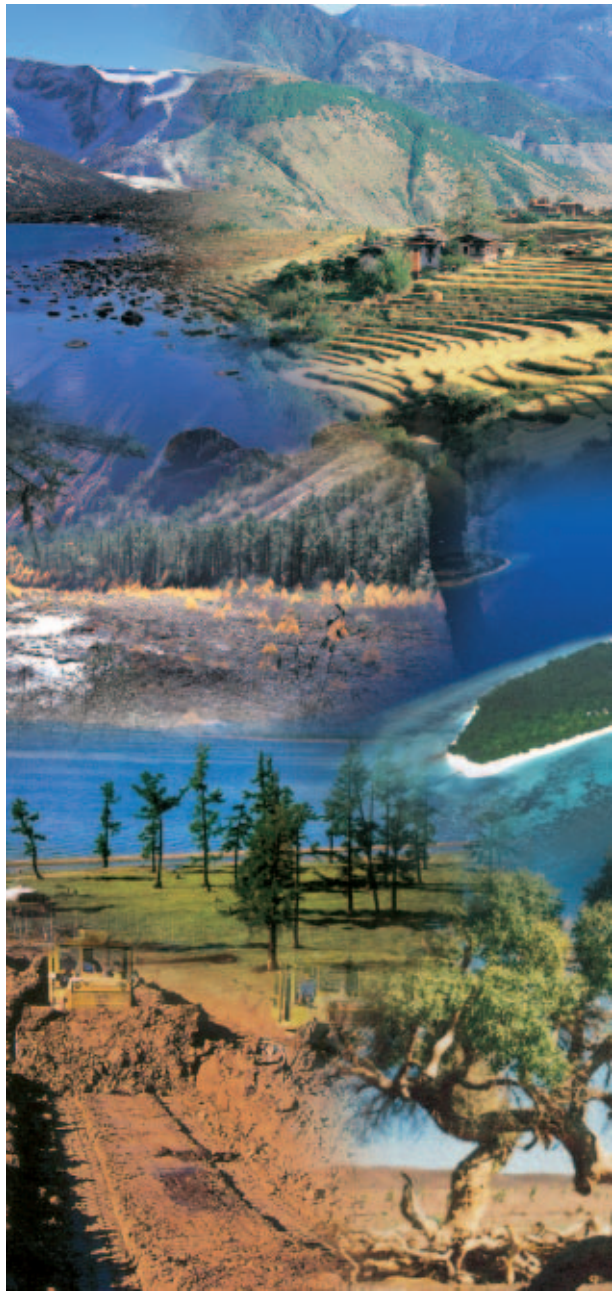
All countries except for Singapore (there is no change) and Vietnam (there is a positive change) show a negative trend in forest cover change i.e. forest cover has decreased over the two decades.

Commercial logging and the consequent deforestation have lead to soil erosion and land degradation. Unsustainable agricultural practices such as overuse of fertilizers, shifting agriculture, improper irrigation and overgrazing by livestock have also lead to land degradation. Loss of topsoil by surface water erosion is the most pervasive form of land degradation found in the sub-region. Land degradation and deforestation have a negative impact especially on the lives of the rural poor, causing a loss of livelihood, thus forcing further poverty on them.

The arable land available per capita has generally shown a decrease for countries of the region over the last decade. Population pressure and increasing land degradation, which leads to declining soil fertility, are among the main causes of this decrease. Southeast Asia is also urbanizing at a rapid rate. In 1999, thirty eight per cent of the Southeast Asian population lived in urban areas. The level of urbanization is steadily increasing and will result in a doubling in the level of urbanisation in most countries by 2015. This urban land expansion is occurring at the expense of the adjacent arable lands.

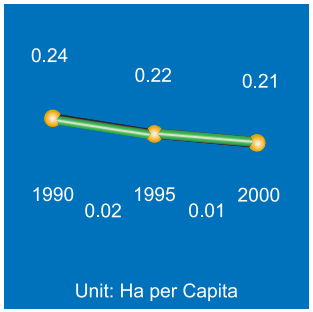
Arable land per capita data is not available for Brunei, which is not surprising as Brunei's economy is not agro-based but is mainly dependent on oil and natural gas exports. Cambodia and Thailand have shown substantial decrease in the available arable land per capita. There has been a decrease of almost 10 ha/capita in these countries. Indonesia and Malaysia have shown an increase in available arable land per capita. This increase is at the cost of the forestland. Usually forested area is cleared to use the land for agricultural purposes. Vietnam has the least amount of arable land per capita while the highest is in Malaysia.

Agriculture is an important sector in Southeast Asia. Loss of arable land and decrease in agricultural land productivity can seriously affect the social and economic well being of the region. Policy measures that integrate the various causes of land degradation and formulate steps that can check land degradation are needed in the region.

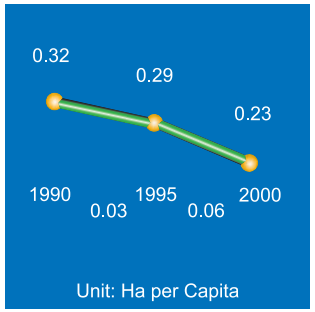


Land Indicator - Arable Land Per Capita

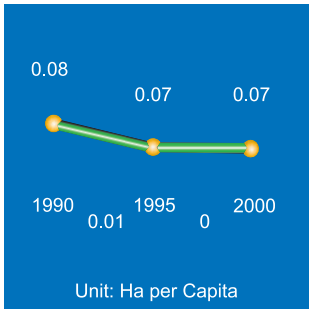
Myanmar



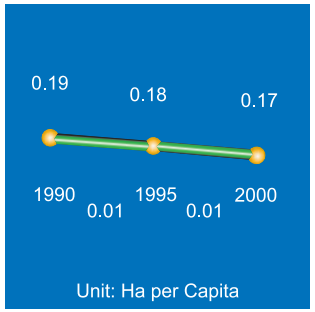
Thailand



Vietnam



Lao PDR

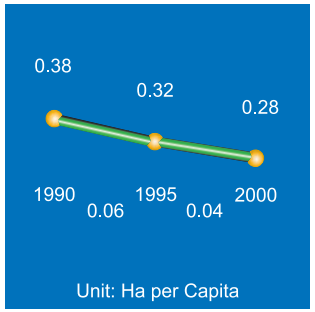


Note: Arable land available per capita has generally shown a decrease for countries of the subregion. Indonesia and Malaysia have shown an increase in available arable land per capita. This increase could be at the cost of the forestland. Vietnam has the least amount of arable land per capita while the highest is in Malaysia.

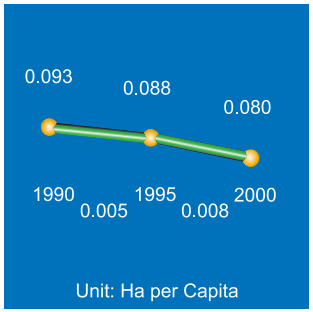
Source: FAOSTAT Agricultural Database 2003

