ENVIRONMENTAL INDICATORS
North East Asia

UNEP

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

UNEP

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 Northeast Asia' has been prepared to present the trends of twenty nine 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 Northeast Asia for 1990, 1995 and 2000. This report provides an assessment of economic, social and environmental conditions in Northeast 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 poverty in Northeast Asia is forecast to drop significantly by 2015. China's economic growth and prosperity has lead to a reduction in the poverty numbers in the sub-region. The Human Development Index (HDI) increased consistently for all the countries of the sub-region except Mongolia where it slightly decreased during 1990 to 1995.

Desertification is an important environmental issue in this sub-region. Mongolia and China are being deeply affected by land degradation and top soil loss. Sustainable agriculture practices along with awareness about land management will help impede desertification. Air quality has worsened in the leading cities of this sub-region. Legal measures and effective policies are needed to counter the rising air pollution.

UNEP hopes that the 'Environmental Indicators for Northeast 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

ACKNOWLEDGEMENT

CONTENT

INTRODUCTION

North East Asia is a sub-region of Asia comprising of five countries: People's Republic of China, Japan, Republic of Korea, Mongolia and Democratic People's Republic of Korea. It has the highest populations of all the subregions with a total of 1.48 billion people.

In the east, China is bound by the Yellow Sea and the East China Sea while to the west it has major mountain ranges, notably the Himalayas. The Mongolian heartland consists of relatively flat steppes. The southern portion of the country is taken up by the Gobi Desert, while the northern and western portions are mountainous. Korea forms a peninsula that extends 1,100 km from the Asian mainland. To the west it borders the West Sea (Yellow Sea) and the Korea Bay; to the east it borders the East Sea of Korea (Sea of Japan). The peninsula ends at the Korea Strait (Tsushima Strait) and the South Sea (East China Sea) to the south. The peninsula's northern part (including North Korea) has mostly hills and mountains separated by deep narrow valleys in the north and east, and prominent coastal plains in the west. Japan is situated between the Pacific Ocean and east of the Korean peninsula. Japan, a country of islands, extends along the eastern or Pacific coast of Asia. The main islands, running from north to south, are Karafuto, Hokkaido, Honshu (or the mainland), Shikoku, and Kyushu.

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

North East Asia consists of Mongolia, Democratic People's Republic of Korea, Republic of Korea, Japan and People's Republic of China.

Progress on the social front is necessary to achieve sustainable development. Economic prosperity without simultaneous social development is not the right path of development. Thus analysis of a country's social indicators is needed to judge a country's overall progress.

Population in North-East Asia accounted for approximately one-fourth of the world total. China is the world's most populous country. This large number of people can be environmentally destructive as such a large population base leads to over-consumption of natural resources. With its large number of people, changes in China's population have the largest effect on the number of people in the sub-region. China has taken measures to curb its growing population and China's population policy has been successful as China's growth rate consistently declined between 1990 and 2002. During the last decade of the 20th century, Mongolia had the highest average growth rate, while Japan had the smallest. In 1995 – 2000, all the countries of the sub-region had a population growth rate of less than one per cent.

Development in the North-East Asian sub-region as indicated by the Human Development Index (HDI) generally increased for all countries in the region, with the exception of Mongolia in between 1990 and 1995. HDI is a summary measure of three dimensions of human development: living a long and healthy life, being educated and having a decent standard of living. The largest positive change occurred in China and the smallest change occurred in Japan. Chinese economy has been booming in the past decade and the benefits of a stronger economy have translated into a higher HDI. The Republic of Korea showed the second largest improvement in HDI, and there was no data available for DPR Korea.
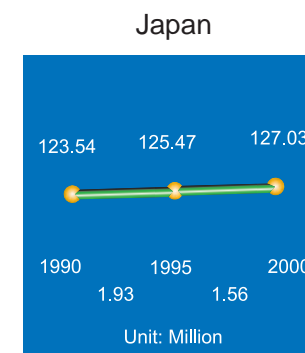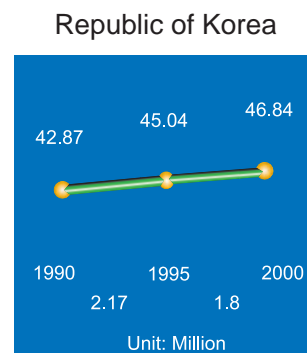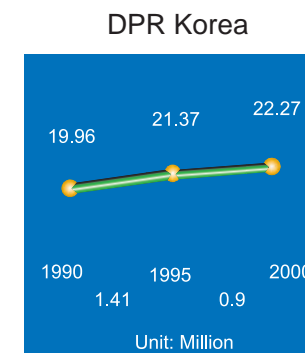
Poverty data for individual countries in North-East Asia was largely unavailable. This may be because in wealthy countries like Japan and the Republic of Korea, the number of people living on less than US$1 per day is very small, and the statistic may not be relevant given other socio-economic indicators. From the data that was available, it can be seen that in 1995 a significant part of Mongolia's population - 14 per cent and in 2000, China's population – 15 per cent, were living below the poverty line. Despite the lack of country data, regional statistics were available for comparison with world data. Poverty in North-East Asia is forecast to drop significantly by 2015. This could largely be due to China's steady economic growth over the next decade, which will reduce the number of poor in the country and subsequently in the region.

Life expectancy at birth increased for all countries except for DPR Korea where it decreased over the decade. The highest life expectancy was in Japan at 80.7 years.

There is a high difference in the infant mortality rates in the region. Japan has the lowest at three per 1000 live births, followed by Republic of Korea at five. For the rest of the region, the rate remains high, with Mongolia at the highest at 61. The infant mortality rate has shown the reassuring trend of decreasing over the last decade for all the countries of the sub-region.

Social Indicator - Population

P.R.China

1161.01	1225.62	1282.02
1990	1995	2000
	64.61	56.4

Unit: Million

Mongolia

2.22	2.39	2.5
1990	1995	2000
	0.17	0.11

Unit: Million

DPR Korea

19.96	21.37	22.27
1990	1995	2000
	1.41	0.9

Unit: Million

Republic of Korea

42.87	45.04	46.84
1990	1995	2000
	2.17	1.8

Unit: Million

Japan

123.54	125.47	127.03
1990	1995	2000
	1.93	1.56

Unit: Million
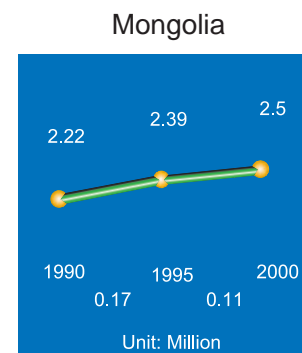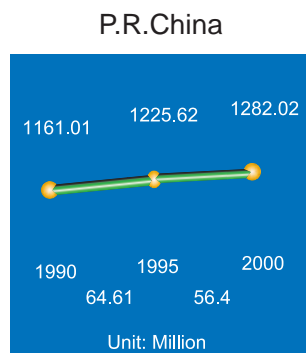
Note: All the countries showed increase in population. China is the world's most populous country and had the highest population in the region – 1282.02 million. Mongolia had the least population – 2.5 million. Population in this sub-region accounted for approximately one-fourth of the world total.

Source: United Nations Environment Programme. (Citing the United Nations Population Division). Global Environmental Outlook Data Portal . http://geodata.grid.unep.ch. (March-April 2003).

Social Indicator - Human Development Index

P.R.China

1990	1995	2000
0.63	0.68	0.73
	0.03	0.05

Mongolia

1990	1995	2000
0.66	0.64	0.66
	0.02	-0.02

Republic of Korea

1990	1995	2000
0.82	0.85	0.88
	0.03	0.03

Japan

1990	1995	2000
0.91	0.92	0.93
	0.01	0.01
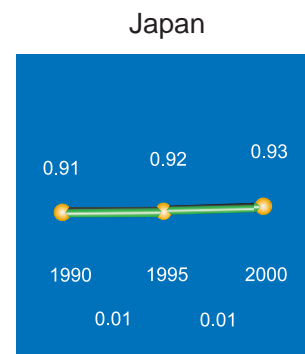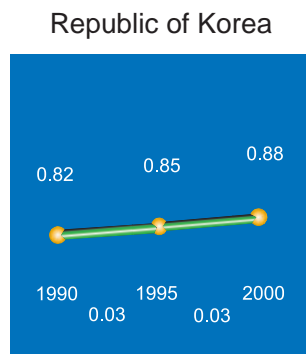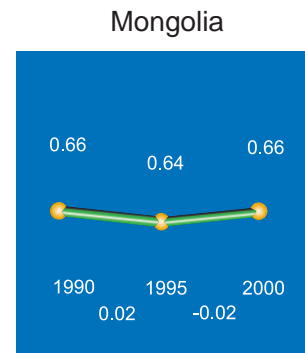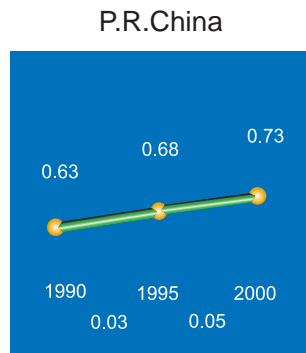
Note: Mongolia showed slight decrease in HDI between 1990 and 1995, but the rest of the region showed increase in HDI over the last decade. The largest positive change in HDI was in China while the smallest was in Japan. The highest HDI was Japan's – 0.93 classifying it as highly developed, while the lowest was Mongolia – 0.66.

Source: United Nations Development Programme. Human Development Indicators . http://hdr.undp.org. (March-April 2003).
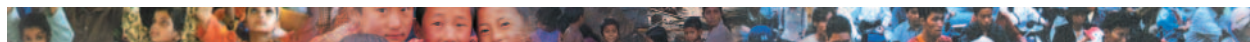
REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
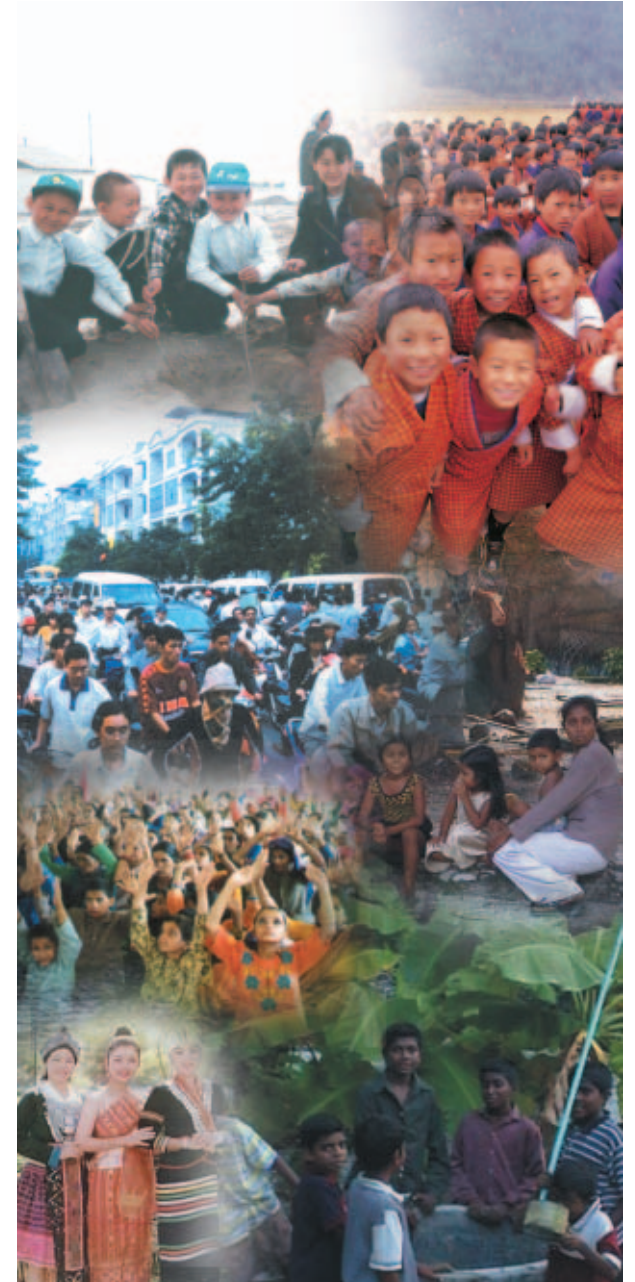
Social Indicator - Population With Income Less than 1 USD/day
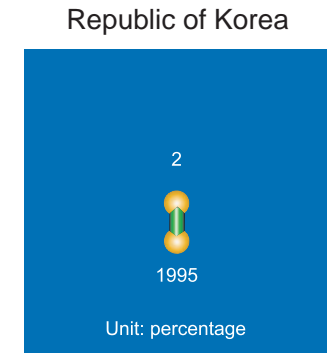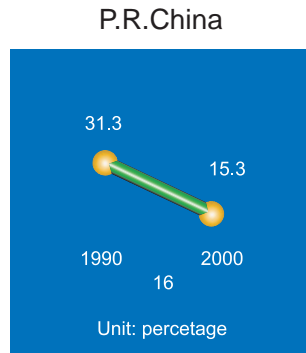
P.R.China

31.3

15.3

1990   2000

16

Unit: percetage

Mongolia

13.9

1995

Unit: percentage

Republic of Korea

2

1995

Unit: percentage

Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. From the available data, it can be seen that poverty in China was reduced by almost half during the 1990s. Around 14 per cent of Mongolia's and only two per cent of Republic of Korea's population was below poverty line in 1995.