Land Indicator - Arable Land Per Capita

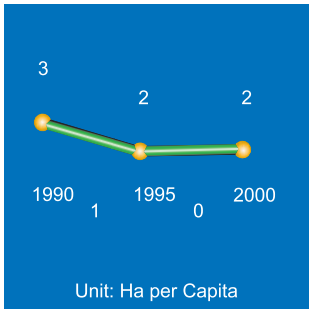
Cambodia



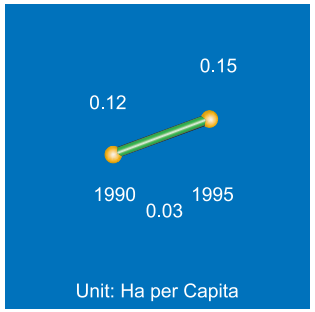
Malaysia



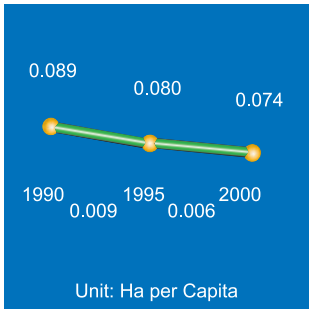
Singapore

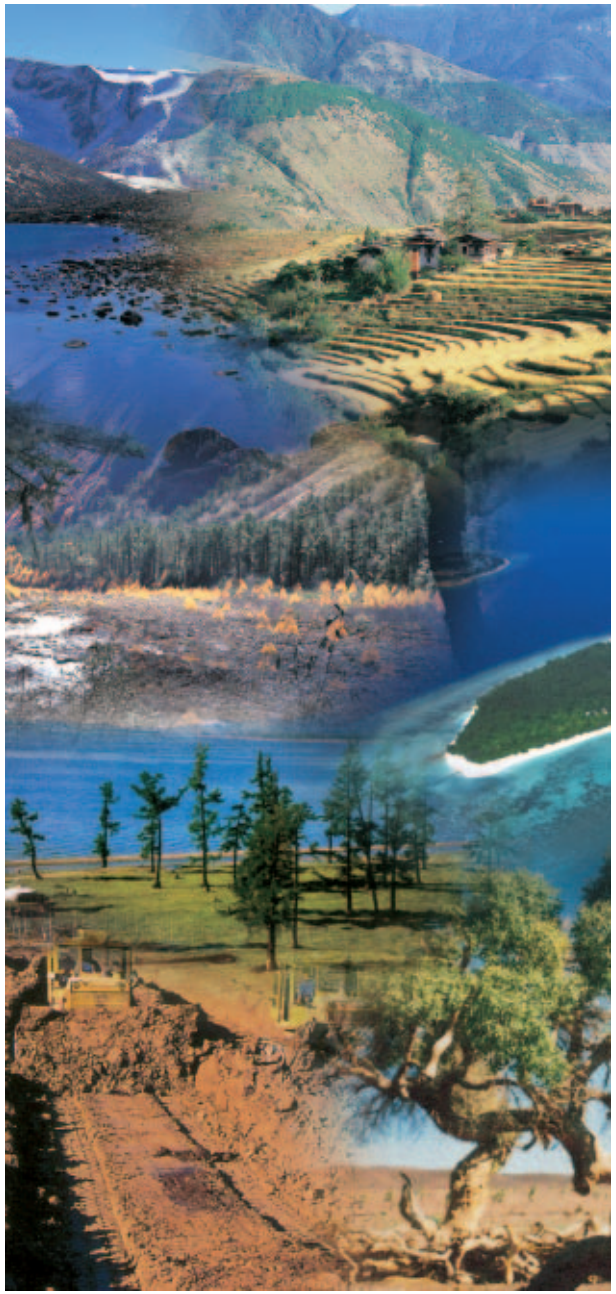


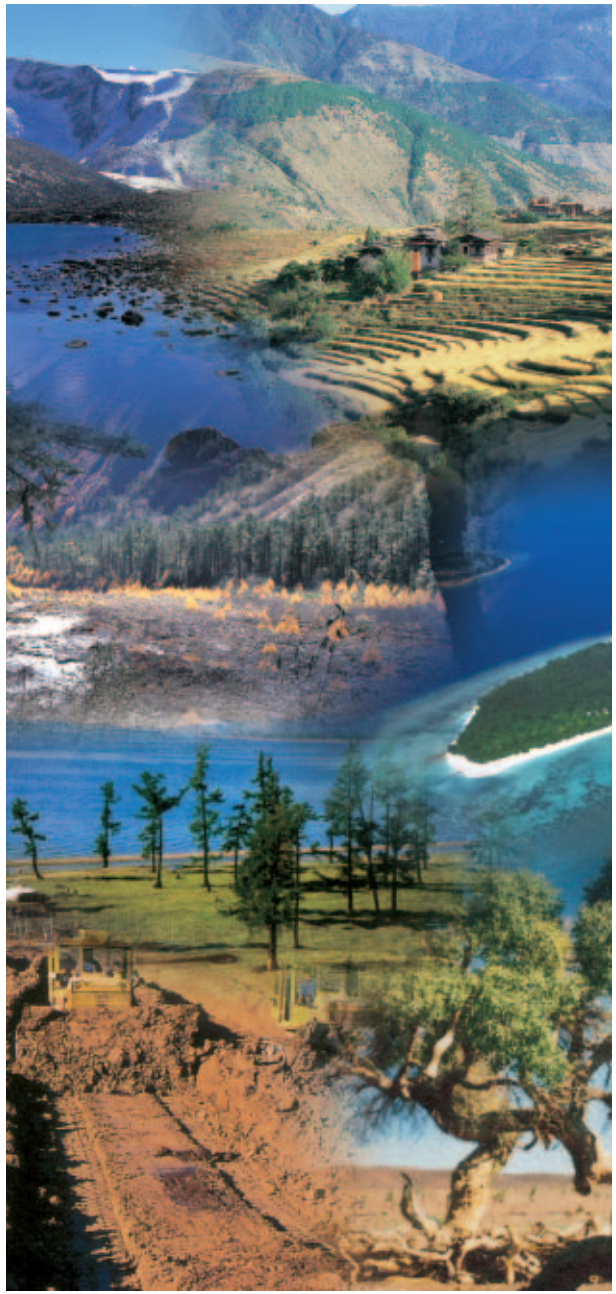
Indonesia



Philippines

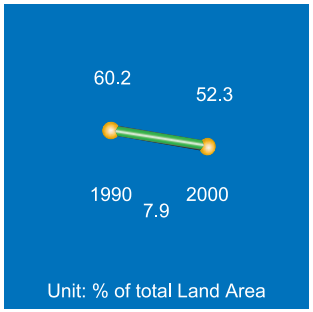




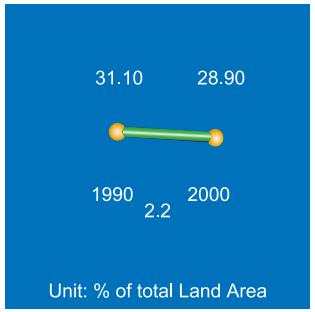


Land Indicator - Forest Area

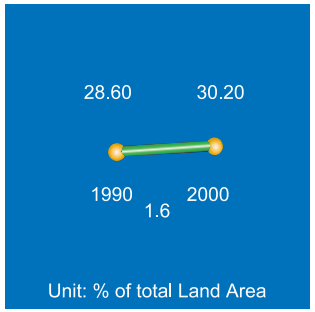
Myanmar



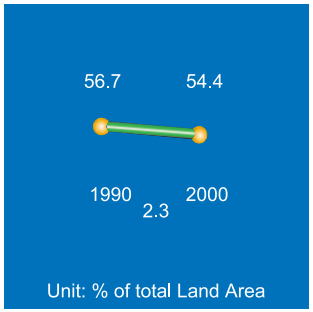
Thailand



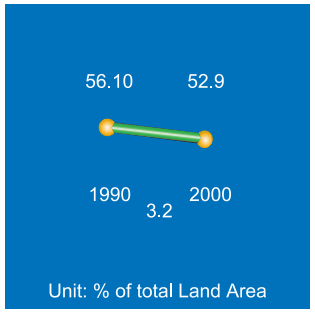
Vietnam



Lao PDR



Cambodia

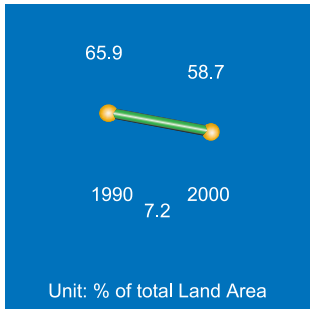


Note: Forest area has decreased for all the countries of the region, except for Singapore where it has remained constant and Vietnam where it has increased. Brunei is the most forested country in the region with more than 80 per cent of its land under forest cover. Population, urbanisation and agriculture pressure has lead to decrease in forest cover.

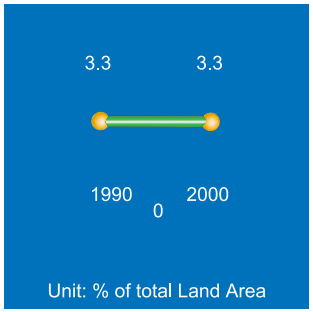
Source: World Development Indicators 2002

Land Indicator - Forest Area

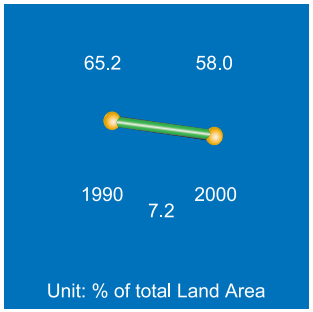
Malaysia



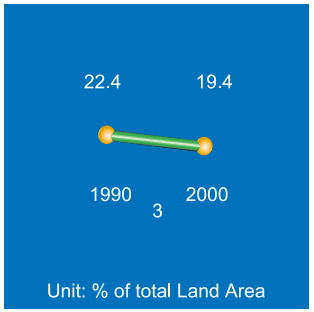
Singapore



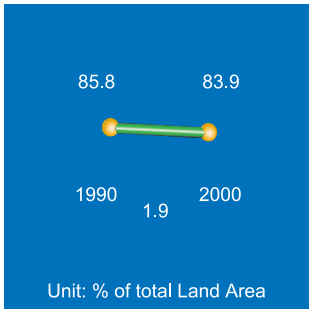
Indonesia

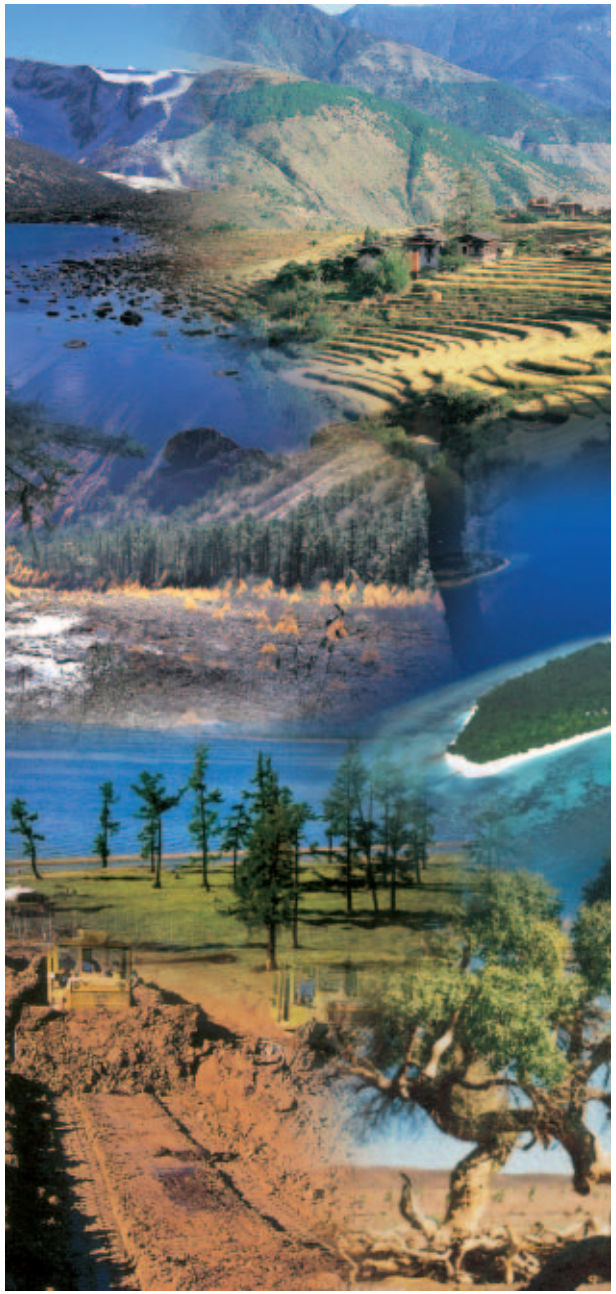


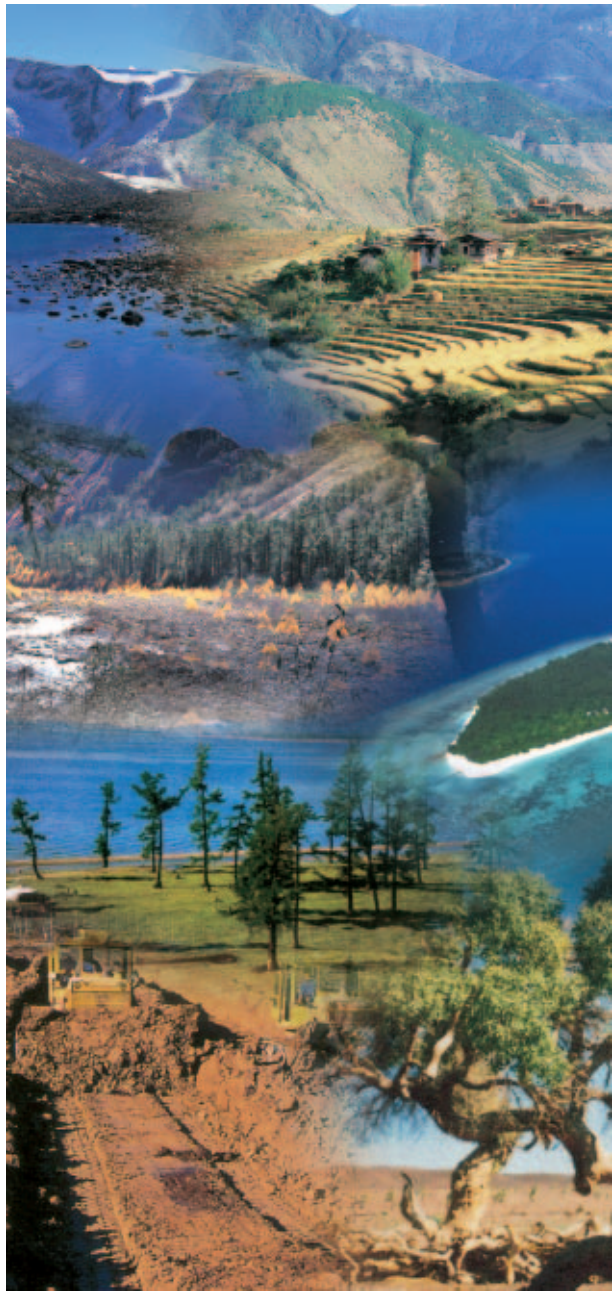
Philippines



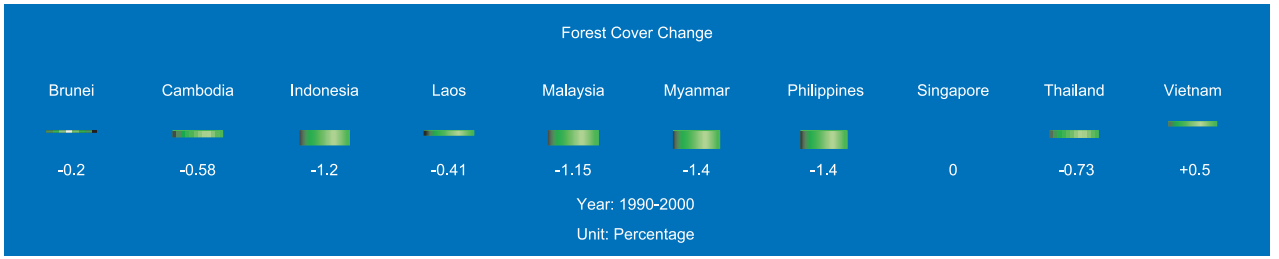
Brunei







Land Indicator - Forest Cover Change



Note: All countries except for Singapore (there is no change) and Vietnam (there is a positive change) show a negative trend in forest cover change i.e. for all countries, forest cover has decreased over the last decades. Philippines showed the highest rate of decreasing forest cover with an annual decrease of approximately 1.4 per cent.

Source: World Bank 2003, FAO, ASEAN SoE 2000

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Water Indicator

Unsafe drinking water and poor sanitation is among the main cause of disease and ill health in developing countries. This in turn, leads to a decreased work force and increased government spending on health – money most developing countries lack.

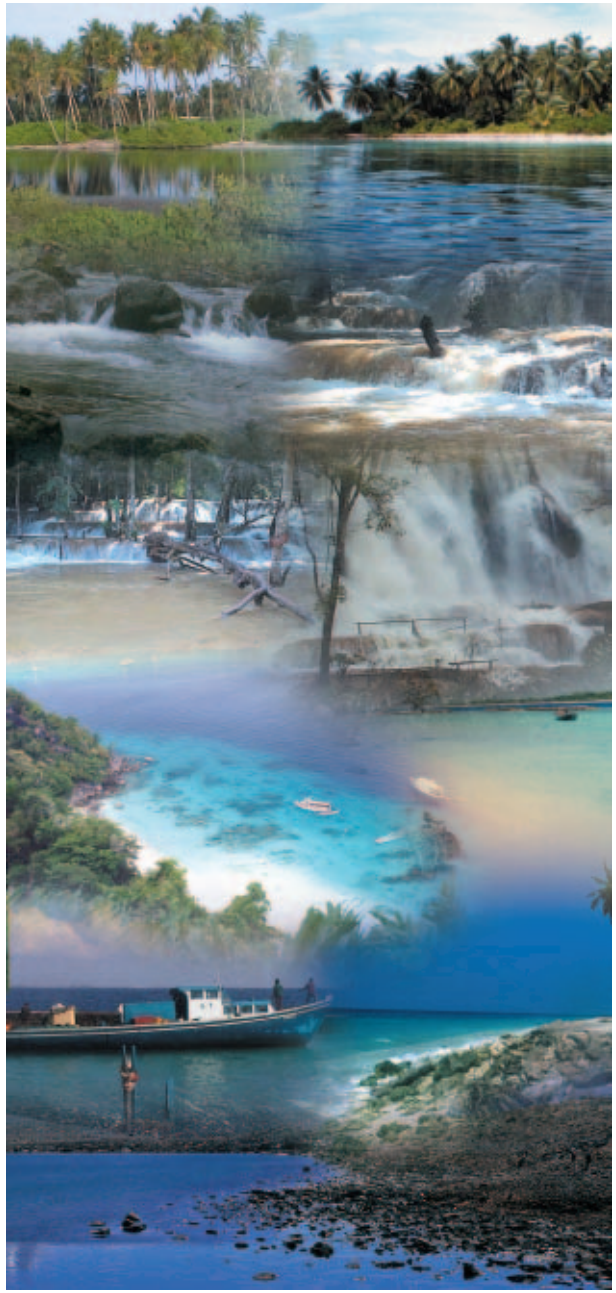
In Southeast Asia alone, diarrhea-related diseases killed more than one million people in 1999, nearly half of all deaths from such cases in the world. Contaminated water and poor sanitation were the main causes of the deaths. BOD data is not available for all the countries in Southeast Asia, but water pollution is an important environmental concern in the region. For example, there is evidence that the rivers of Metro Manila can be considered biologically dead because of excessive pollution discharge. The pollution of water bodies in Bangkok has reached extreme levels in the Bangkok Metropolitan Region. Water pollution is caused mainly by the discharge of untreated or inadequately treated wastewater from domestic, industrial and agricultural point sources as well as surface runoff from non-point sources.

Moreover, Southeast Asia has been rapidly urbanizing. Rapid urbanization and industrialization have contributed to pollution of water-sources. Sewage from cities and industrial effluents are indiscriminately dumped in rivers.

Urbanization has also resulted in other urban environmental concerns. Urban centers in most countries do not have complete and full access to safe water and sanitation. Though the urban population has more access to safe water and sanitation in comparison to their rural counterpart. But squatter settlements and slum dwellings in cities face similar lack of access to safe water and sanitation. Singapore has the highest figure for percentage of population with access to safe drinking water (the entire population has access to safe drinking water). Cambodia and Lao PDR have the lowest figures, with less than half the population in both countries having access to safe drinking water. Over the decade, all countries have shown a slight increase in the percentage of population with access to safe drinking water.

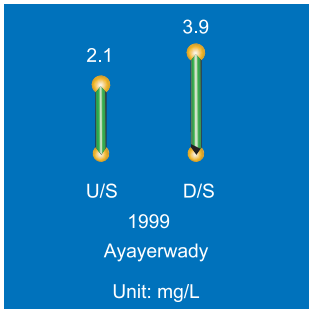
Access to safe sanitation follows the same trends as access to safe water, as both the indicators are closely linked and dependent on similar socio-economic factors. Singapore has the highest figure while Cambodia and Lao PDR have the lowest figures. Thailand has shown considerable improvement in population with access to safe sanitation. By 2000, almost the entire population had access to safe sanitation. Myanmar also has shown improvement in percentage figures, with a jump from 45 per cent in 1990 to 64 per cent in 2000.

Southeast Asia receives abundant rainfall and has been blessed with abundant water resources. The volume of water actually available per person for use in Southeast Asia in the year 2000 was 4900 cubic metres, which is considerably higher than the per capita water availability for most of Asia-Pacific. Deteriorating water quality is an important issue. National water standards and legal framework needs to be promulgated and enforced to improve water quality in the region. Also, water demand has intensified to meet to increasing needs of irrigated agriculture and other industrial activities. Malaysia had the highest per capita water availability in the region, while Singapore had the lowest.

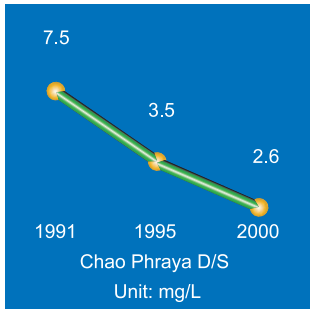


Water Indicator - BOD in Major Rivers

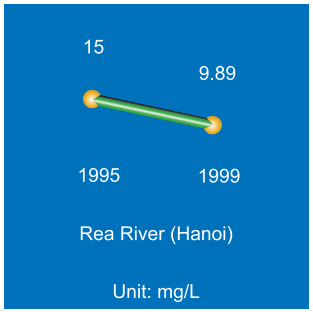
Myanmar



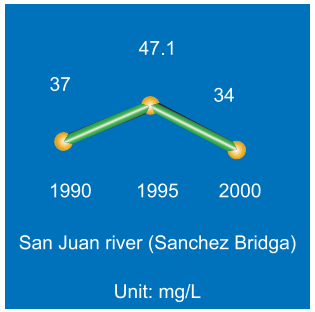
Thailand



Vietnam



Philippines

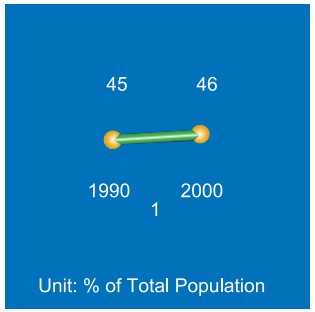


Note: Water quality is of concern in the developing nations of Southeast Asia such as Thailand and Philippines. Available data is not sufficient for analysis of bio-chemical oxygen demand in rivers of Southeast Asia, but empirical evidence shows that river water quality is deteriorating in the region.

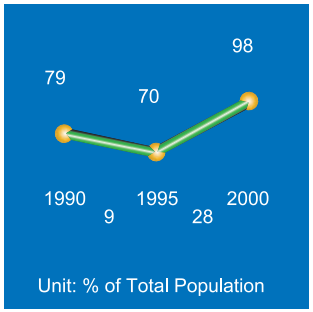
Source: Philippines Environmental Quality Report 1990-95, Environmental Atlas of GMS ADB-UNEP RRCAP,

Water Indicator - Access to Safe Sanitation

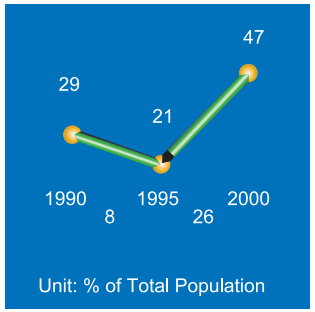
Myanmar



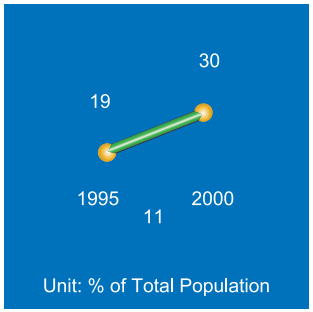
Thailand



Vietnam

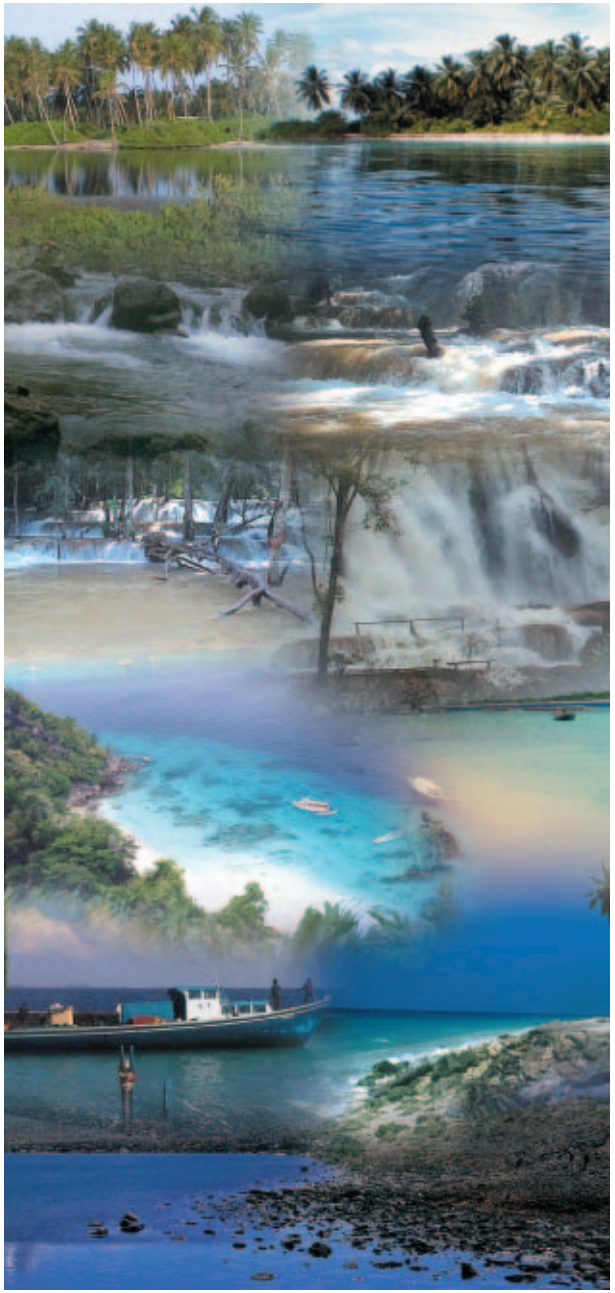


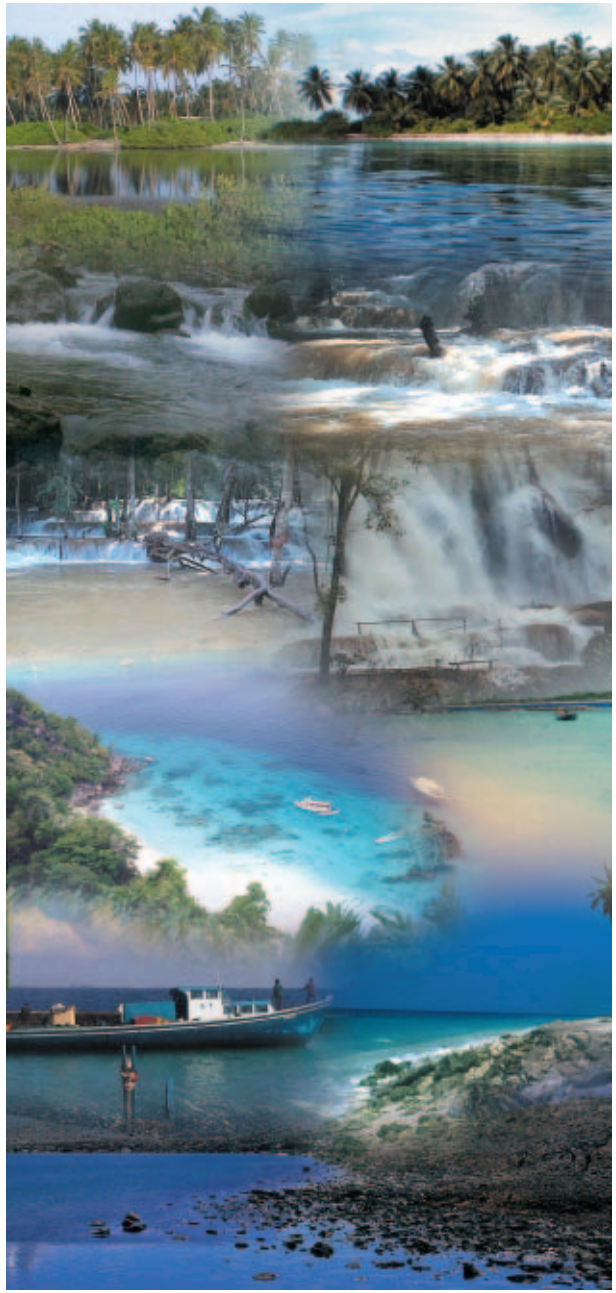
Lao PDR



Note: The entire population in Singapore has access to safe sanitation while in Cambodia only 18 per cent of the population has access. Thailand has extended its coverage of safe sanitation from three quarters of the population at the beginning of the decade to nearly the entire population by the end. Myanmar and Cambodia have also shown significant improvements.

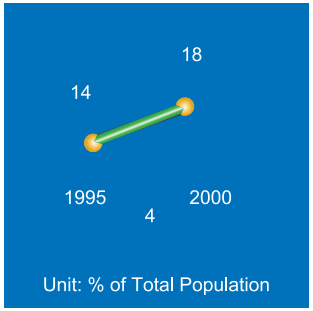
Source: World Development Indicators 2002, ASEAN SoE 2000, Consultative Group on International Agriculture Research