Source: World Bank. 2003. Global Economic Prospects and the Developing Countries - Investing to Unlock Global Opportunities : 2003. (World and Regional Data) and World Bank. Millennium Development Goals. http://www.developmentgoals.org. (March-April 2003) (Country data)

Social Indicator - Poverty Forecast

Unit: Million of people

	1990	1999	2015
World	1300	1190	800
East Asia and Pacific	500	270	100
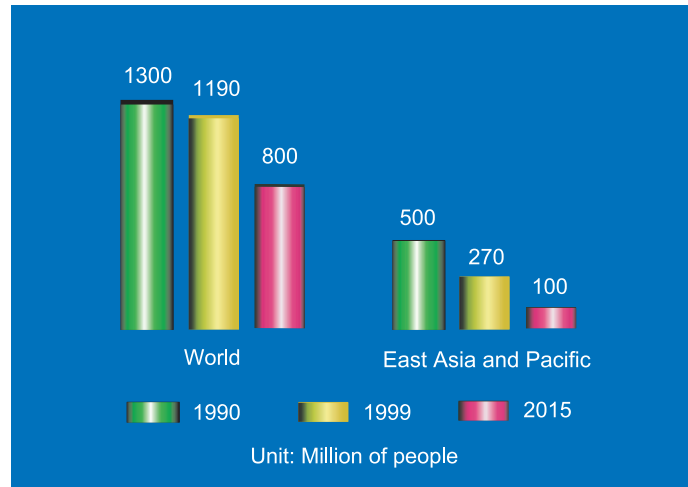
Note: Despite the lack of country data, sub-regional statistics were available for comparison with world data. Poverty in North East Asia is forecast to drop significantly by 2015. The highest decrease is forecasted for China, which will significantly reduce poverty numbers in North East Asia.

Source: World Bank. 2003. Global Economic Prospects and the Developing Countries - Investing to Unlock Global Opportunities : 2003. (World and Regional Data) and World Bank. Millennium Development Goals. http://www.developmentgoals.org. (March-April 2003) (Country data)

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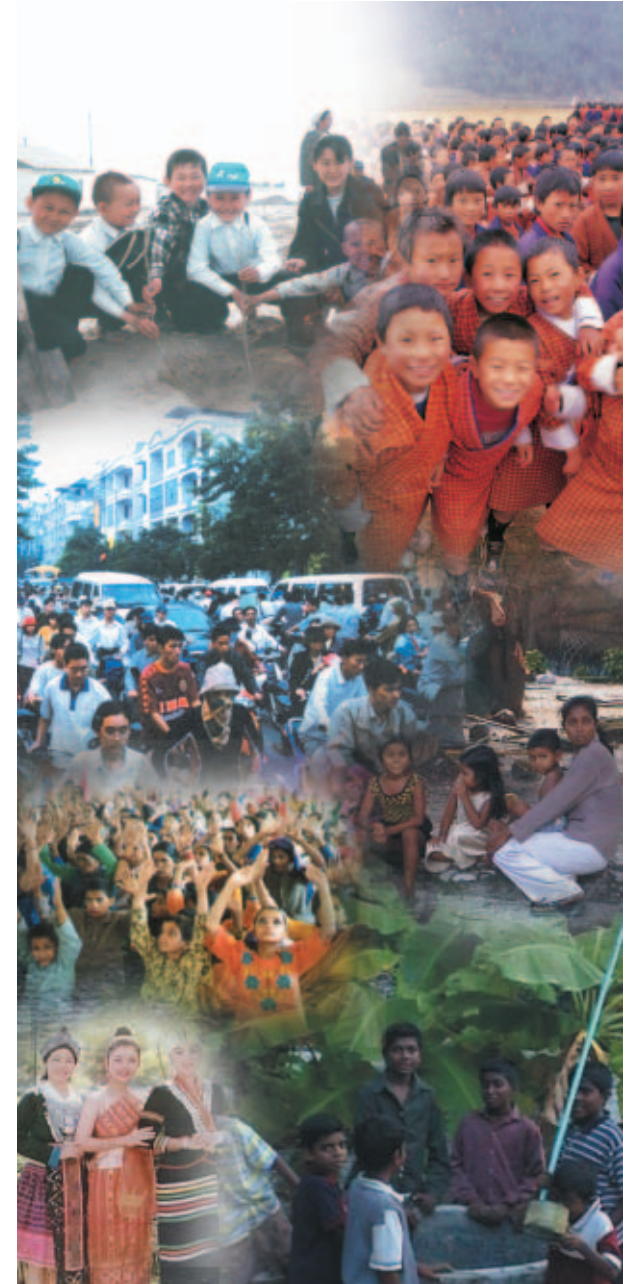
Social Indicator - Infant Mortality Rate

P.R.China

38   37
         32

1990   1995   2000
      1   5

Unit: Per 1000 Live Births.

Mongolia

77
    67
         61

1990   1995   2000
     10   6

Unit: Per 1000 Live Births.

DPR Korea

26
    23   23

1990   1995   2000
     3   0

Unit: Per 1000 Live Births.

Republic of Korea

8
    6
         5

1990   1995   2000
     2   1

Unit: Per 1000 Live Births.

Japan

5
    4
         3

1990   1995   2000
     1   1

Unit: Per 1000 Live Births.
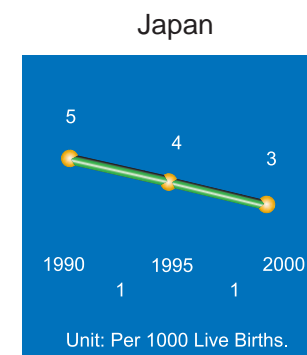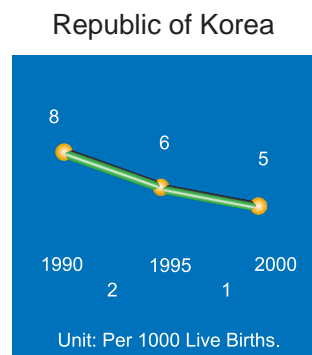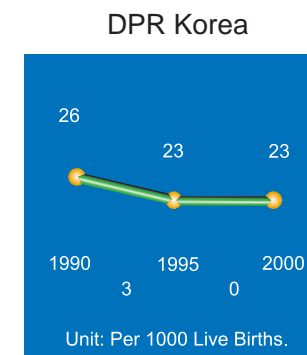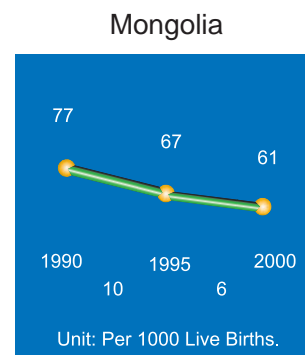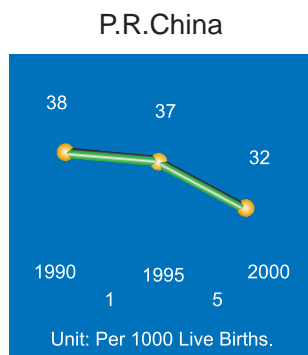
Note: Infant mortality rate has decreased in all countries. Japan has the lowest infant mortality rate – 3 per 1000 live births. Republic of Korea comes next – 5 per 1000 live births. The infant mortality rate for the rest of the countries is higher, with the highest in Mongolia – 61 per 1000 live births.

Source: http://www.childinfo.org

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
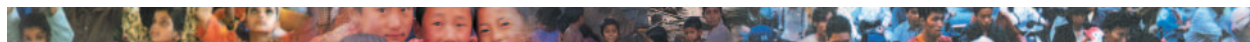
Social Indicator - Life Expectancy at Birth

P.R.China

68.9   69.4   70.3

1990   1995   2000
    0.5   0.8

Unit: Years

Mongolia

62.7   64.9   67

1990   1995   2000
    2.2   2.1

Unit: Years

DPR Korea

65.5   60.7   60.7

1990   1995   2000
    4.8   0

Unit: Years

Republic of Korea

70.3   71.8   73.2

1990   1995   2000
    1.5   1.4

Unit: Years

Japan

78.8   79.5   80.7

1990   1995   2000
    0.7   1.2

Unit: Years

Note: Life expectancy at birth decreased for DPR Korea, but increased for the rest of the region. The highest absolute increase was reported in Mongolia. The highest life expectancy at birth was in Japan – 80.7 years, which is higher than the rest of the region, as the rest fall between 60 and 74 years. The lowest is in DPR Korea – 60.7 years.

Source: World Development Indicators 2002

Economy Indicator

During the 1990s, economic growth in East Asia and the Pacific (EA and P) in terms of GDP, was approximately three times the growth of the world average. China and the Republic of Korea lead the sub-region with growth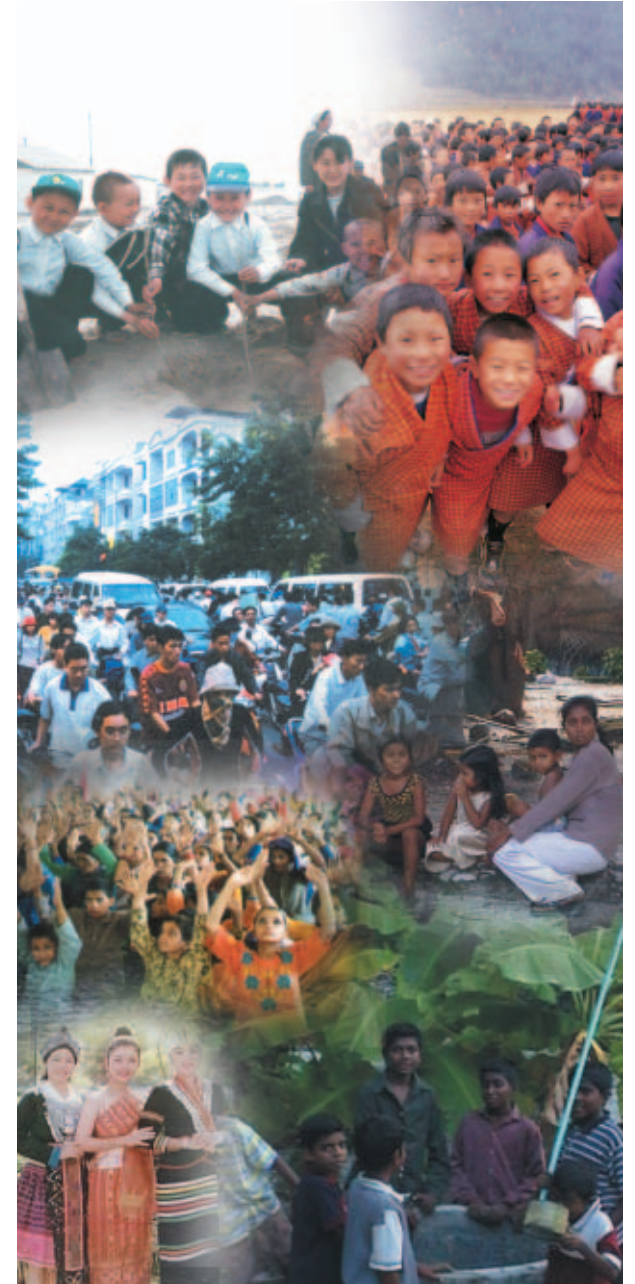 rates as high as eight per cent and nine per cent respectively. The Asian economy crisis slowed down economic growth rates in the latter half of the decade. Economic growth in Japan stagnated towards the end of the 1990s as the Japanese economy was in recession. But in the past few years, the Japanese economy has shown signs of improvement. Growth in Mongolia was strong in the middle of the decade, but weak at the beginning and end. Mongolia needs higher rates of growth to achieve poverty reduction. The forecast for the region in the coming decade suggests some slowing of growth, but the region's GDP will grow at nearly two times the world average, with China leading the economic growth in the region.
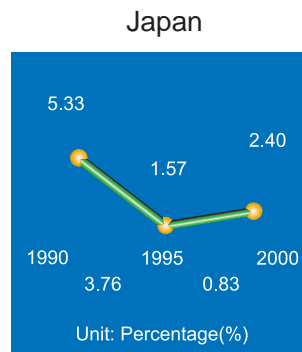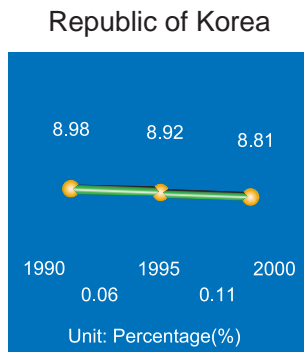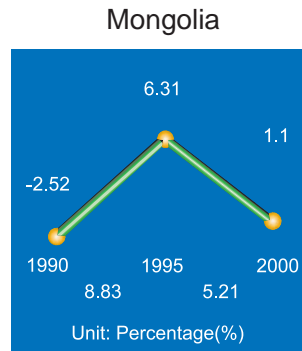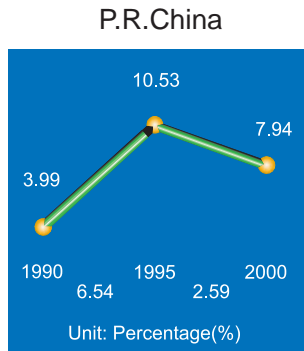
GDP grew rapidly in East Asia and the Pacific in comparison to the world average. This accelerated growth is forecast to slow down somewhat, but to continue strongly into the coming decade. The GNI in Japan and in the Republic of Korea declined between 1995 and 2000, while China's GNI continued to accelerate during the 1990s. Data was not available for DPR Korea. Japan had the highest GNI per capita in the sub-region. The Republic of Korea was second, followed by China and then Mongolia. Data was not available for DPR Korea.

Japan's GNI and GNI per capita figures also remain higher than figures for the rest of the sub-region. Japan has seen tremendous economic boom and prosperity and is bracketed as a developed country. Thus, it is not surprising that Japan's GNI and GNI per capita will exceed that of the rest of the region by a significant amount.

During the last decade Japan faced economic recession and this is reflected in the decrease in GDP growth. At the beginninf of the decade, Japan's GDP growth was 5.33 per cent. This had declined to 2.40 per cent by the end of the decade and had a nadir of 1.57 per cent in the middle of the decade. China on the other hand experienced economic expansion – From a GDP growth of 3.99 per cent in 1990, China ended with a GDP of 7.94 per cent by the end of the decade.

China has shown consistent economic growth over the last decade and its economy is forecasted to continue growing, albeit at a slighter lower rate. China's economic boom has been good for the social development of the country and has helped reduce poverty in the country. Urban areas in China have prospered more under the economic boom than the rural areas. But in the coming years, this inequality should be addressed. The economic growth in China has fueled high rates of urbanization, which are now a cause of environmental concern. Urban centres in China face stress, pollution and urban environmental problems such as improper garbage and sewage disposal and lack of proper sanitation and safe water.

Economy Indicator - Gross Domestic Product Annual Growth

P.R.China

10.53

7.94

3.99

| 1990 | 1995 | 2000 |

6.54   2.59

Unit: Percentage(%)

Mongolia

6.31

1.1

-2.52

| 1990 | 1995 | 2000 |

8.83   5.21

Unit: Percentage(%)

Republic of Korea

8.98   8.92   8.81

| 1990 | 1995 | 2000 |

0.06   0.11

Unit: Percentage(%)

Japan

5.33

2.40

1.57

| 1990 | 1995 | 2000 |

3.76   0.83

Unit: Percentage(%)

Note: China and Republic of Korea lead the region with growth rates as high as eight and nine per cent respectively. Japan's economy slowed down during the 1990s, with GDP only 2.40 per cent by the end of the decade. Growth in Mongolia was strong in the middle of the decade, but weak at the beginning and the end.

Source: United Nation Environmental Program. (Citing the World Bank). Global Environmental Outlook Data Portal . http://geodata.grid.unep.ch March-April 2003.

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
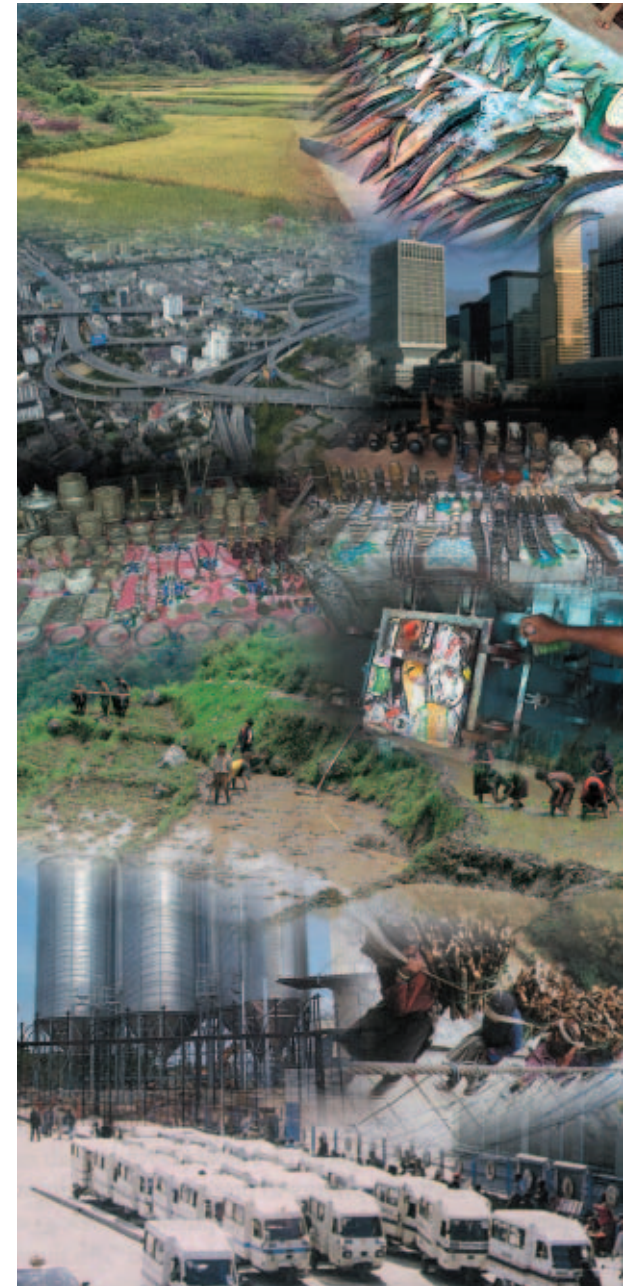
Economy Indicator - Gross Domestic Product Comparison

	World	U.S.A	Europe	Asia	East Asia and Pacific	South Asia
1991-2000	2.6	3.2	2.0	7.0	7.7	5.2
2002-2015	3.1	3.1	2.3	6.0	6.2	5.4

■ 1991-2000   ■ 2002-2015
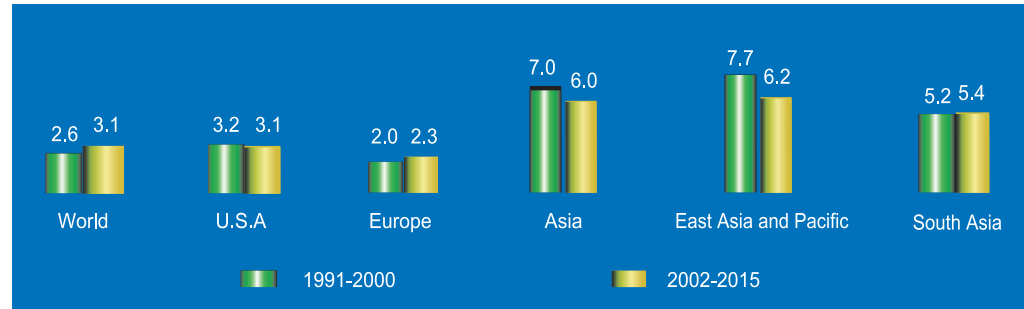
Note: The forecast for the region in the coming decade suggests some slowing of growth, but the region's GDP will grow at nearly two times the world's average.

Source: World Bank. 2003. Global Economic Prospects and the Developing Countries: Investing to Unlock Global Opportunities 2003.

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Economy Indicator - Gross National Income

P.R.China

1100

622.7

368.1

| 1990 | 1995 | 2000 |

254.6   477.3

Unit: Billion USD

Mongolia

0.95

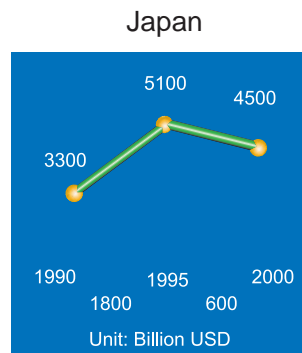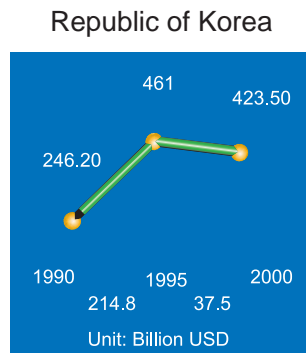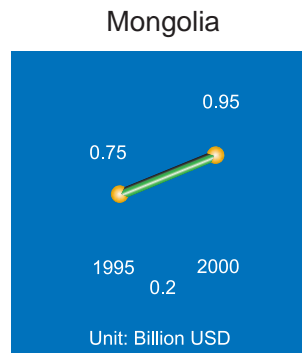0.75

| 1995 | 2000 |

0.2

Unit: Billion USD

Republic of Korea

461   423.50

246.20

| 1990 | 1995 | 2000 |

214.8   37.5

Unit: Billion USD

Japan

5100   4500

3300

| 1990 | 1995 | 2000 |

1800   600

Unit: Billion USD
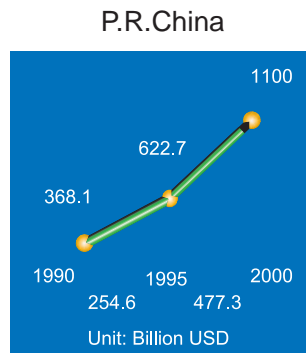
Note: Japan has the largest GNI in the region – US$ 4500 billion. This is more than the combined GNI of the rest of the region. Mongolia has the lowest – US$0.95 billion. The GNI in Japan and in the Republic of Korea declined between 1995 and 2000, while China's GNI continued to accelerate during the 1990s.

Source: World Bank. Millennium Development Goals . http://www.developmentgoals.org. (March-April 2003)
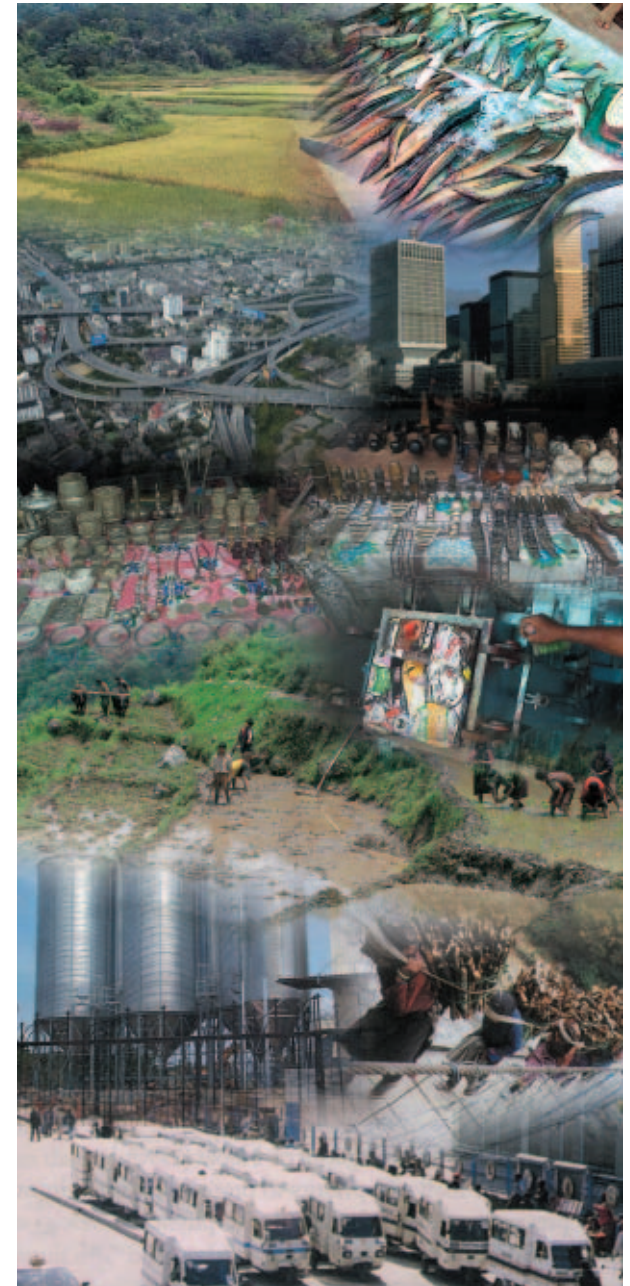
Economy Indicator - Gross National Income Per Capita

P.R.China

840
520
320
1990   1995   2000
200   320
Unit: USD/Capita

Mongolia

390
330
1995   2000
60
Unit: USD/Capita

Republic of Korea

10250
8960
5740
1990   1995   2000
4510   1290
Unit: USD/Capita

Japan

40830
35620
27100
1990   1995   2000
13730   5210
Unit: USD/Capita
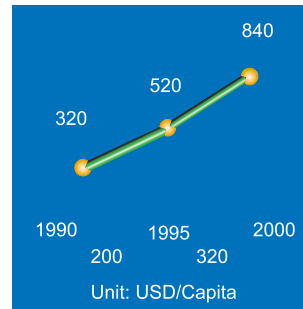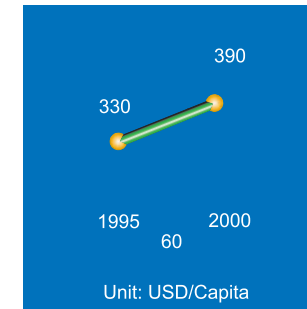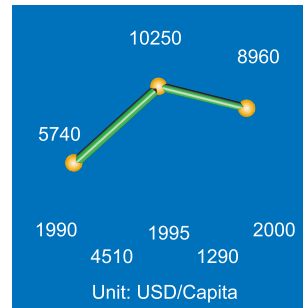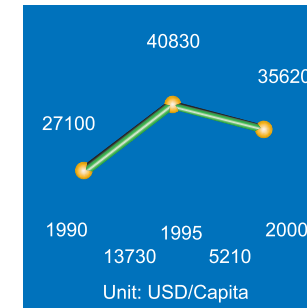
Note: Japan and Republic of Korea had an increase in GNI per capita in the first half of the decade, followed by a decline in the second half. Japan has the highest GNI per capita – US$35620, which is much higher than figures for the rest of the region. China's GNI per capita showed accelerated growth. Mongolia's is the lowest – US$390.