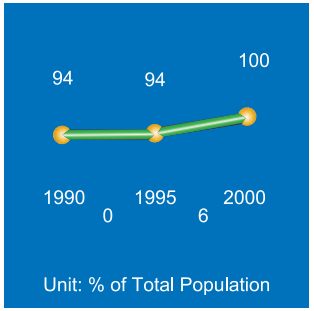


Water Indicator - Access to Safe Sanitation

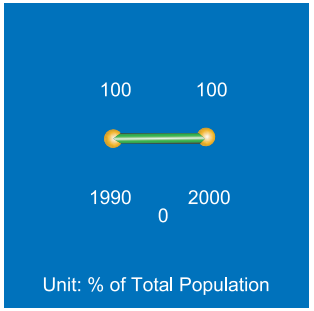
Cambodia



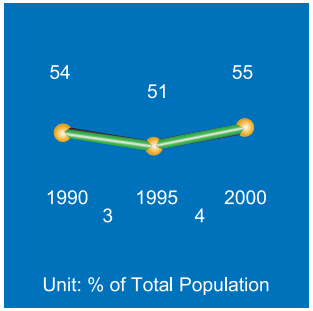
Malaysia



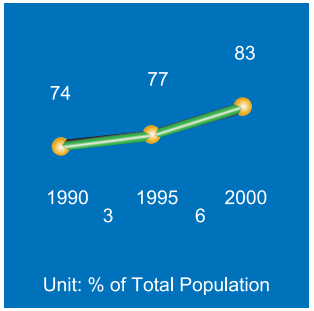
Singapore

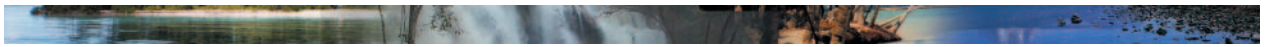


Indonesia



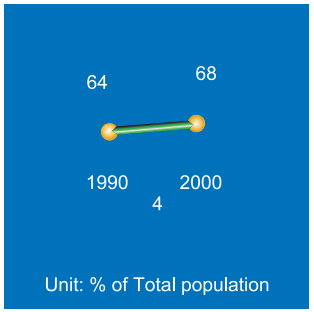
Philippines



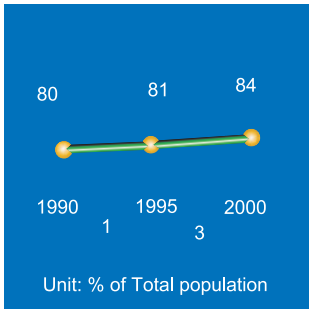


Water Indicator - Access to Safe Drinking Water

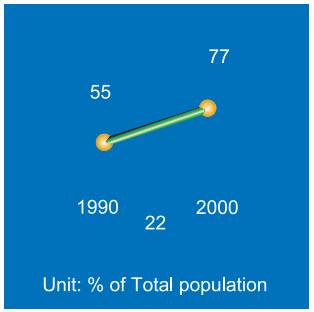
Myanmar



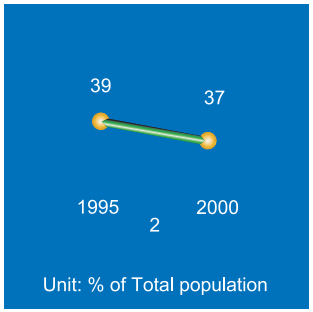
Thailand



Vietnam

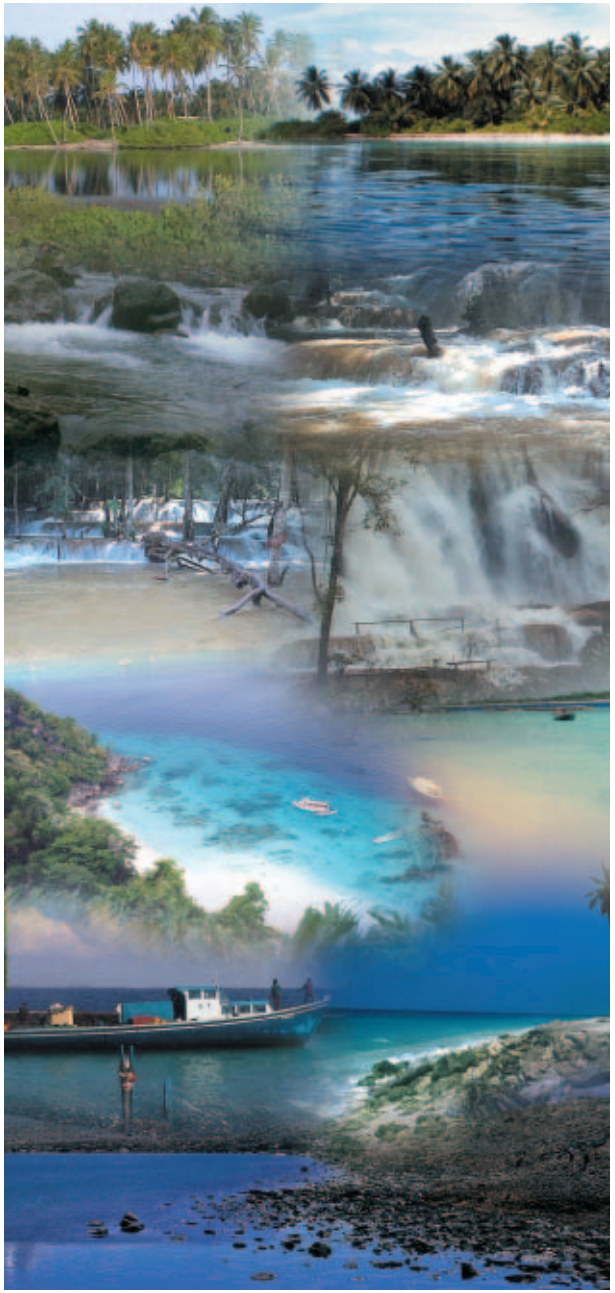


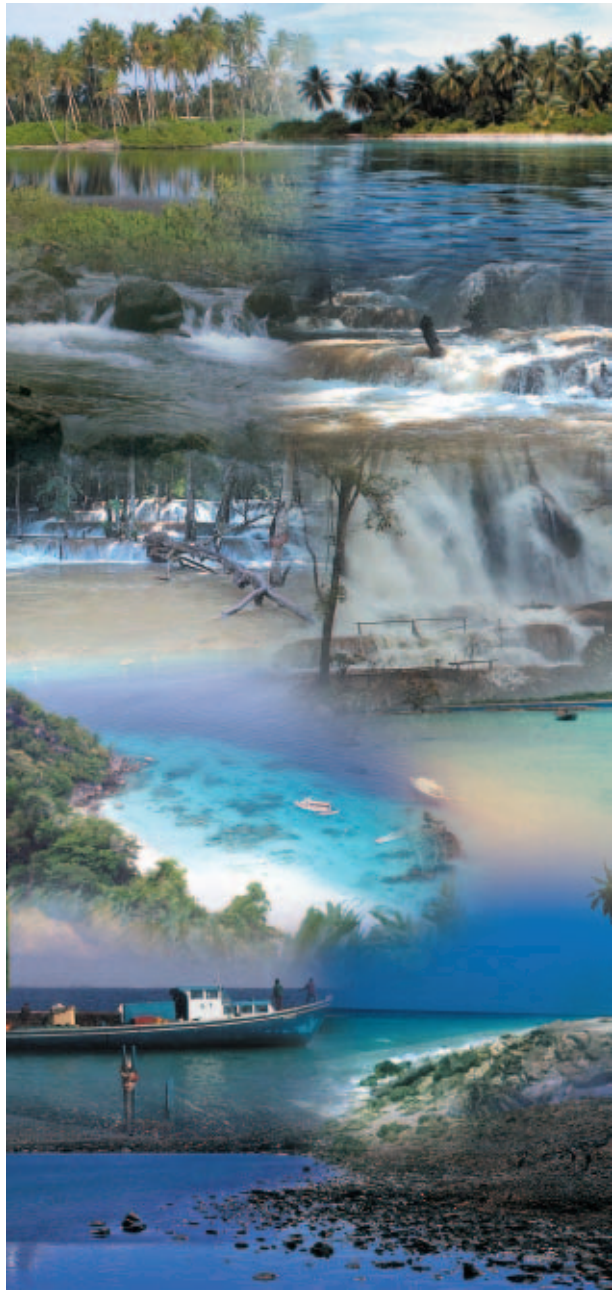
Lao PDR



Note: Singapore has the highest figures (the entire population has access to safe drinking water). Cambodia and Lao PDR have the lowest figures, with less than half of the population in both countries having access to safe drinking water. Most countries have higher coverage of safe water in urban neighbourhoods than rural areas.

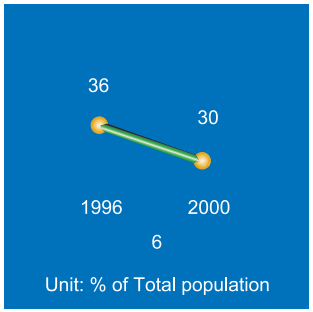
Source: Consultative Group on International Agriculture Research