Source: World Bank. Millennium Development Goals . http://www.developmentgoals.org. (March-April 2003)

Economy Indicator - Energy Consumption Per Capita

P.R.China

0.66

0.61

0.42

1990	1995	1999
0.24	0.05	

Unit: Tonnes of Oil Equivalent

DPR Korea

2.4

2.21

2.01

1990	1995	1999
0.19	0.20	

Unit: Tonnes of Oil Equivalent

Republic of Korea

2.69

2.39

1.57

1990	1995	1999
0.82	0.30	

Unit: Tonnes of Oil Equivalent

Japan

2.7

2.62

2.38

1990	1995	1999
0.24	0.08	

Unit: Tonnes of Oil Equivalent
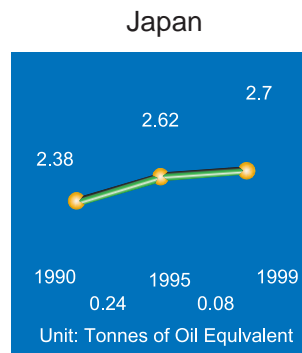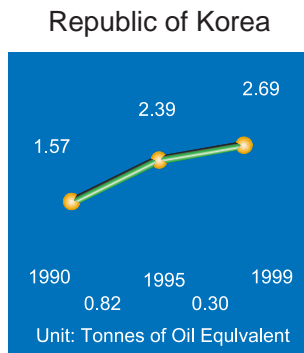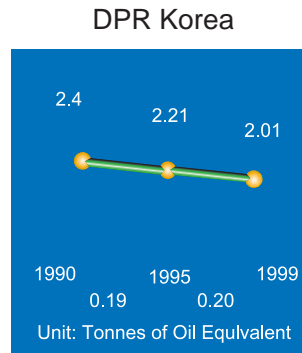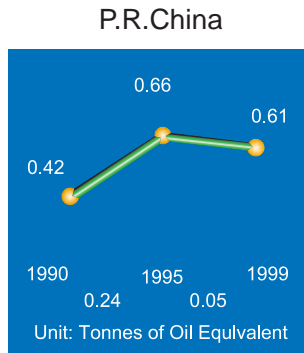
Note: Japan and Republic of Korea have the highest energy consumption per capita – 2.70. DPR Korea comes close to this, with an energy consumption of 2.01. Energy consumption has increased for all countries except for DPR Korea where it decreased over the last decade. China has the lowest energy consumption per capita – 0.61. Data is not available for Mongolia.

Source: World Bank. Millennium Development Goals . http://www.developmentgoals.org. (March-April 2003)
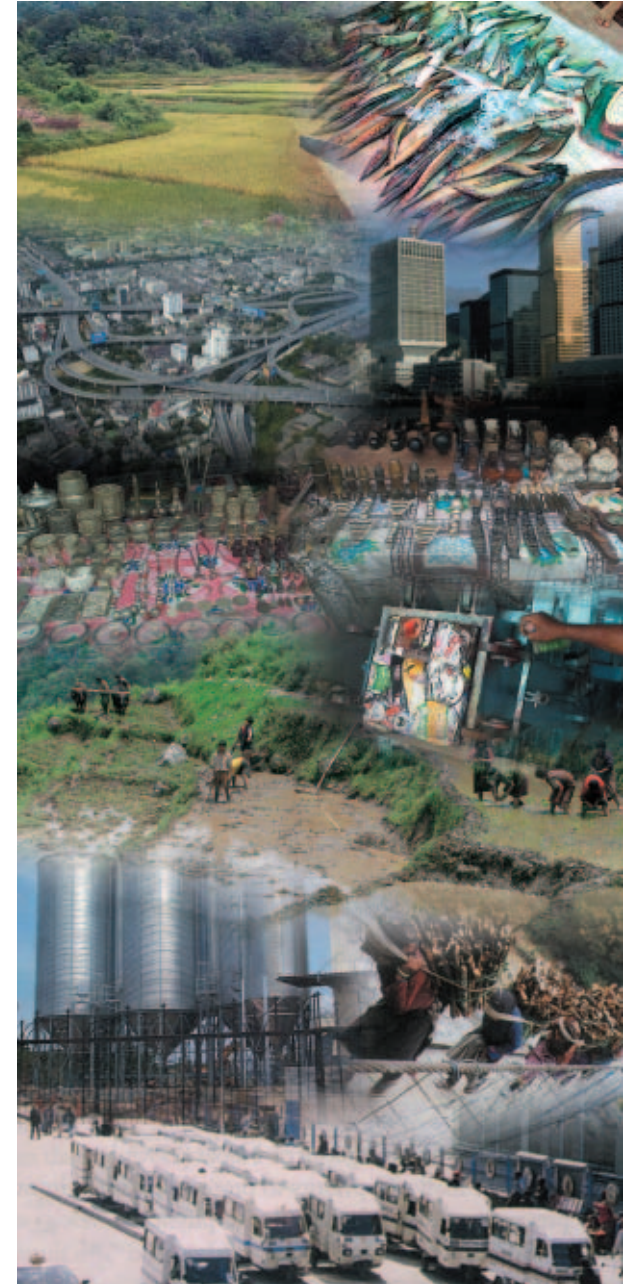
Land Indicator

Forest cover in North-East Asia is highly variable among the five countries. Mongolia, nearly half of which is the Gobi desert, has lesser than ten per cent forest cover while DPR Korea has nearly 70 per cent forest cover. Though some changes are documented, forest change in the sub-region did not greatly change during the 1990s. For DPR Korea and Japan, forest cover remained constant during the 1990s. Republic of Korea showed a negligible decrease in forest cover over the past decade. Mongolia showed the highest rate of decreasing forest cover with an annual rate of approximately 0.5 per cent. China showed an increase in forest cover over the last decade, with an annual increase of approximately one per cent. This was the highest forest cover increase in the region. Despite population pressure, rapid industrialization and urbanisation, China successfully managed to preserve and increase existing forest cover in the 1990s, largely due to government afforestation campaigns.

Land degradation has affected areas of North-East Asia. The soil quality data for 1990 showed that the land quality ranged from not degraded to very high degradation in China, medium to high degradation in both DPR Korea and Republic of Korea, not degraded in Japan and not degraded to high degradation in Mongolia. Land degradation has lead to desertification in parts of North-East Asia. Desertification in China is accelerating, leading to progressively greater annual losses of the arable land. Desertification impacted 262 million hectares in 1996, accounting for just over 27 per cent of the total national territory of China in 1996. Desertification has been of concern in Mongolia too. Overgrazing in Mongolia by the nomadic livestock herds that occupy 75 per cent of the total land area and the creation of multi-tracks in the Gobi desert, after vehicles are driven on wide new strips alongside rural roads when old tracks deteriorate have lead to degradation of the land.
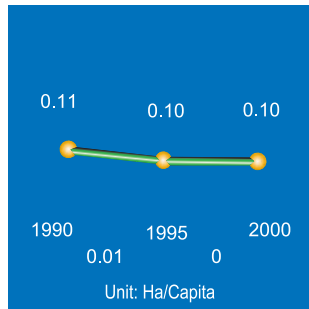
Soil pollution also has lowered the quality of the land. In China, sewage is successfully recycled for irrigation. Though this conserves water, the sewage has left heavy metal pollutants in the soil. Japan and Republic of Korea also face the problem of heavy metal contaminants in soil.

Agricultural capacity in the region, in terms of arable land available per capita, experienced increased pressure throughout North-East Asia during the 1990s. In all countries, the amount of arable land per capita showed a decrease. Increasing population pressure and encroachment of arable land by urban and industrial expansion have contributed to the decrease in arable land. Land degradation, desertification and salinization have also contributed to the loss of arable land in the region. Mongolia has the largest arable land per capita in the region, but this capacity has degraded over the 1990s. China has the second largest arable land per capita, followed by DPR Korea, the Republic of Korea while Japan has the least arable land per capita.
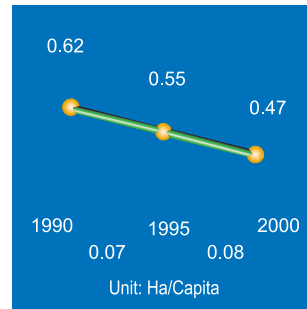
The rate and growth of land degradation is of concern in the region. Land degradation has long-term repercussions and it is not easy to regenerate land that has been degraded. Rapid and increasing land degradation can have effects on the food producing capacity and food security of the region.

Land Indicator - Arable Land Per Capita

P.R.China

0.11   0.10   0.10

1990   1995   2000
0.01   0

Unit: Ha/Capita

Mongolia

0.62
0.55
0.47

1990   1995   2000
0.07   0.08

Unit: Ha/Capita

DPR Korea

0.09
0.08   0.08

1990   1995   2000
0.01   0

Unit: Ha/Capita

Republic of Korea

0.05
0.04   0.04

1990   1995   2000
0.01   0

Unit: Ha/Capita

Japan

0.04   0.04   0.04

1990   1995   2000
0   0

Unit: Ha/Capita
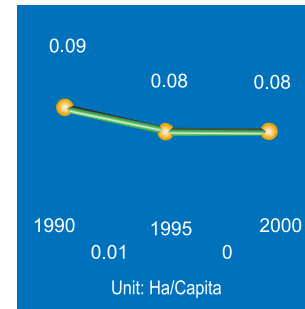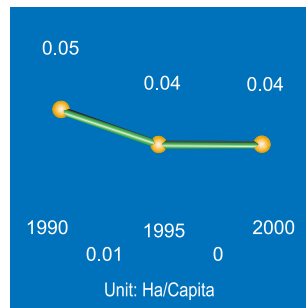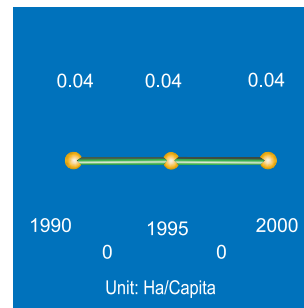
Note: The largest decrease in arable land per capita was in Mongolia. In the rest of the region, the decrease was slight during the first half of the decade and there was no decrease in the second half of the decade. Japan's arable land per capita remained constant during the decade. Mongolia had the highest arable land – 0.47 ha/capita.