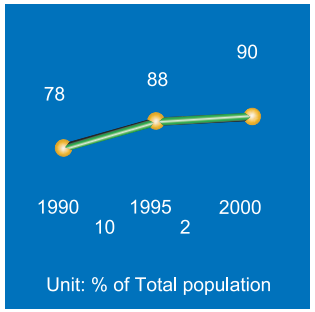


Water Indicator - Access to Safe Drinking Water

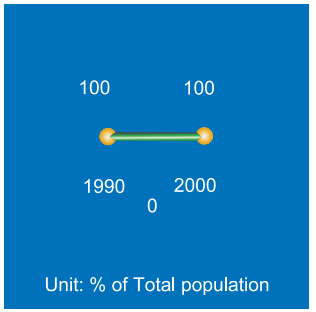
Cambodia



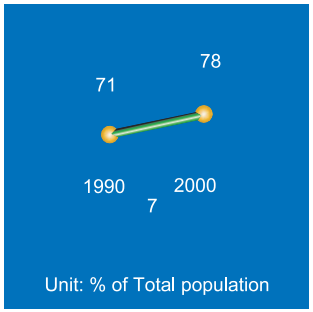
Malaysia



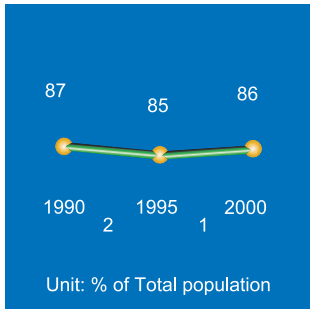
Singapore



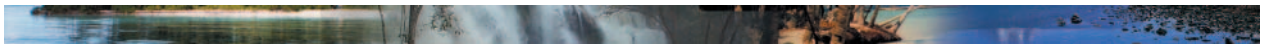
Indonesia



Philippines

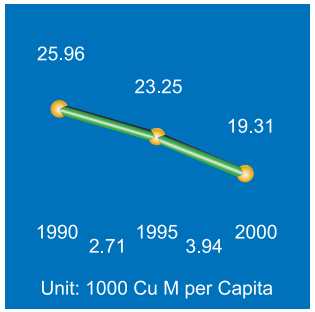


REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

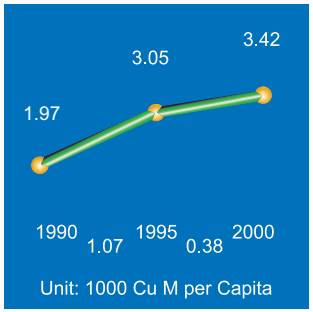


Water Indicator - Total Water Availability

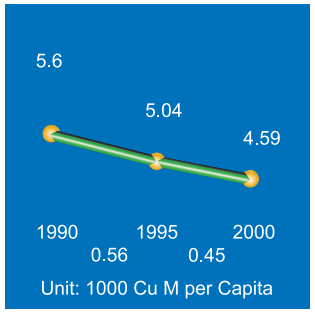
Myanmar



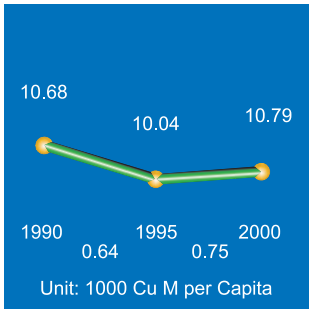
Thailand



Vietnam

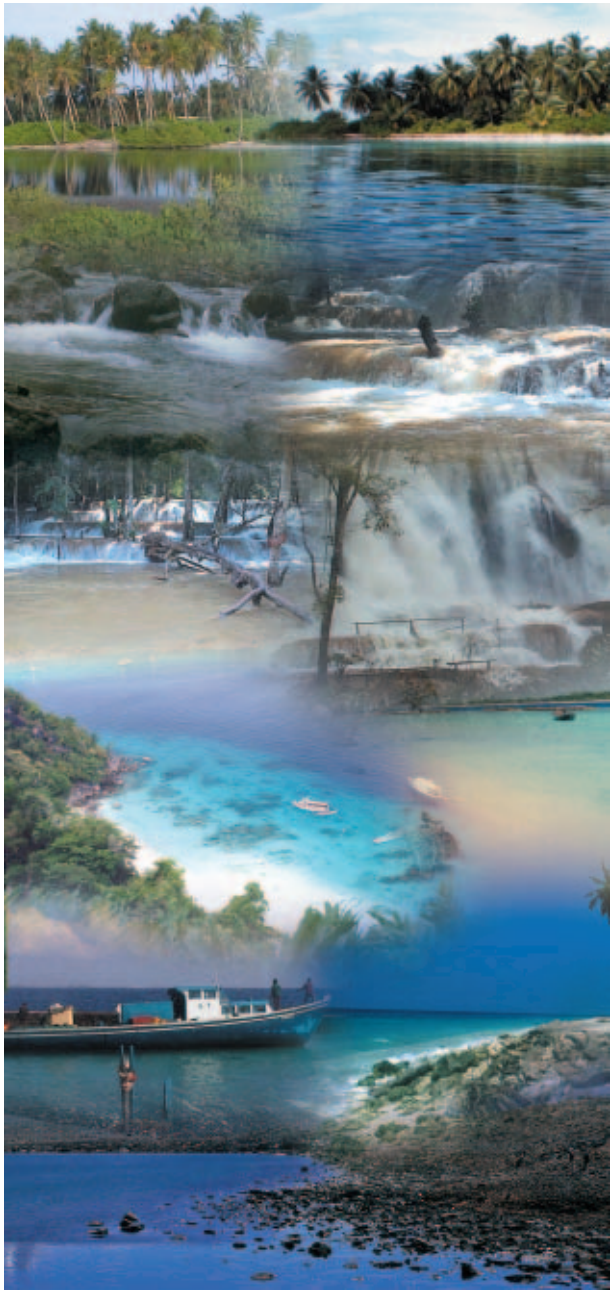


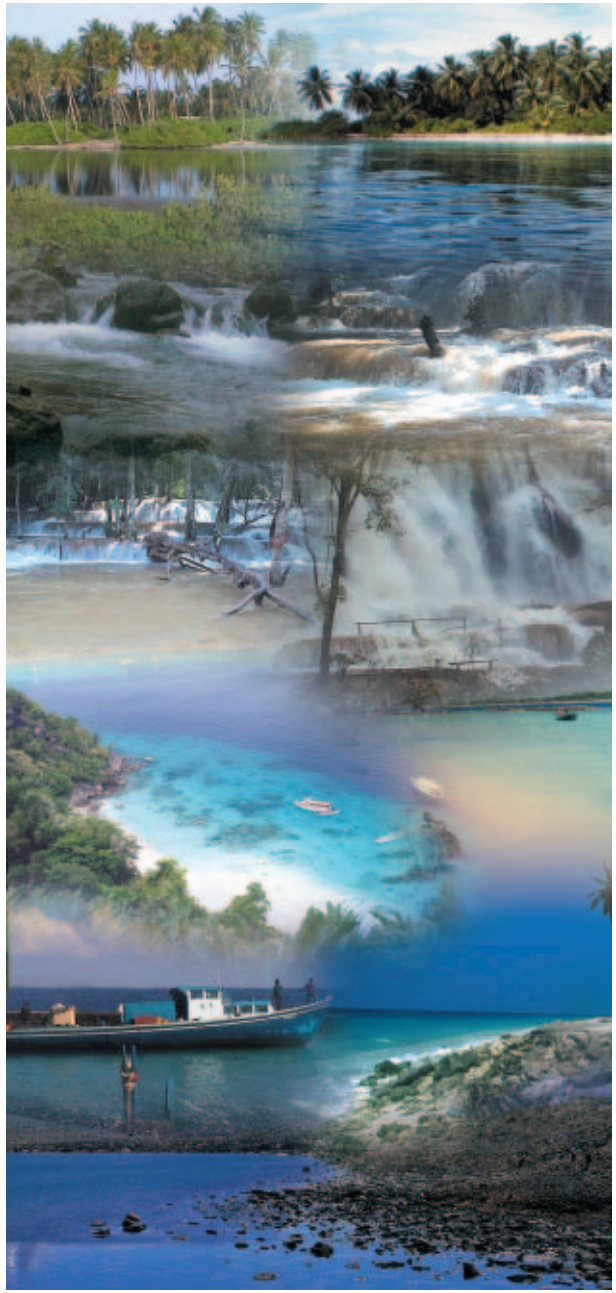
Cambodia



Note: The total water availability increased in most of the countries of the region over the last decade, in contrast to decreasing water availability trends elsewhere in the world. Malaysia had the highest total water available at 26.07 thousand cu. m/capita, while Singapore had the lowest at 0.17 thousand cu. m/capita.

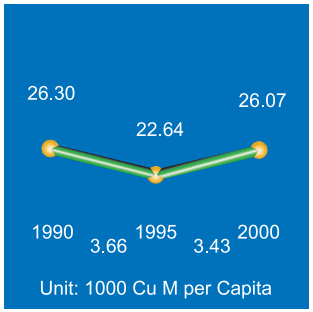
Source: WRI 1990, 1995, 2000-01



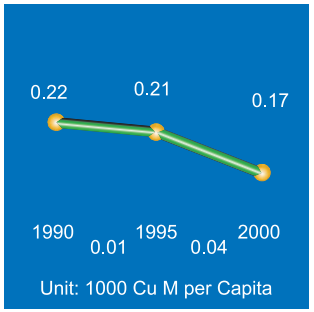


Water Indicator - Total Water Availability

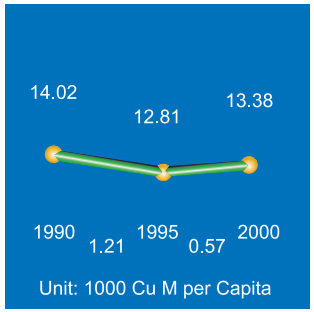
Malaysia



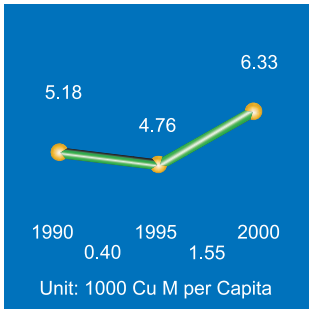
Singapore



Indonesia



Philippines



Air Indicator

Air pollution poses serious health hazards. Atmospheric pollutants exacerbate acute respiratory diseases such as pneumonia, bronchitis and tuberculosis. Asthmatics, children and the elderly are particularly vulnerable. With increasing industrialization and urbanisation, air pollution is become a serious problem in Southeast Asia. Urban air pollution is significant in major cities such as Bangkok, Jakarta, Manila, Ha Noi, Ho Chi Minh City and Kuala Lumpur; as well as some secondary cities such as Surabaya and Bandung in Indonesia; Cebu and Davao in the Philippines; and Chiang Mai and Hatyai in Thailand. Vehicular emissions contribute significantly to the pollution load in urban areas. The number of vehicles has increased but there has not been a simultaneous improvement in technology. Older, outdated technology is still used, resulting in higher emissions. Improper siting of industries in residential areas is also detrimental to public health especially as most industries lack efficient pollution control devices.

There are high costs due to air pollution in terms of public health and reduced productivity – amounting to billions of dollars per annum. Degraded air quality is also responsible for reduced quality of life in the three Southeast Asian capital cities. Although ambient and emission standard have been promulgated in most Southeast Asian countries, enforcement is weak and ineffective.

Forest fires have been a major cause of transboundary air pollution problems with particulates, smoke, and haze. The forests fires in 1997 – 1998 engulfed Indonesia, Malaysia, Brunei and to a lesser extent the Philippines and are considered among the worst episodes of air pollution in recent world history. The fires released an estimated 110 –180 million tones of CO_2 to the atmosphere. The area affected by both CO_2 and other air pollutants from the fire had spread to more than 3,200 kilometres east to west, covering six Southeast Asian countries and perhaps affecting 70 million people. The forest fires of 1997 – 98 exemplify transboundary pollution, as the fires were started by clearing of forests for agriculture in Indonesia but the impact and effects of the fire were felt in areas far and beyond Indonesia. The Regional Haze Action Plan was developed in Southeast Asia in response to the 1997 forest fires.

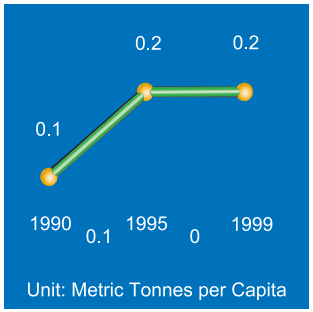
Industrial activities, energy and transportation sectors are also the main sources of NO_x and SO_2, which are precursors of acid deposition. Adaptation of clean technology and use of pollution control devices are effective measures for containment of NO_x and SO_2 emissions.

A major greenhouse gas, carbon dioxide showed increasing trends in all Southeast Asian countries except Indonesia during the 1990s. Fossil fuel combustion in the energy, transport and industrial sectors is the main source of carbon dioxide. Singapore's emissions of carbon dioxide per capita are the highest in the sub-region, while Cambodia had the lowest. These figures reflect the difference in consumption patterns in developed and developing nations.

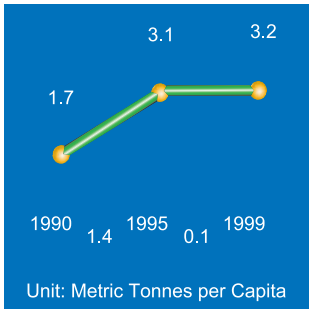
Countries in the region need to develop a detailed work plan to improve urban air quality. This would entail better management of traffic, investment in public transport and limits on number of vehicles in urban areas.

Air Indicator - CO_2 emissions per capita

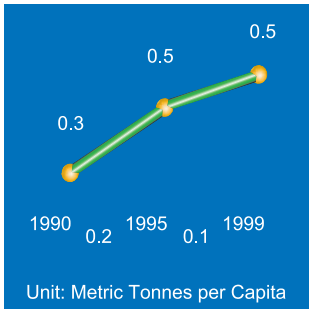
Myanmar



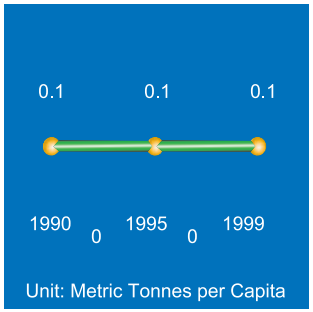
Thailand



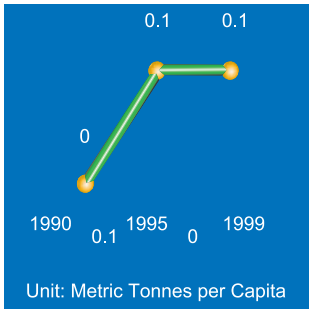
Vietnam



Lao PDR



Cambodia



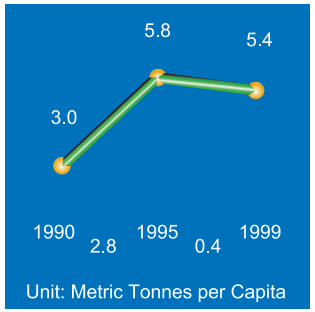
Note: Singapore had the highest emissions of CO_2 per capita in the region at 21 metric tonnes/capita while Cambodia had the lowest at 0.1 metric tonnes/capita. All the countries of the subregion showed increase in carbon dioxide emissions over the last decade except for Indonesia, which showed slight decrease in CO_2 emissions.

Source: World Bank 2003, UNDP HDR 2002, ADB 2002, WRI 1998-99, World Development Indicators 2002

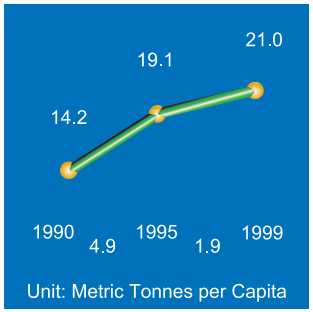
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Air Indicator - CO_2 Emissions Per Capita