Source: United Nations Food and Agricultural Organization. FAOSTAT Agricultural Database . http://www.fao.org. April 2003

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Land Indicator - Forest Area

P.R.China

15.60
14.30
17.50

1990   1995   2000
1.3   3.2

Unit : % of Total Land Area

Mongolia

7.20
6.00
6.80

1990   1995   2000
1.20   0.80

Unit : % of Total Land Area

DPR Korea

68.20
51.20
68.20

1990   1995   2000
17   17

Unit : % of Total Land Area

Republic of Korea

63.80
51.20
63.30

1990   1995   2000
12.60   12.10

Unit : % of Total Land Area

Japan

66.8
63.9
64

1990   1995   2000
2.9   2.80
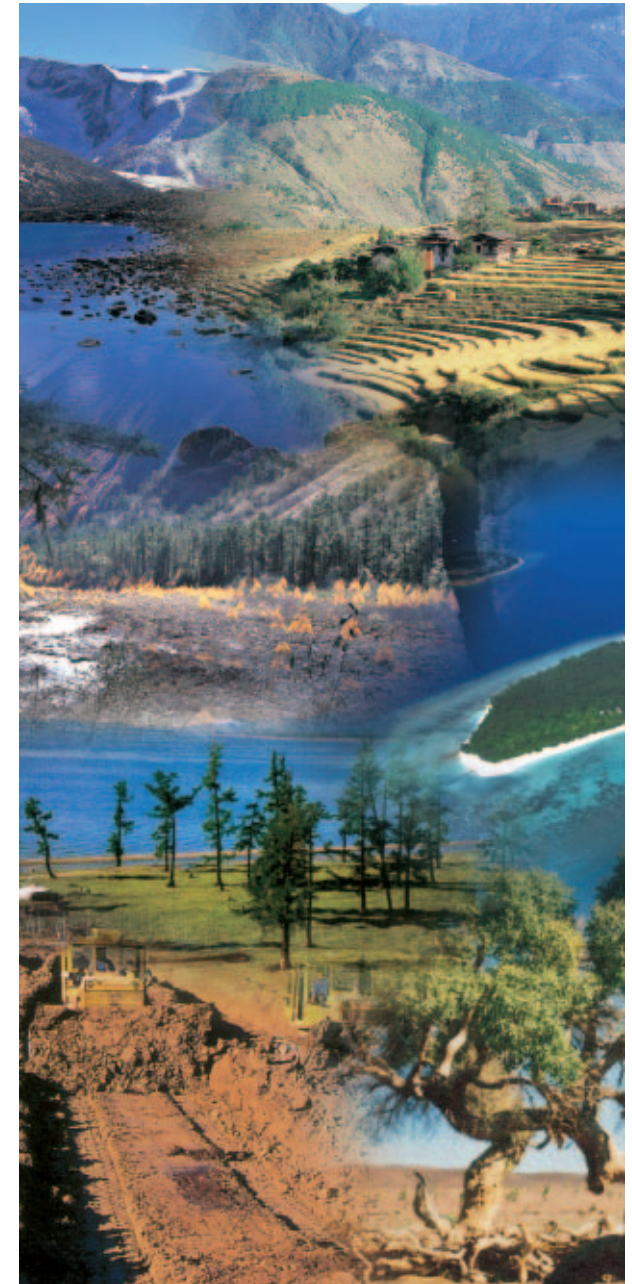
Unit : % of Total Land Area

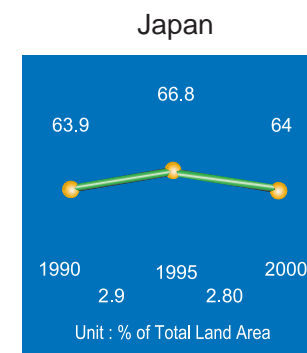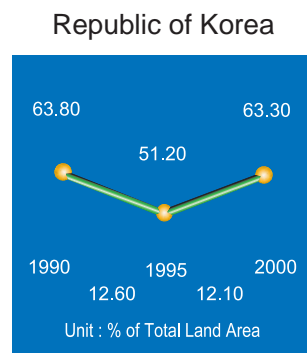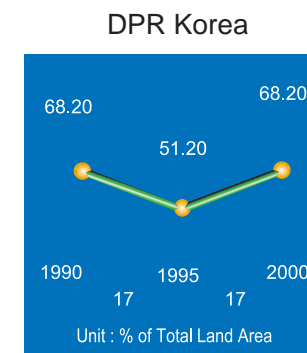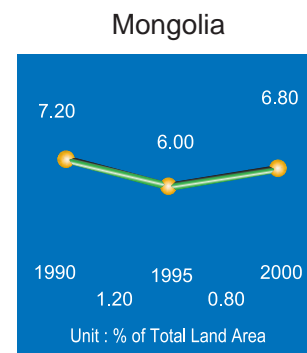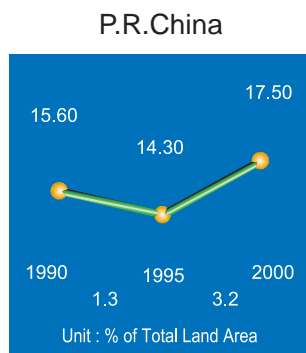Note: Republic of Korea, DPR Korea and Japan have high percentage of forest area, greater than 60 per cent in each country. DPR Korea has the highest percentage of forest area – 68.20 per cent. Mongolia has the least percentage of forest cover – 6.80 per cent. Forest cover has slightly increased in China over the last decade.

Source: United Nations Statistics Division. Millennium Indicators . http://www.unstats.org. April 2003

R E G I O N A L   R E S O U R C E   C E N T R E   F O R   A S I A   A N D   T H E   P A C I F I C

Land Indicator - Forest Cover Change

China	DPR Korea	Japan	Mongolia	Rep of Korea
1.2	0	0	-0.5	-0.1

Year 1995   Unit: %
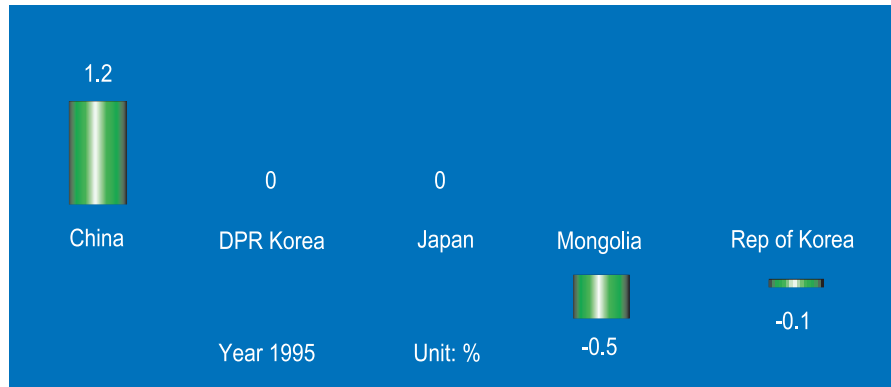
Note: China had the highest rate of increasing forest cover with an annual increase of approximately one per cent. Mongolia had the highest rate of decreasing forest cover with an annual decrease of approximately 0.5 per cent. Forest cover change in Japan and DPR Korea were zero.

Source: United Nations Statistics Division. Millennium Indicators . http://www.unstats.org. April 2003

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Water Indicator

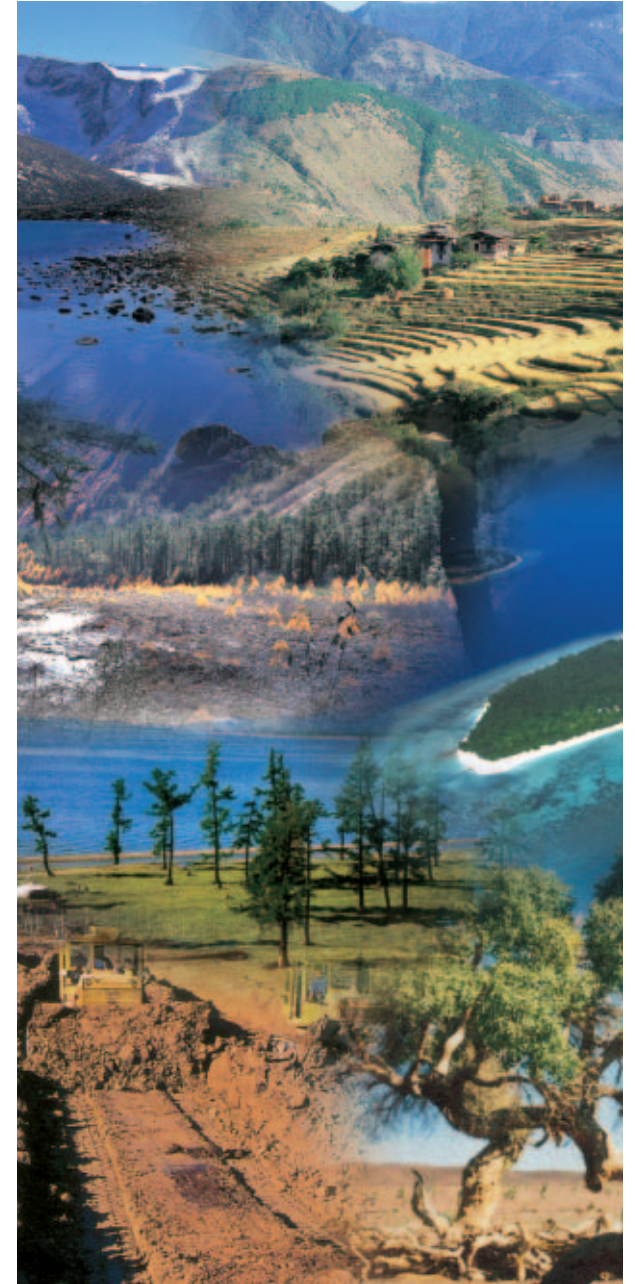As an indicator of water pollution, BOD data from the rivers of North-East Asia is analysed. From the available data it was seen that BOD levels were lowest in China. In Republic of Korea, the BOD levels showed an increase during the first half of the decade but subsequently decreased during the second half. Japan has promulgated progressive environmental laws to ensure river quality. Implementation of these laws has helped to improve the water quality in Japan.

Dirty water and poor sanitation are among the main causes of disease. Though North-East Asia consists of the relatively developed nation of Japan and Republic of Korea, outbreaks of water borne diseases may occur in parts of rural China and Mongolia. Japan, DPR Korea and the Republic of Korea reported very high levels of access to safe drinking water (> 95 per cent), while 94 per cent of China's population had access to safe drinking water in the year 2000. Japan and DPR Korea also had similarly high levels of access to safe sanitation (> 95 per cent). Only 68 per cent of China's population had access to safe sanitation while in Mongolia the figure was 46 per cent.
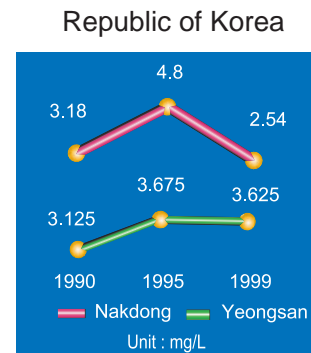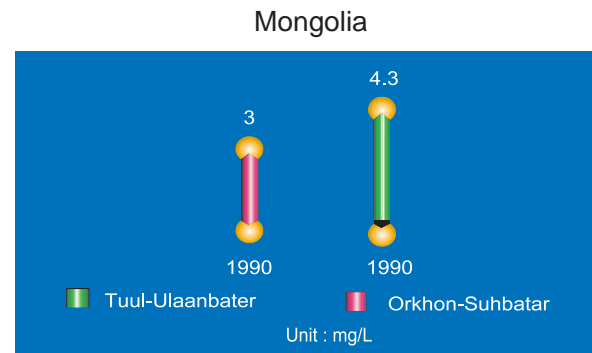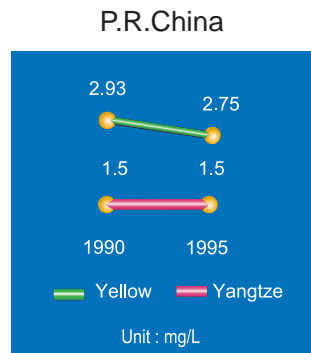
Annual water availability per capita was relatively constant in the countries of North-East Asia during the 1990s. The Republic of Korea had the least water resources per capita, and Mongolia had the greatest water resources per capita in the region. The annual water availability per capita in Japan and China decreased. Population growth and industrial development has increased water demand in the region. Increased pollution of water-bodies and increased water consumption has reduced the per capita water availability. Increasing urbanisation has increased the demand and consumption of water. Introduction of amenities such as flush toilets and centralized water supply has lead to increase in water consumption. There is a need to regulate the water consumption in cities and urban areas. The rapid economic growth in Japan lead to greater urbanisation. With higher urbanisation, Japan saw a rise in the demand of water. Shortage of water is an important issue in China. In 1990's, out of 600 cities, the problem of water shortage emerged in 300 cities and 108 cities experienced severe water shortage, in China. In DPR Korea and the Republic of Korea, the availability per capita fluctuated over the decade and did not show an obvious trend of increasing or decreasing.

Access to safe drinking water and safe sanitation are important socio-economic indicators, which talk about a country's social development. These two indicators are also important for the well-being of a nation. Inadequate sanitation and polluted water are the main culprits of outbreaks of water-borne diseases. Emphasis also needs to be laid on stricter laws for pollution control of rivers and effluent treatment before discharge by polluting industries. City councils and municipalities also need to invest in sewage treatment plants and facilities.

Marine and Coastal pollution is an issue of concern in the region. Republic of Korea, DPR Korea, and Japan border the Sea of Japan, which is exposed to pollution from land-based sources, maritime transport and waste dumping.

Water Indicator - BOD level in Major Rivers

P.R.China

2.93
2.75
1.5   1.5
1990   1995

Yellow   Yangtze

Unit : mg/L

Mongolia

4.3
3
1990   1990

Tuul-Ulaanbater   Orkhon-Suhbatar

Unit : mg/L

Republic of Korea

4.8
3.18   2.54
3.675   3.625
3.125
1990   1995   1999

Nakdong   Yeongsan

Unit : mg/L

Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. BOD levels were lowest in China. In Republic of Korea, the BOD levels showed an increase during the first half of the decade but subsequently decreased during the second half.

Source: World Bank. New Ideas in Pollution Regulation . http://www.worldbank.org. April 2003. (China), Ministry of Nature and Environment. Government of Mongolia. 1996. Nature and Environment in Mongolia. Ulaanbaatar. 1996. (Mongolia), Water Korea. Korean Department of Water . http://www.water.or.kr. April 2003. (Rep. of Korea)

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Water Indicator - Population with Access to Safe Sanitation
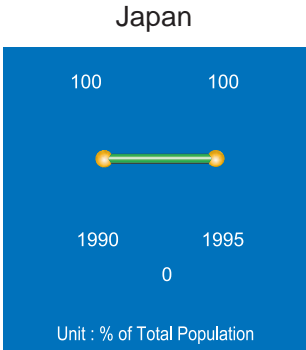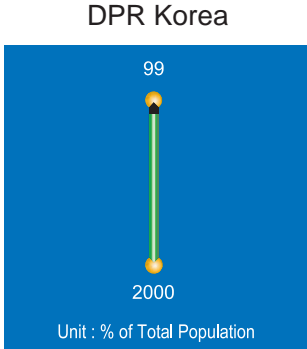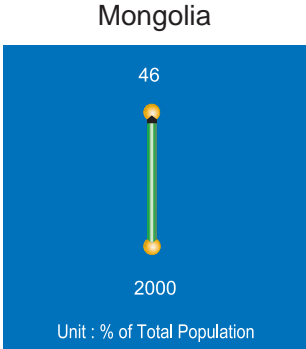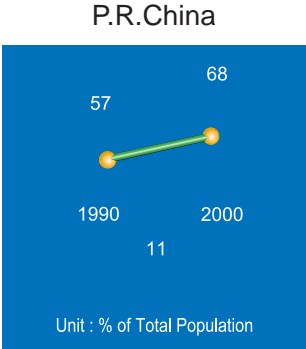
P.R.China

68
57
1990   2000
11
Unit : % of Total Population

Mongolia

46
2000
Unit : % of Total Population

DPR Korea

99
2000
Unit : % of Total Population

Republic of Korea

76
2000
Unit : % of Total Population

Japan

100   100
1990   1995
0
Unit : % of Total Population
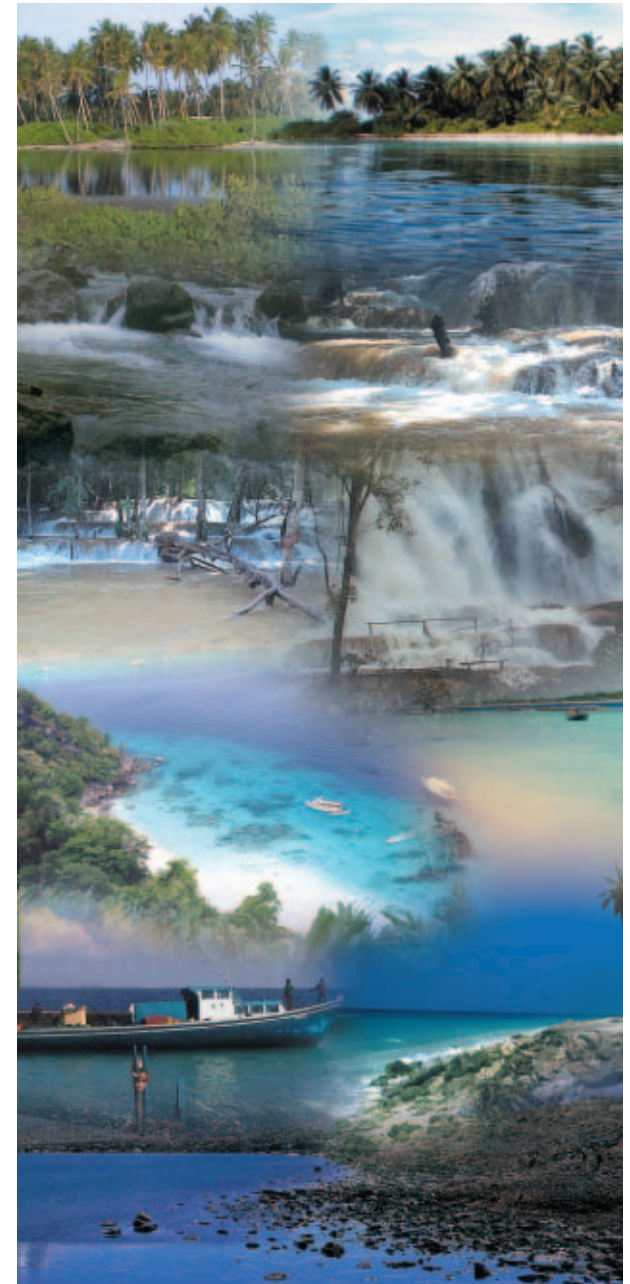
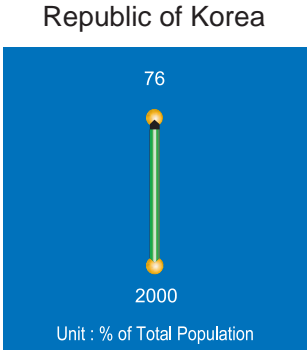Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. From the data available, DPR Korea had the highest percentage of population with access to sanitation – 99 per cent. Mongolia had the least – 46 per cent. China showed increase in percentage of population during the last decade.

Source: World Health Organization and UNICEF

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Water Indicator - Population with Access to Safe Drinking Water

P.R.China

99
94
1990   2000
5
Unit : % of total population

DPR Korea

100
2000
Unit : % of total population

Republic of Korea

97
2000
Unit : % of total population

Japan

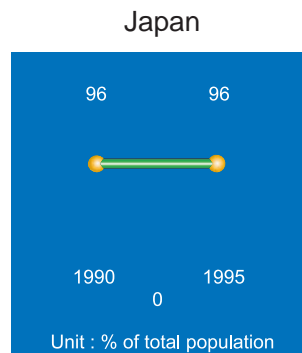96   96
1990   1995
0
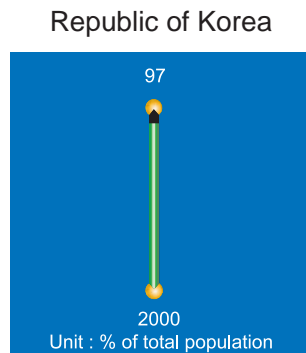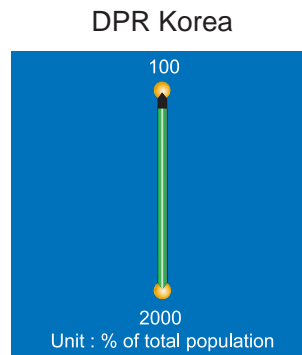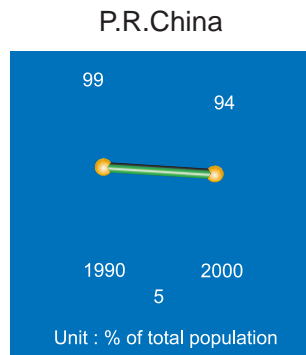Unit : % of total population

Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. From the data available, DPR Korea had the highest percentage of population with access to drinking water – 100 per cent. China showed decrease in percentage of population during the last decade.
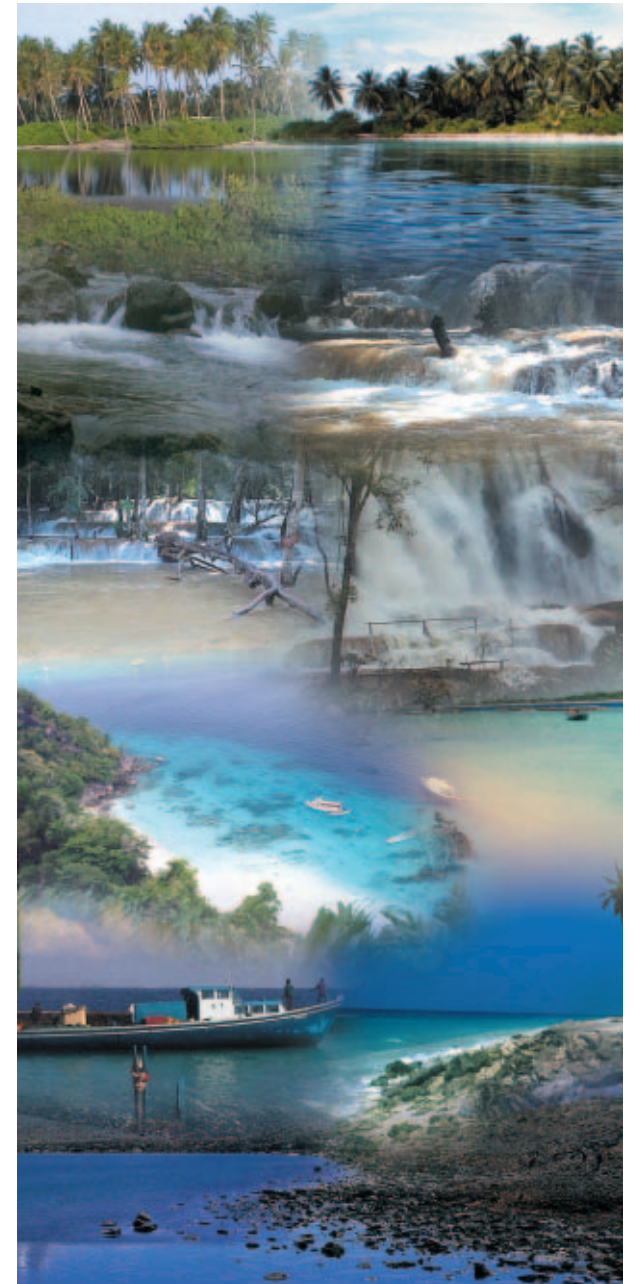
Source: World Health Organization and UNICEF

Water Indicator - Annual Water Availability

P.R.China

2470
2303
2194

1990   1995   2000

167   109

Unit : Cu M per Capita

Mongolia

11050
9776
13737

1990   1995   2000

1274   3961

Unit : Cu M per Capita

DPR Korea

2920
2984
3009

1990   1995   2000

64   25

Unit : Cu M per Capita

Republic of Korea

1450   1451
1387

1990   1995   2000

1   64

Unit : Cu M per Capita

Japan

4350
3383

1995   2000

967

Unit : Cu M per Capita
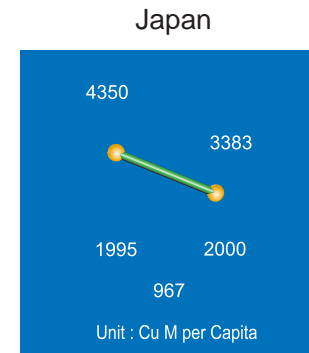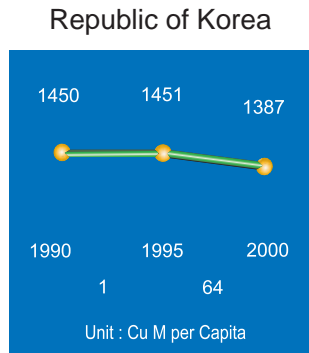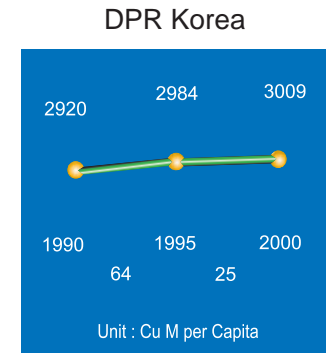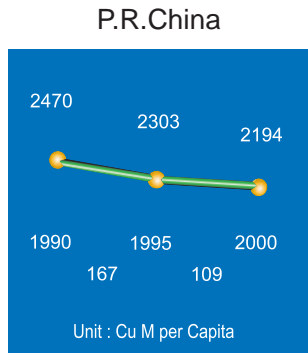
Note: Annual water availability showed slight increase in DPR Korea and slight decrease in China and Republic of Korea. Water availability showed fluctuation in Mongolia in the last decade. The highest water availability is in Mongolia – 13737 cu. m/capita, which is higher than the rest of the region. The lowest is in Republic of Korea – 1387 cu. m/capita.