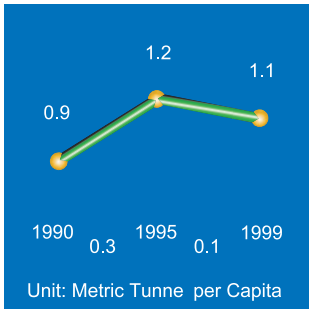
Malaysia



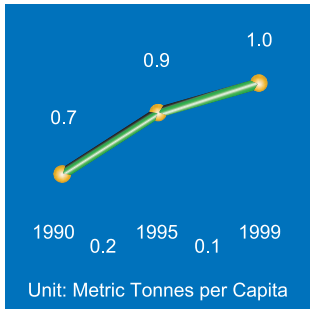
Singapore



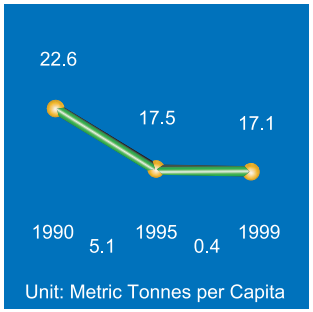
Indonesia

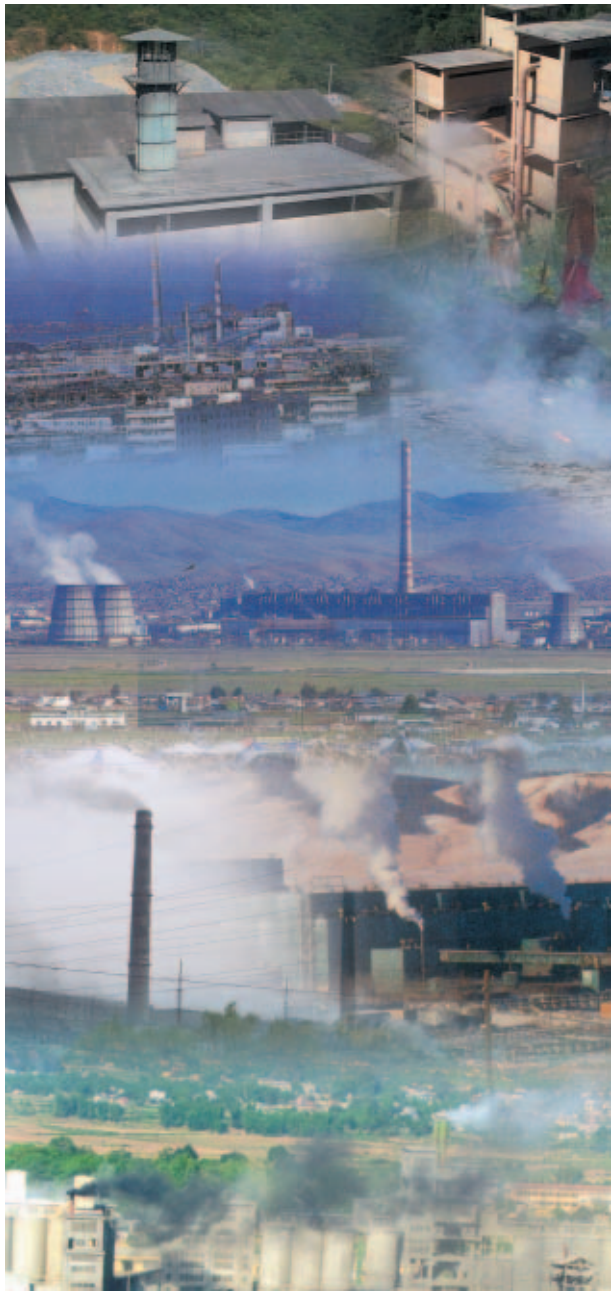


Philippines



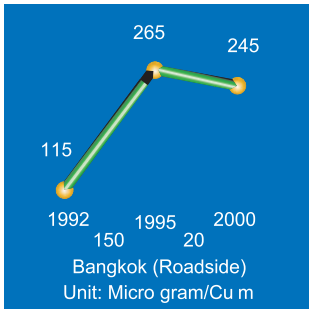
Brunei



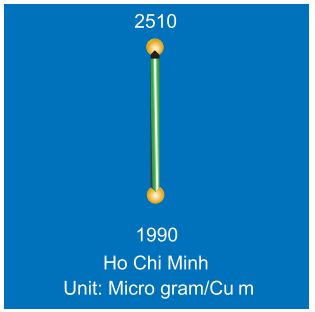


Air Indicator - SPM concentration

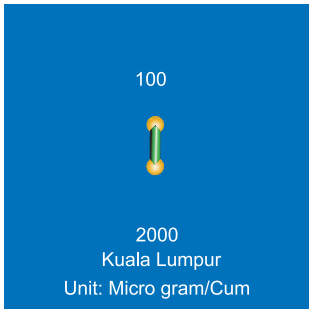
Thailand



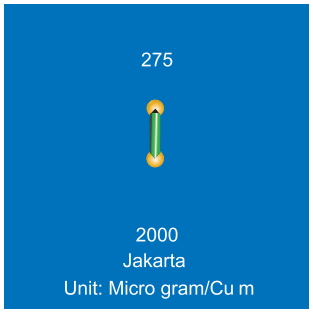
Vietnam



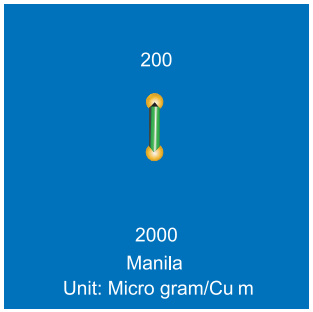
Malaysia



Indonesia



Philippines

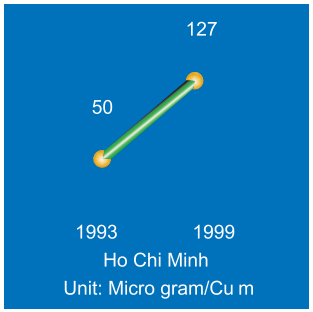


Note: Urban air quality in most Southeast Asian cities has been deteriorating and this can be seen in the high SPM concentrations the capital cities of the region. Enough data is not available for the entire subregion, but available data suggests above normal pollutant levels in urban areas of the subregion.

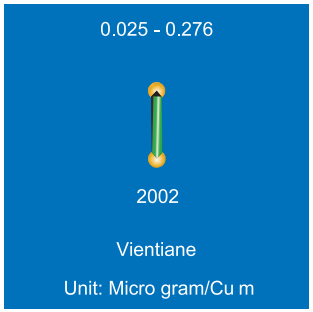
Source: SoE Bangkok UNEP RRC.AP, Environmental Atlas-GMS UNEP RRC.AP-ADB 2002

Air Indicator - SO_2 concentration in Capitals

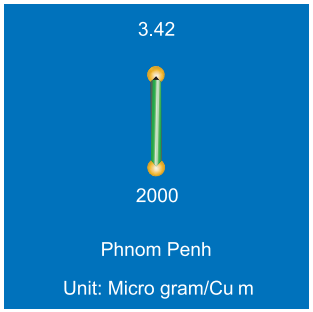
Vietnam



Lao PDR



Cambodia

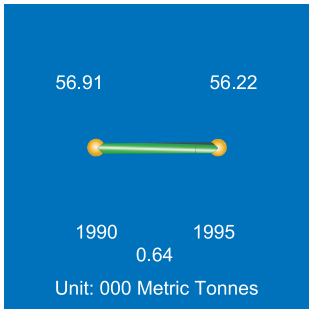


Note: In comparison to SPM concentrations, SO_2 levels in the subregion are more under control. Enough data is not available for the entire subregion, but present trends indicate that SO_2 levels are within or close to permissible limits in most parts of the subregion.

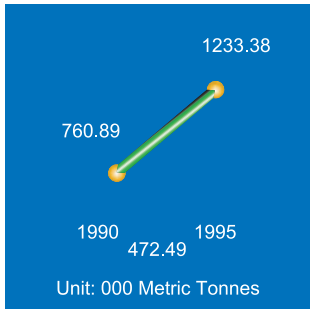
Source: Environmental Atlas of GMS ADB-UNEP RRCAP, Ministry of Industry and Handicrafts and Science Technology and Environment Agency, Lao PDR,

Air Indicator - SO_2 Emission

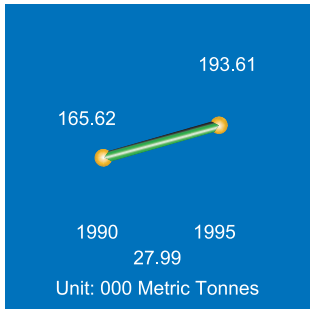
Myanmar



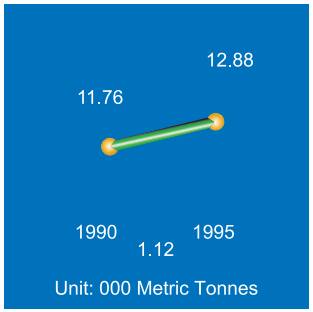
Thailand



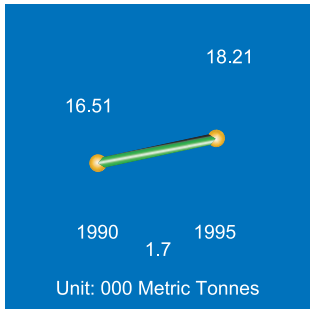
Vietnam



Lao PDR



Cambodia

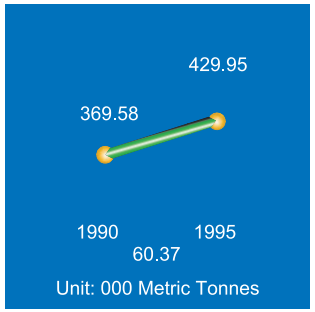


Note: SO_2 emissions increased for all the countries of the subregion except for Philippines, where it decreased and Myanmar where it remained constant during the first half of the decade. Thailand had the highest increase in $S0_2$ emissions from 1990 to 1995. Thailand also had the highest SO_2 emissions in the region – 1233.38 thousand metric tonnes.

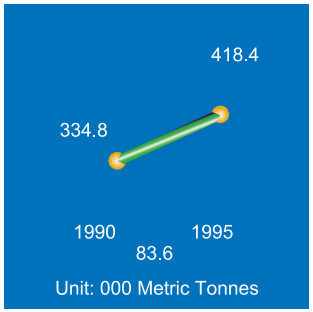
Source: World Bank World Development Report, GEO III Grid data, UNEP

Air Indicator - SO_2 Emission

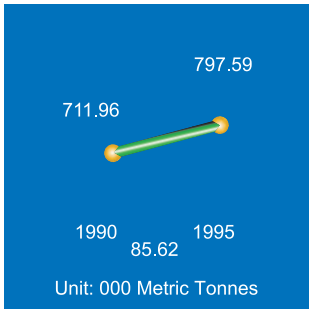
Malaysia



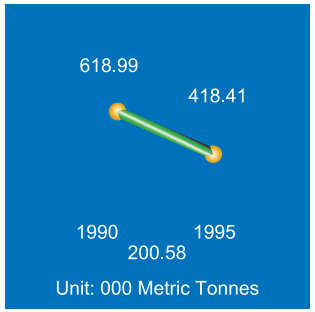
Singapore



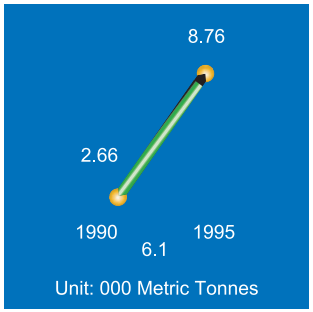
Indonesia

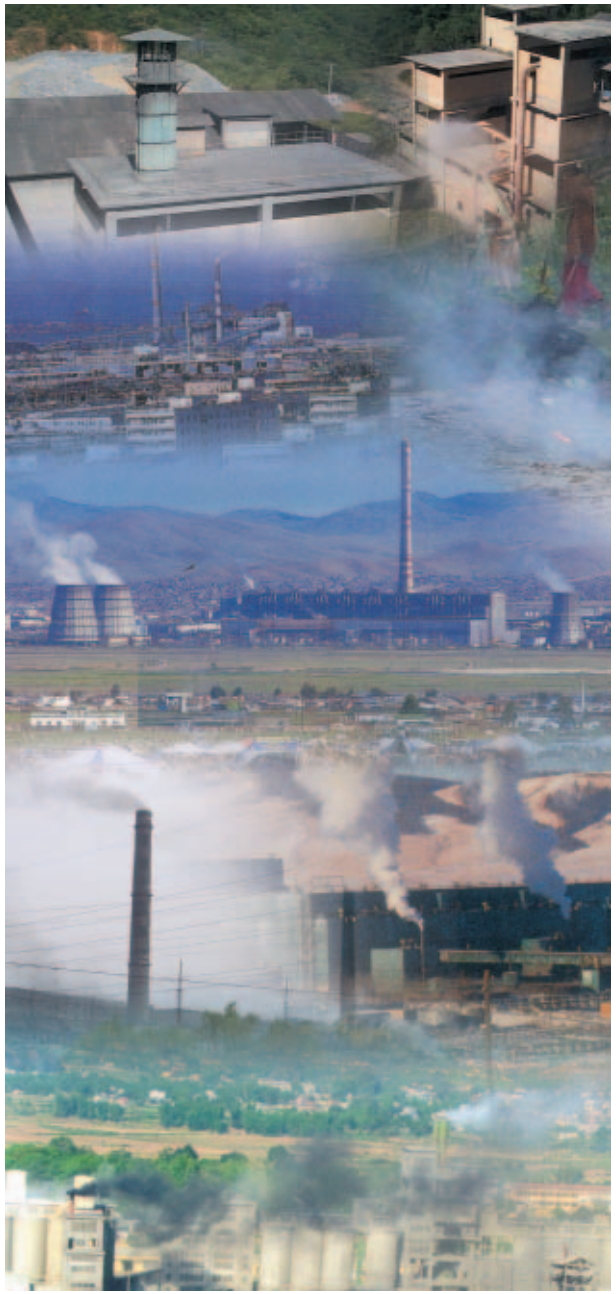


Philippines



Brunei

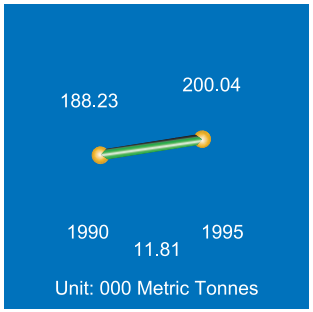




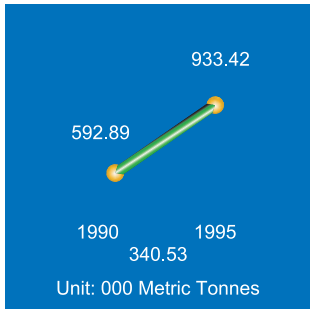
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Air Indicator - NO_x Emission

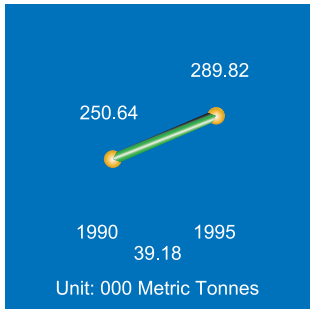
Myanmar



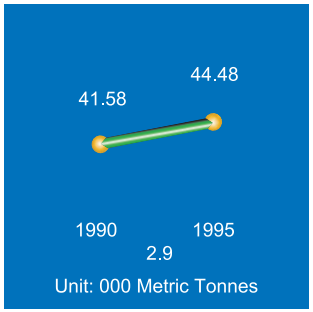
Thailand



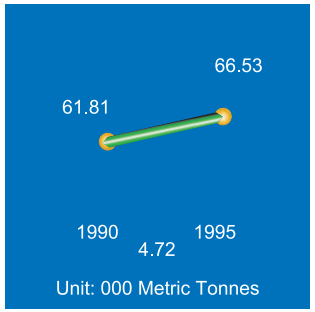
Vietnam



Lao PDR



Cambodia

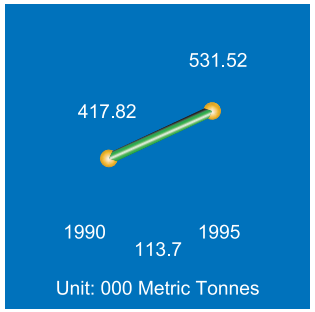


Note: Thailand had the highest increase in NO_x emissions in the region, from 1990 to 1995. The highest NO_x emissions in the region were in Indonesia – 1388.26 thousand metric tonnes while Brunei had the lowest – 14.69 thousand metric tonnes. All the countries in the region showed an increase in NO_x emissions from 1990 to 1995.

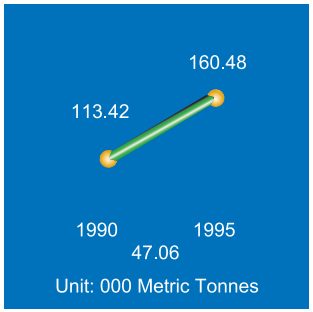
Source: GEO III Grid data UNEP

Air Indicator - NO_x Emission

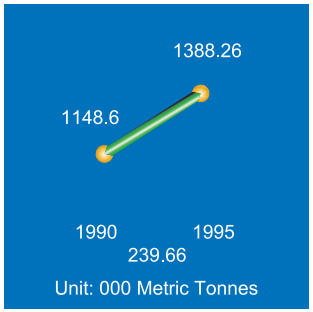
Malaysia



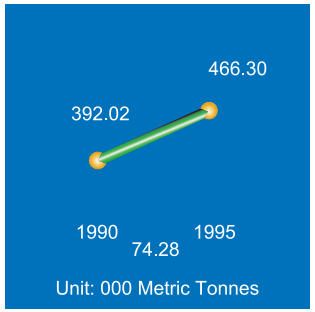
Singapore



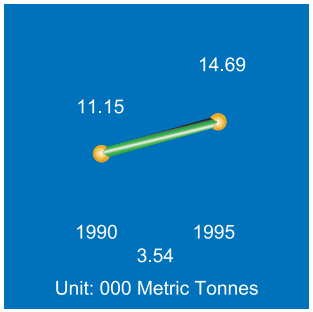
Indonesia

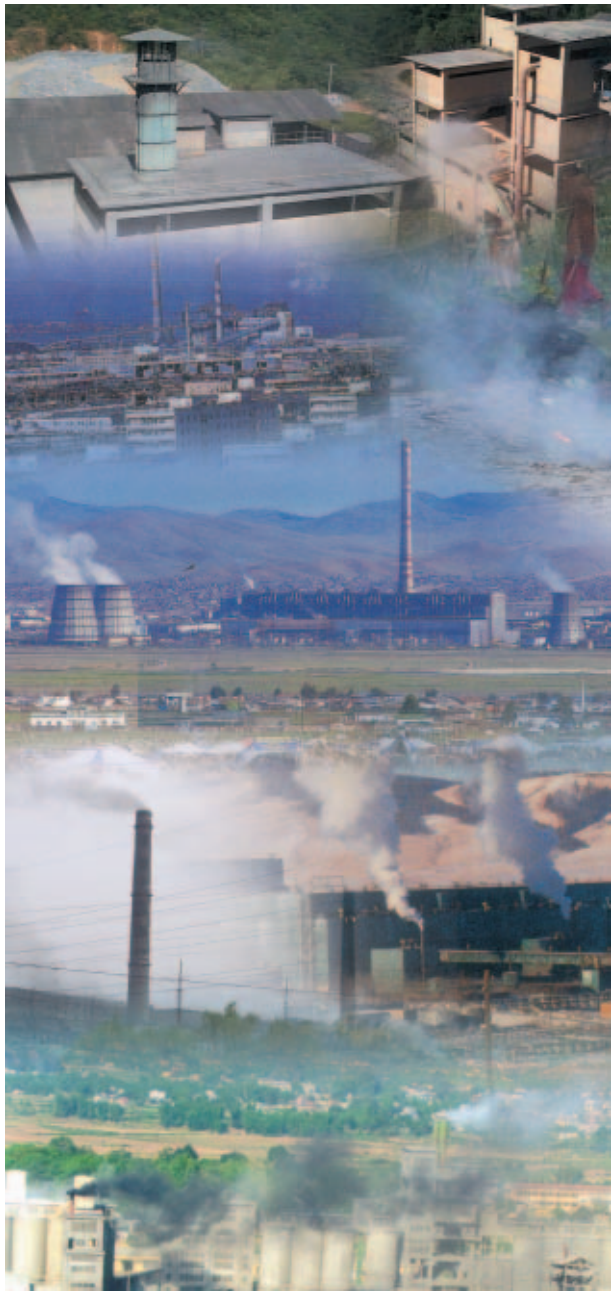


Philippines



Brunei





Bio-diversity Indicator

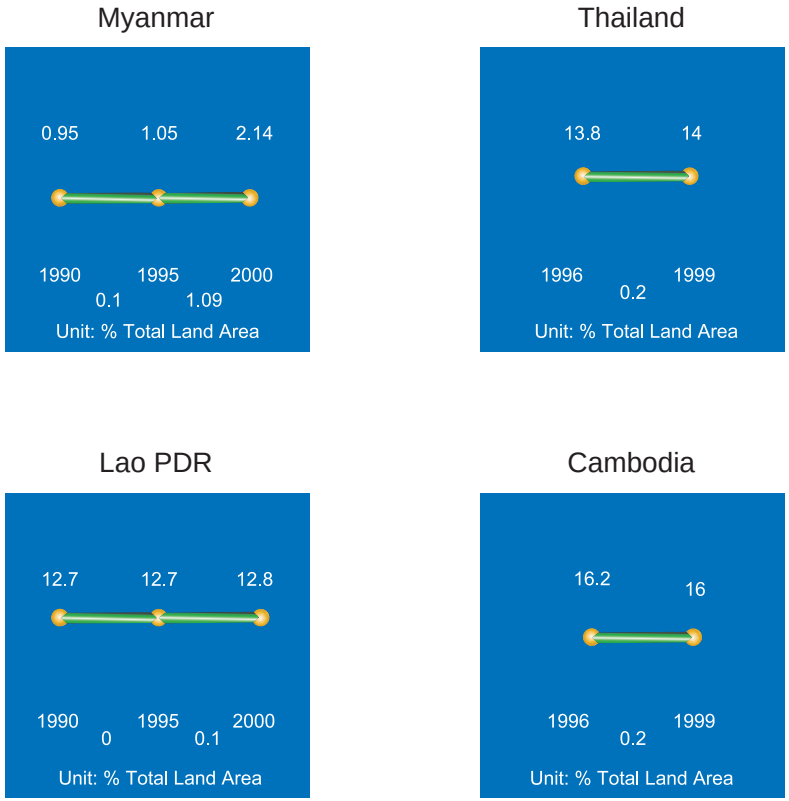
Southeast Asia is home to about half of the world's terrestrial and marine biodiversity. Around 30 per cent of the world's coral reefs are situated within the sub-region, with the seas around the Philippines, Indonesia, and Malaysia containing the most marine biodiversity. Malaysia, Indonesia and The Philippines are mega diversity countries with 80 per cent of the global biological diversity. Some of the last remaining intact expanses of mangroves occur in South-East Asia.

Southeast Asia now has the highest deforestation rate in Asia-Pacific. Despite this, forest cover in Southeast Asia as a proportion of total land remained one of the highest in the world at bout 52 per cent of the total land area. Protected land in Southeast Asia showed slight increment over the 1990s. Cambodia had the highest percentage of protected area. Singapore showed the highest increase in percentage of protected area over the 1990s.

High rates of deforestation have had a negative impact on the biodiversity in Southeast Asia. The number of threatened birds has increased in all Southeast Asian countries except for Indonesia. Though the number of threatened birds is highest in Indonesia, in terms of percentage of threatened birds, Philippines has the highest – 34.18 which is much higher than the percentage in Indonesia – 7.39. The number of threatened mammals increased in all countries. The Philippines and Indonesia showed a significant increase in the number of threatened mammals with the number tripling over the decades. In terms of percentage of threatened mammals, Philippines has the highest – 31.65 which is slightly higher than Indonesia – 30.63. Loss of natural habitat of species because of deforestation has lead to increase in number of threatened animals and plant species.

Coastal and marine ecosystems are also being degraded because of over-fishing, destructive fishing, destruction of mangroves, marine pollution and other such human activities.

Bio-diversity Indicator - Protected Area

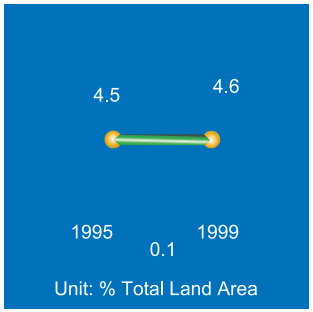


Note: Protected land in Southeast Asia showed slight increment over the 1990s. Cambodia had the highest percentage of protected area at 16 per cent while Myanmar had the lowest at 2.14 per cent. Singapore showed the highest increase in percentage of protected area over the 1990s.

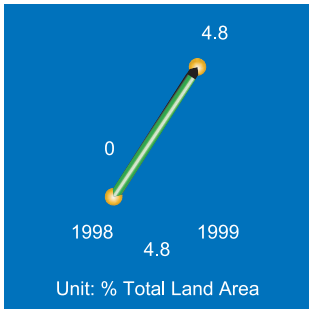
Source: ASEAN SoE 2000, World Band 2003, World Development Report 2002, World Development Indicators 2002, ADB 2002

Bio-diversity Indicator - Protected Area

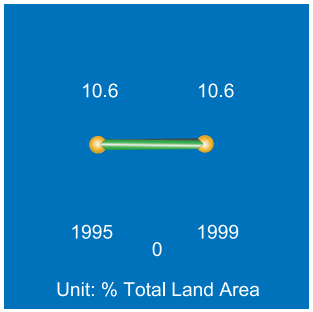
Malaysia



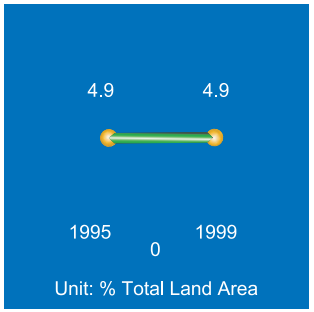
Singapore



Indonesia

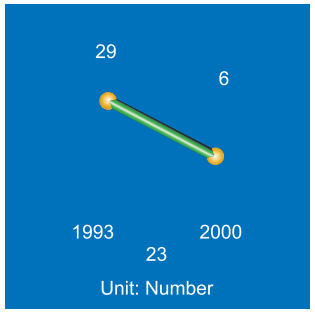


Philippines

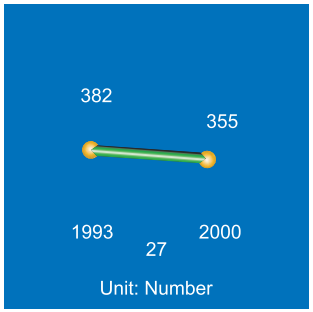


Bio-diversity Indicator - Threatened Plants

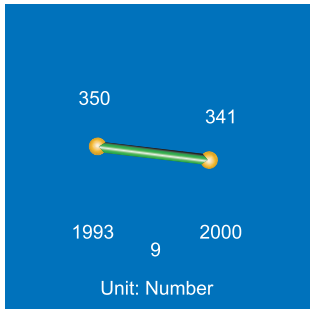
Myanmar



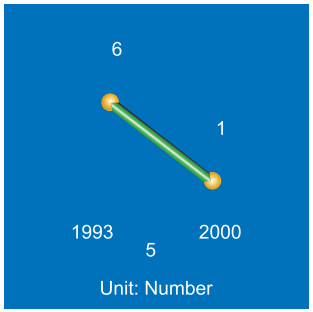
Thailand



Vietnam



Lao PDR

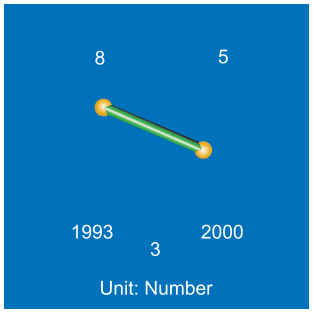


Note: Plant biodiversity is increasing in all Southeast Asian countries except Philippines. The highest drop in number of Threatened plants was reported in Indonesia. The Philippines has the highest number of threatened plants at 371; the lowest number is in Lao PDR at one.