Source: World Resources Institute 1992-93: A Guide to the Global Environment. Oxford University Press, Oxford, UK. 1992. (1990 data), World Bank. 1998, 2000. World Development Indicators. (1996), World Development Indicators. (1998), UNEP. (Citing the UN FAO). Global Environmental Outlook Data Portal . http://geodata.grid.unep.ch. (March-April 2003) (2000)

Air Indicator

Urban air pollution exacts a heavy toll on human health and the quality of human life. Recent major studies confirm the damaging effects of air pollution on human health. These effects include premature death, as well as increases in the incidence of chronic heart and lung diseases. China's two largest cities, Beijing and Shanghai regularly exceed safe emission levels for multiple pollutants. Levels of smoke and dust, major causes of respiratory diseases are frequently measured in Chinese cities at levels higher than the world average. Total suspended particulate matter concentration in Beijing ranged from 300 to 380 $\mu g/m^3$, which is a high value. By the end of the decade concentrations in Shanghai were more than halved at 150 $\mu g/m^3$. But even this lower value exceeds the permissible limit. Concentrations were highest in the city of Shenyang (China) and 17 per cent of deaths in this city are attributed to the effects of air pollution. In Japan, for the year 1995, particulate matter concentration in Tokyo and Osaka were within WHO limits. For the year 1995, particulate matter concentration in Seoul was 80 $\mu g/m^3$, which is higher than the permissible standard.
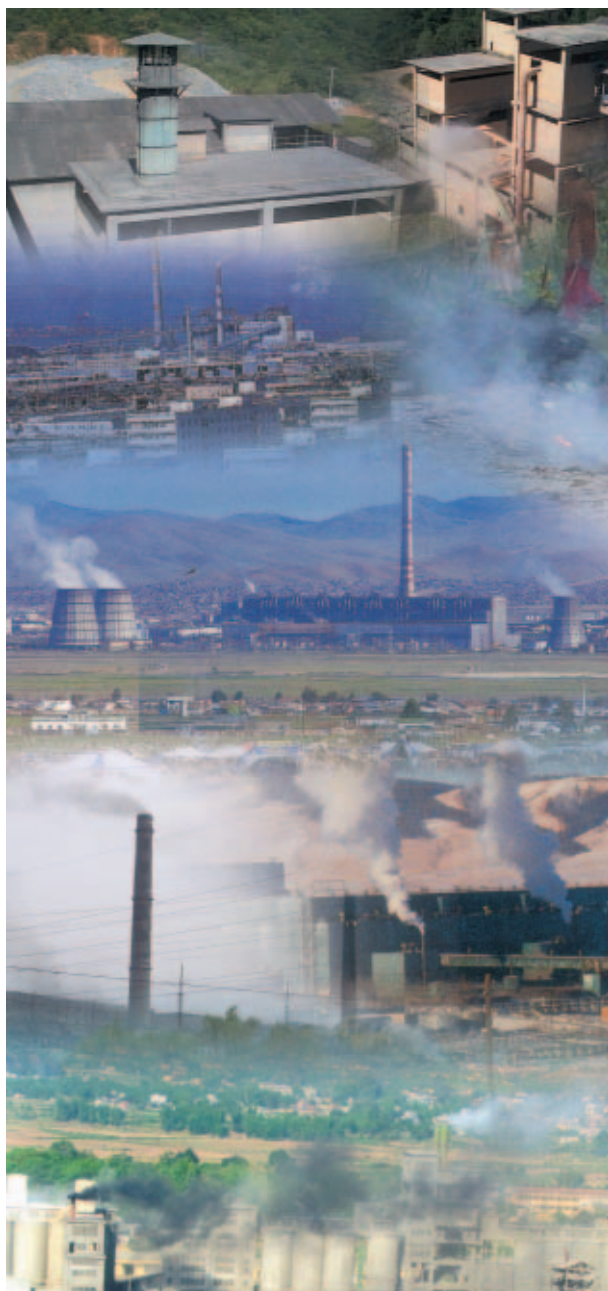
The largest net increase in emissions of nitric oxide occurred in China in the first half of the decade. In the same period, the emissions in Japan and the Republic of Korea also increased, while DPR Korea and Mongolia showed a decrease in emission.

Sulfur dioxide emissions in the region followed the same trend as the nitric oxide emission. China showed the largest net increase in Sulfur dioxide emissions in the first half of the decade. Japan and the Republic of Korea saw an increase in emissions of sulfur dioxide, while DPR Korea and Mongolia showed slight reduction in emission
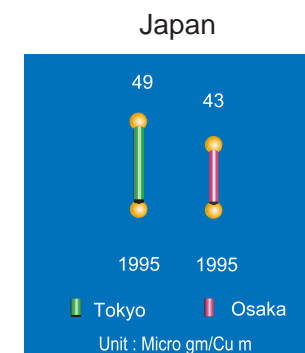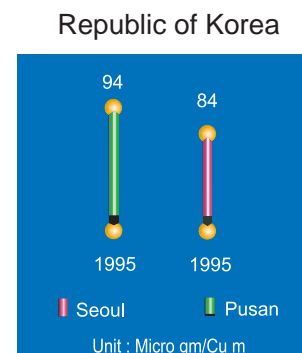
of SO_2. China relies heavily on coal as a fuel source. Most of this coal is of poor quality and with high sulfur content. About 90 per cent of China's total sulfur dioxide emissions come from coal burning. With increasing SO_2 emissions, acidification is emerging as an issue throughout the region, with South China being among the areas more sensitive to acidic deposition.

The transport sector has also been a major source of emissions. Economic growth has been followed by an increase in the number of private vehicles, which have been a main source of atmospheric pollutants especially in the urban areas. Strict standards and regulations should be enforced on vehicles. Monitoring and implementation of effective standards can help achieve better air quality.

As an indicator of greenhouse gas emissions, carbon dioxide emissions per capita showed both increasing and decreasing trends in the 1990s in North-East Asia. Emissions of CO_2 per capita decreased in DPR Korea and Mongolia over the decade. China and the Republic of Korea had small peaks in emissions in the middle and latter half of the decade, and ended the decade with higher emissions than 1990 levels. Japan's carbon dioxide per capita emissions showed a gradual increase over the decade. DPR Korea had the highest per capita emissions, while China had the lowest. CO_2 emissions per capita are still low in the region compared to the greenhouse gas emissions of the developed countries of the Western world. This can give the sub-region an advantage in carbon trading.

Air Indicator - SPM Concentration in major cities
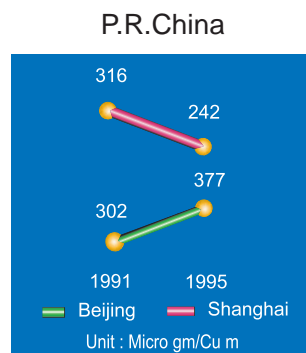
P.R.China

316
242
377
302

1991   1995

━━ Beijing   ━━ Shanghai

Unit : Micro gm/Cu m

Republic of Korea

94
84

1995   1995

▌ Seoul   ▌ Pusan

Unit : Micro gm/Cu m

Japan

49
43

1995   1995

▌ Tokyo   ▌ Osaka

Unit : Micro gm/Cu m

Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. From the data available, it is seen that the concentrations in Beijing and Shanghai are the highest in the region. High SPM concentrations can cause respiratory diseases in the population.
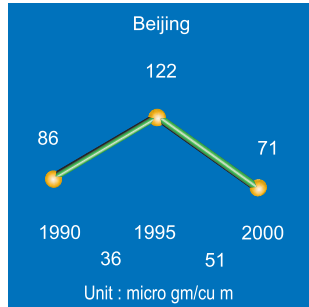
Source: World Bank. New Ideas in Pollution Regulation . April 2003. (1990-1994), World Bank. 2000. World Development Indicators. (1995), China National Environmental Monitoring Center. Ambient Air Quality Monitoring in China. 2000. World Bank. 2000. World Development Indicators. (1995)

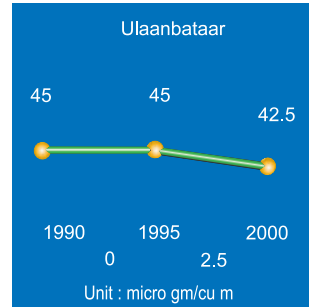REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Air Indicator - NO$_2$ Concentration in Capitals

P.R.China

Beijing

122
86
71
36   51

1990   1995   2000

Unit : micro gm/cu m

Mongolia

Ulaanbataar

45   45   42.5

1990   1995   2000
0   2.5

Unit : micro gm/cu m

DPR Korea

Pyongyang

60
30
30

1994   1998

Unit : micro gm/cu m

Republic of Korea

Seoul

65.8
62
60.2
2.2   5.6

1991   1995   2000

Unit : micro gm/cu m

Japan

Tokyo

68

1995

Unit : Micro gm/Cu m
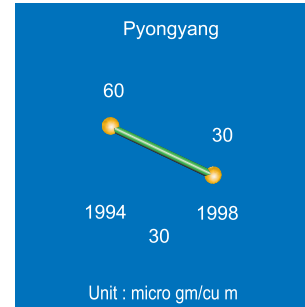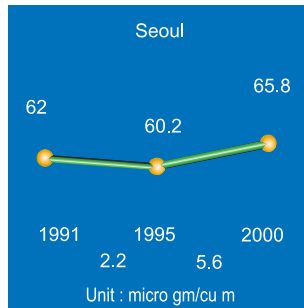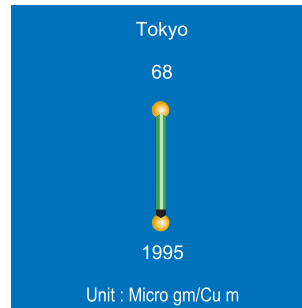
Note: NO$_2$ concentrations reduced by half in Beijing (China) and Pyongyang (DPR Korea). The highest nitric oxide concentration was observed in Beijing – 71 µg/cu. m. The lowest was in Pyongyang – 30 µg/cu. m.

Source: New Ideas in Pollution Regulation . April 2003. (1990-1994), World Bank. 2000. World Development Indicators. (1995), China National Environmental Monitoring Center. Ambient Air Quality Monitoring in China 2000. UNEP 2003. State of the Environment DPR Korea. Draft/Confidential. Ministry of Nature and Environment. Government of Mongolia. 1996. Nature and Environment in Mongolia. Ulaanbaatar. 1996. (1990-1995), Janjaadorj, J. and Bulgan, T. 2002. Country report of Mongolia. 24-26 April 2002, Incheon, Korea. (2000-2001)

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
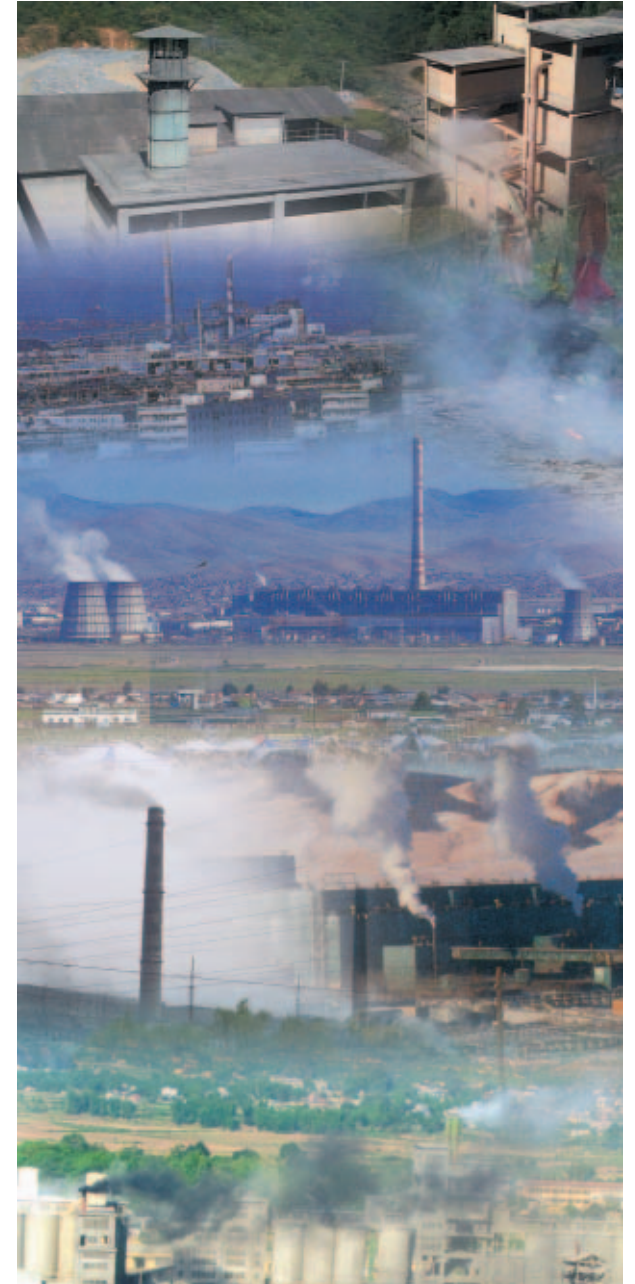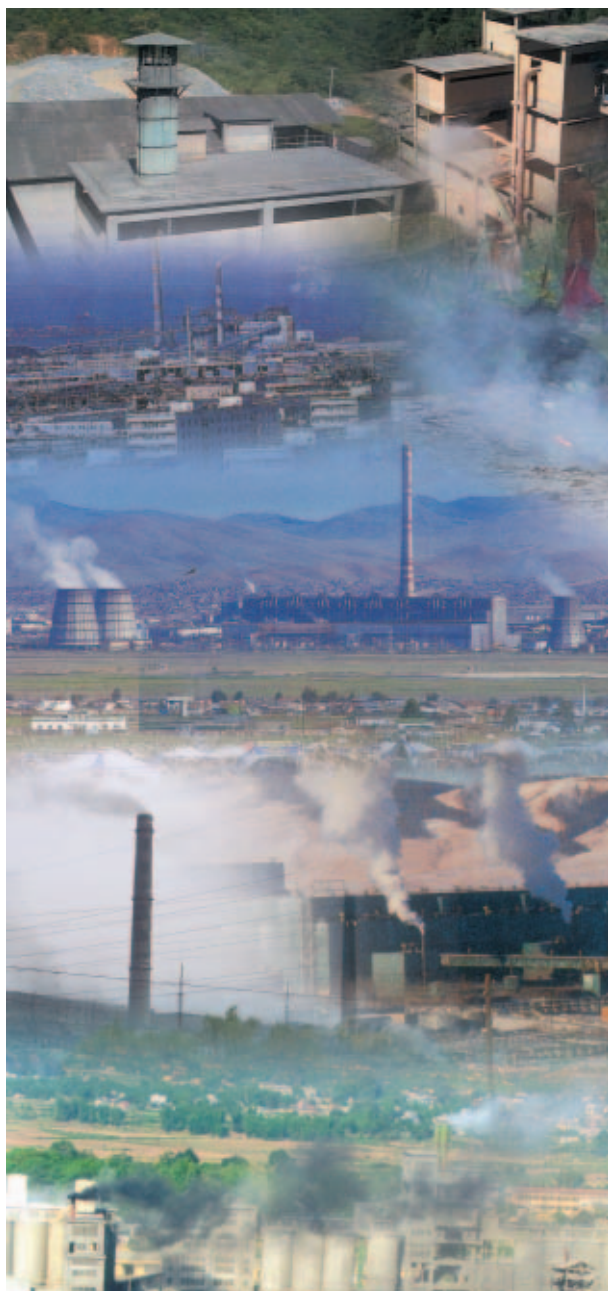
Air Indicator - SO$_2$ Concentration