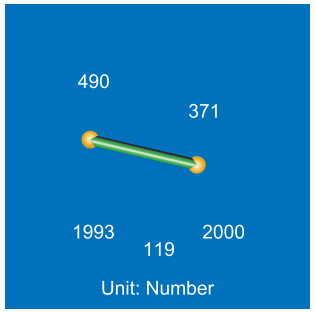
Source: ASEAN SoE 2000, WRI 1994-95, WRI 1998-99, WRI 2000-2001

Bio-diversity Indicator - Threatened Plants

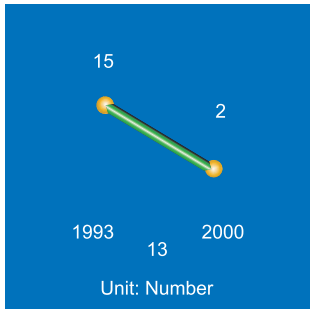
Cambodia



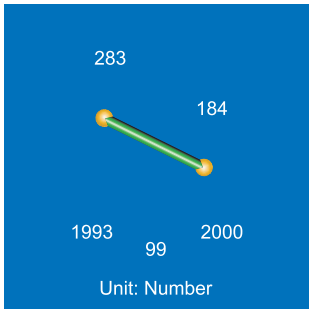
Malaysia



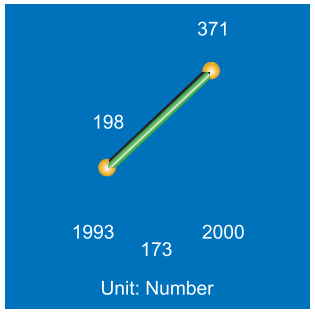
Singapore



Indonesia



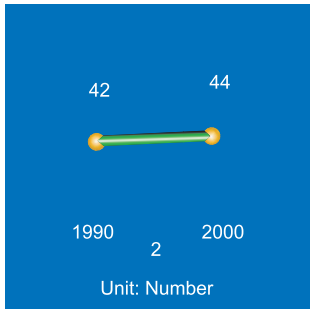
Philippines



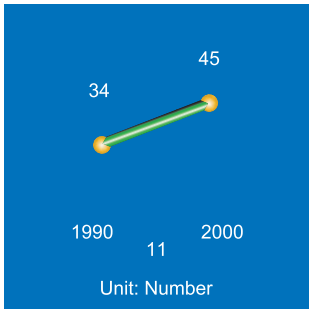
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Bio-diversity Indicator - Threatened Birds

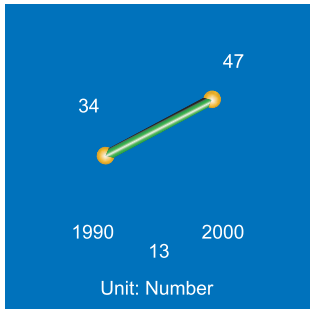
Myanmar



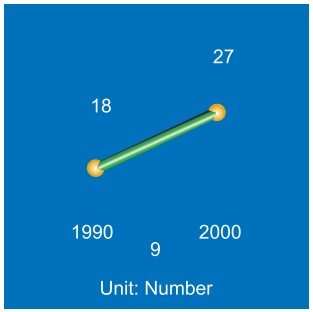
Thailand



Vietnam



Lao PDR

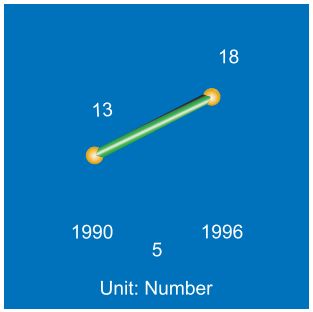


Note: The number of threatened birds has increased in all Southeast Asian countries except for Indonesia. The highest number of threatened birds is in Indonesia at 104. The country with the least number of threatened bird species is Singapore at 9. In terms of percentage of threatened birds, Philippines has the highest – 34.18 which is much higher than the percentage in Indonesia – 7.39.

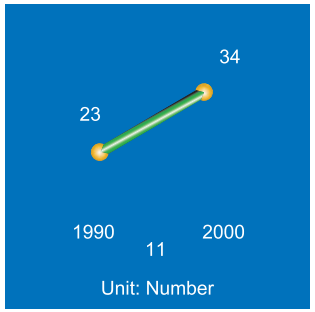
Source: WRI 1994-95, WRI 1998-99, WRI 2000-2001

Bio-diversity Indicator - Threatened Birds

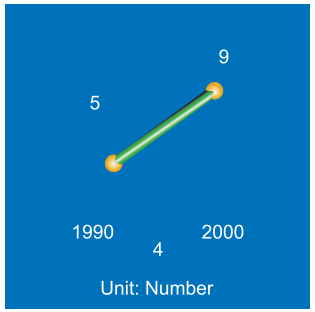
Cambodia



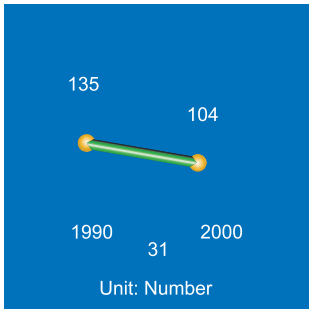
Malaysia



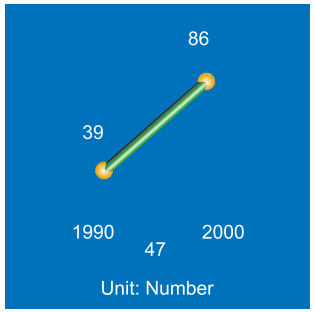
Singapore



Indonesia



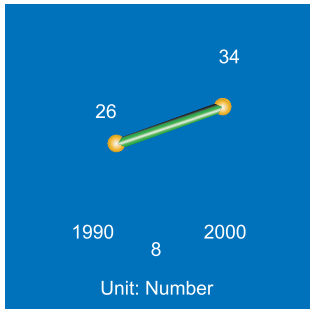
Philippines



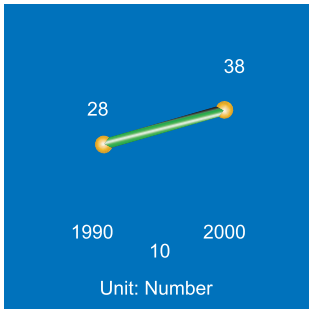
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Bio-diversity Indicator - Threatened Mammals

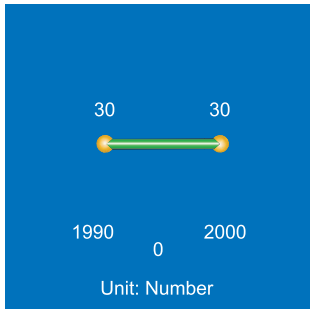
Thailand



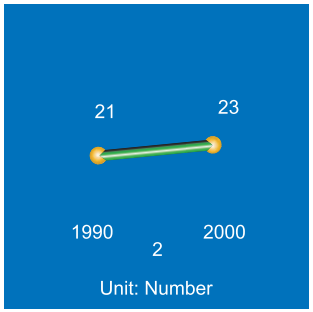
Vietnam



Lao PDR



Cambodia

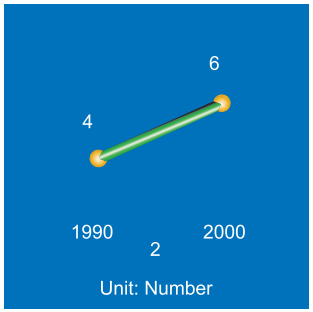


Note: The number of threatened mammals increased in all countries with the number tripling over the decade for Philippines and Indonesia. The highest number of threatened mammals is in Indonesia at 128; the lowest is in Singapore at six. In terms of percentage of threatened mammals, Philippines has the highest – 31.65 which is slightly higher than Indonesia – 30.63.

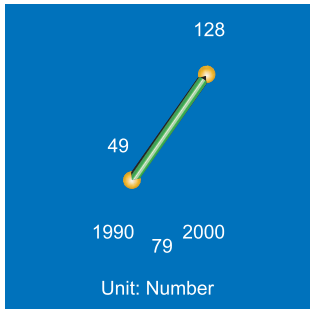
Source: WRI 1994-95, WRI 1998-99, WRI 2000-2001

Bio-diversity Indicator - Threatened Mammals

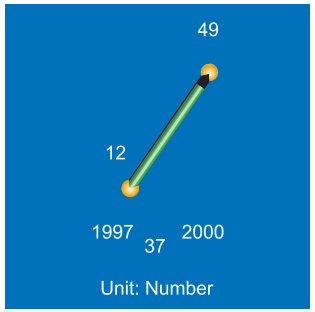
Singapore



Indonesia



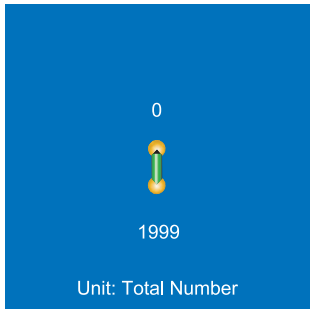
Philippines



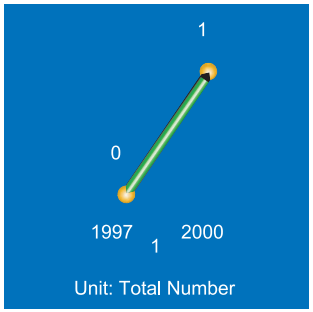
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Bio-diversity Indicator - Wetlands of International Importance

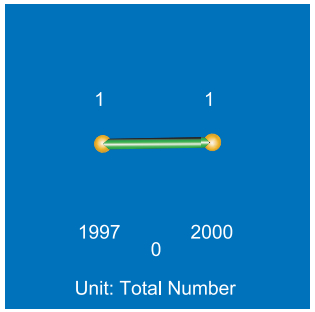
Myanmar



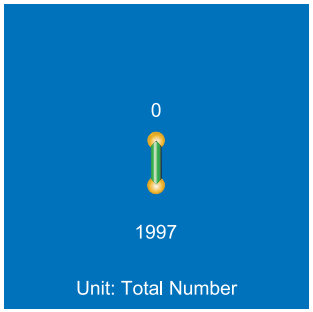
Thailand



Vietnam



Lao PDR

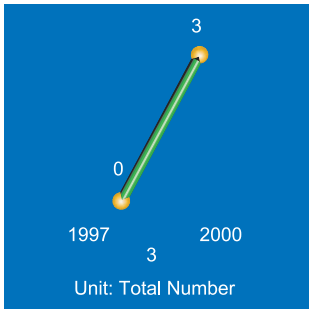


Note: The Philippines had the highest number of wetlands in this sub-region. Wetlands are important ecosystems and are protected internationally by the RAMSAR convention.

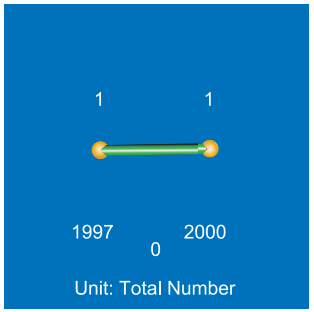
Source: ASEAN SoE 2000, WRI, UNEP

Bio-diversity Indicator - Wetlands of International Importance

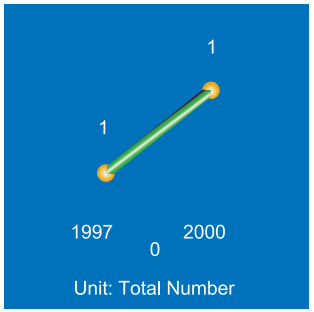
Cambodia



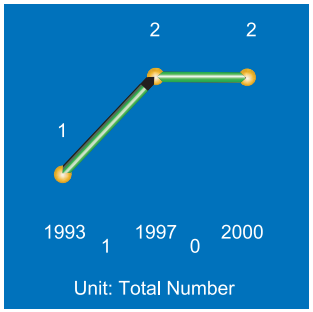
Malaysia



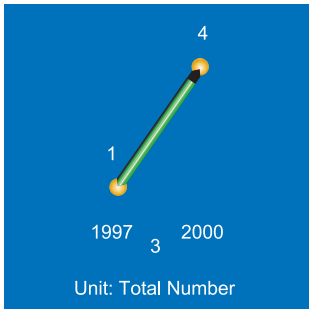
Singapore



Indonesia



Philippines



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APPENDIX I

Definitions

The indicators in this publication are well-known and well-accepted. In the following section, the definition of some of the indicators used in this publication is given.

Total population-is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship--except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin.

Population below US$1 a day-is the percentage of the population living on less than US$1.08 a day at 1993 international prices (equivalent to US$1 in 1985 prices, adjusted for purchasing power parity). Poverty rates are comparable across countries, but as a result of revisions in PPP exchange rates, they cannot be compared with poverty rates reported in previous editions for individual countries.

Infant mortality rate-is the number of infants dying before reaching one year of age, per 1 000 live births in a given year.

Life expectancy at birth-indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

GNI (formerly GNP)-is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. Data are in current U.S. dollars. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank. This applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country and the G-5 countries. The GNI data here follows the World Bank methodology.

GNI per capita (formerly GNP per capita)-is the gross national income, converted to U.S. dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to U.S. dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank. This applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country and the G-5 countries.

Proportion of land area covered by forest-is land under natural or planted stands of trees of whether productive or not, as percentage total land area.

Access to an improved water source-refers to the percentage of the population with reasonable access to an adequate amount of water from an improved source, such as a household connection, public standpipe, borehole, protected well or spring, and rainwater collection. Unimproved sources include vendors, tanker trucks, and unprotected wells and springs. Reasonable access is defined as the availability of at least 20 litres a person a day from a source within one kilometre of the dwelling.

Access to improved sanitation facilities-refers to the percentage of the population with at least adequate excreta disposal facilities (private or shared, but not public) that can effectively prevent human, animal, and insect contact with excreta. Improved facilities range from simple but protected pit latrines to flush toilets with a sewerage connection. To be effective, facilities must be correctly constructed and properly maintained.

BOD level in Major Rivers - The biochemical oxygen demand (BOD) is used as a measure of the degree of water pollution.

Nationally protected areas-are totally or partially protected areas, as the percentage of total land area, of at least 1 000 hectares that are designated as national parks, natural monuments, nature reserves or wildlife sanctuaries, protected landscapes and seascapes, or scientific reserves with limited public access. The data do not include sites protected under local or provincial law.

Carbon dioxide emissions per capita-are those stemming from the burning of fossil fuels and the manufacture of cement. They include contributions to the carbon dioxide produced during consumption of solid, liquid, and gas fuels and gas flaring.

Wetlands of International Importance is defined under the Wetlands Convention, signed in Ramsar, Iran, in 1971. In order for an area to qualify as a Ramsar site, it has to have “international significance in terms of ecology, botany, zoology, limnology or hydrology.”

APPENDIX II

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