P.R.China

Beijing

98
90
71
1990 1995 2000
8   19
Unit : micro gm/cu m

Mongolia

Ulaanbataar

11.2
8
8
1990 1995 2000
0   3.2
Unit : micro gm/cu m

DPR Korea

Pyongyang

44   15
1990   1995
29
Unit : micro gm/cu m

Republic of Korea

Seoul

112.6
44.50
15.70
1990 1995 2000
68.1   26.8
Unit : micro gm/cu m

Japan

Tokyo

20
1995
Unit : micro gm/cu m
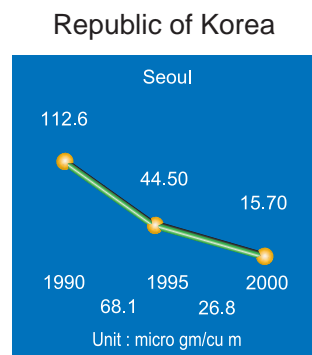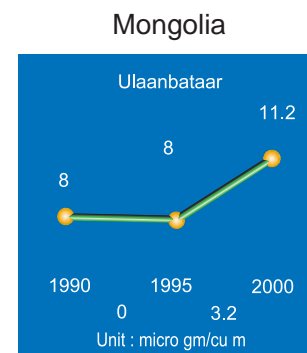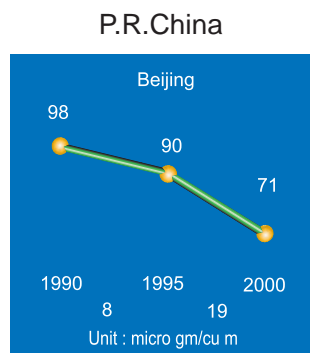
Note: Seoul (Republic of Korea) cut down its SO$_2$ concentration by almost ninety percent. Pyongyang and Beijing also showed decrease in SO$_2$ concentration during the last decade.

Source: New Ideas in Pollution Regulation. April 2003. (1990-1995), China National Environmental Monitoring Center. Ambient Air Quality Monitoring in China 2000. UNEP 2003. State of the Environment DPR Korea. Draft/Confidential. World Bank. 2000. World Development Indicators. (1995) Ministry of Nature and Environment. Government of Mongolia 1996. Nature and Environment in Mongolia. Ulaanbaatar. 1996. (1990-1995), Janjaadorj, J. and Bulgan, T. 2002. Country report of Mongolia. 24-26 April 2002, Incheon, Korea. (2000-2001)

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Air Indicator - CO$_2$ Emissions Per Capita

P.R.China

2.60

2.50

2.10

1990   1995   1999

0.5   0.1

Unit : 000 Metric Tonnes per Capita

Mongolia

3.5

3.3

1995   1999

0.2

Unit : 000 Metric Tonnes per Capita

DPR Korea

11.97   11.56

10.30

1990   1995   1999

0.41   1.26

Unit : 000 Metric Tonnes per Capita

Republic of Korea

8.32

7.80

5.63

1990   1995   1999

2.69   0.52

Unit : 000 Metric Tonnes per Capita

Japan

9.07

9.00

8.67

1990   1995   1999

0.4   0.07

Unit : 000 Metric Tonnes per Capita
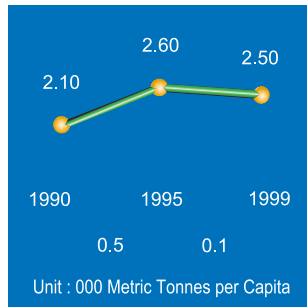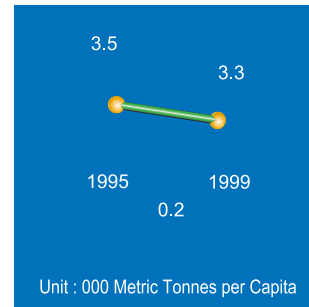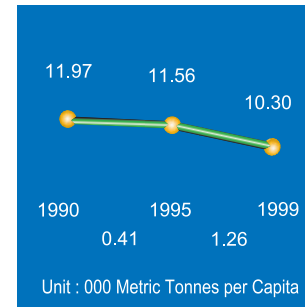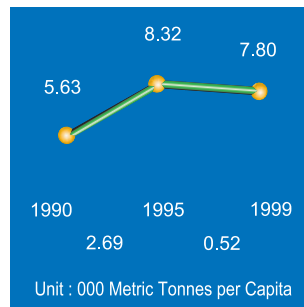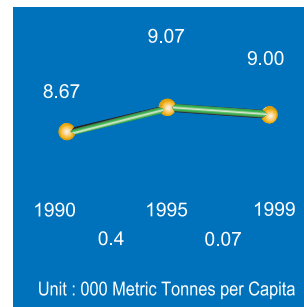
Note: Republic of Korea, DPR Korea and Japan were the higher CO$_2$ producers, with their CO$_2$ emissions per capita being two to three times the emissions of China and Mongolia. Republic of Korea had the highest increase while DPR Korea had the highest decrease in emissions. DPR Korea had the highest per capita emissions and China the lowest – 10.3 and 2.5 metric tonnes/capita respectively.

Source: United Nation Environmental Program. (Citing the Carbon Dioxide Information Analysis Center). Global Environmental Outlook Data Portal . (March-April 2003) (CH, DK, JP, RK), World Bank. Millennium Development Goals . (March-April 2003). (MO 1990, 1995, 1999), UNEP Human Development Indicators . (March-April 2003). (MO 1998).

R E G I O N A L   R E S O U R C E   C E N T R E   F O R   A S I A   A N D   T H E   P A C I F I C
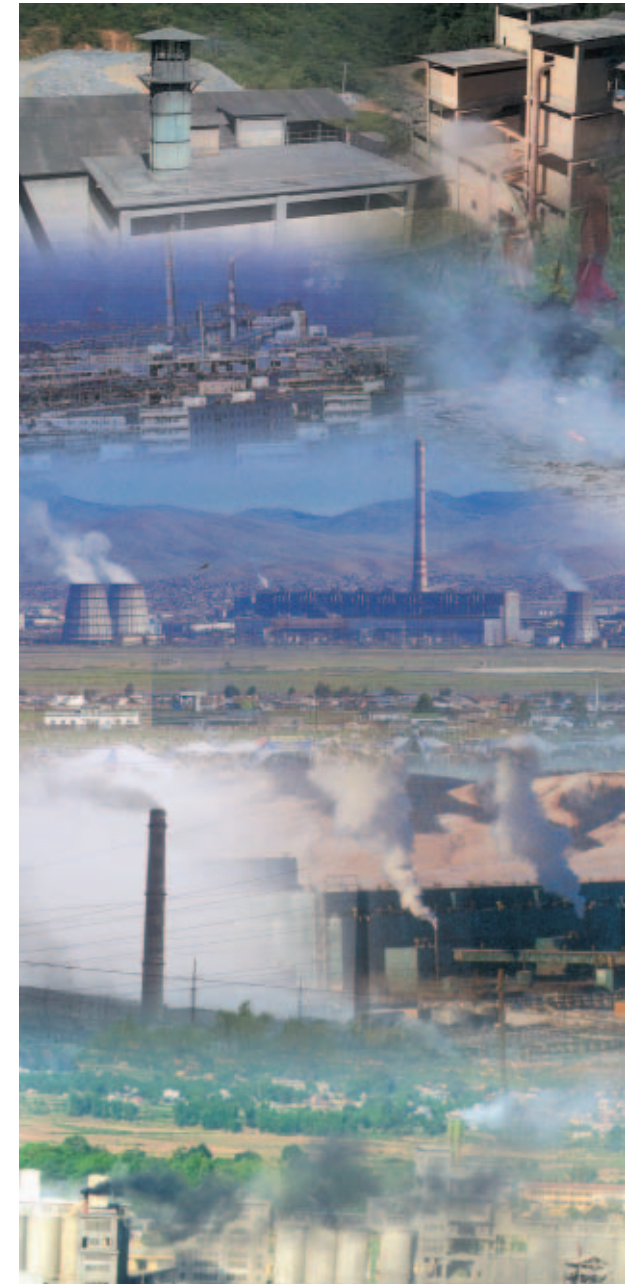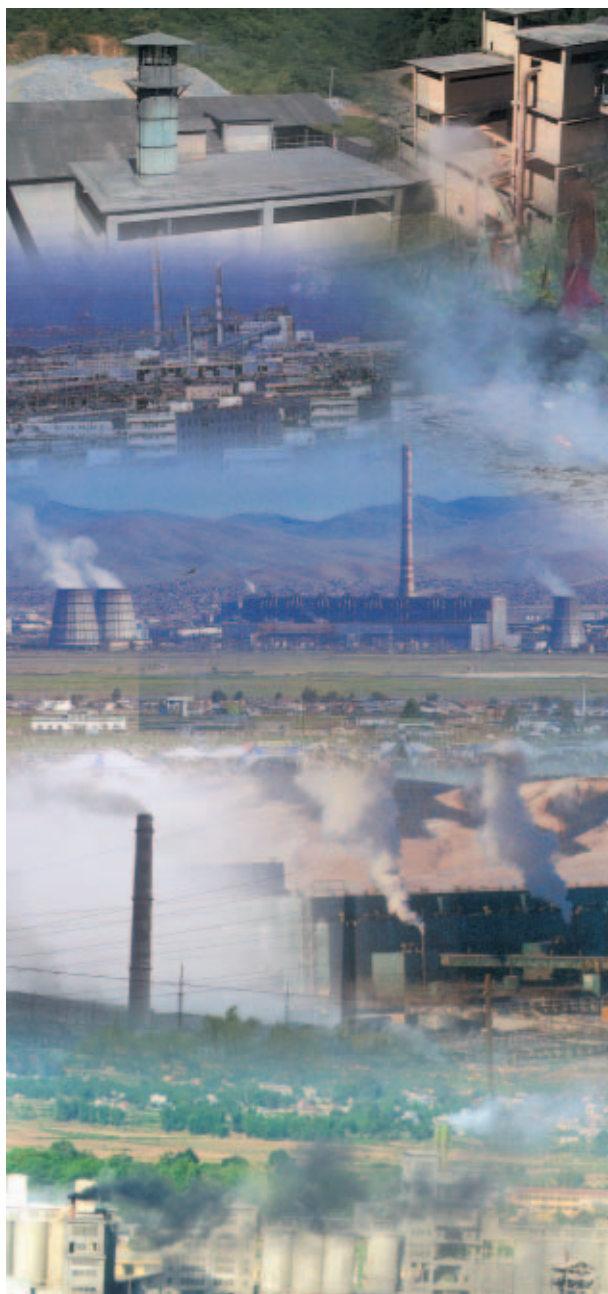
Air Indicator - SO$_2$ Emissions

P.R.China

34544.14

25565

1990   1995

8978.24

Unit : 000 Metric Tonnes

Mongolia

14.94

12.62

1990   1995

2.32

Unit : 000 Metric Tonnes

DPR Korea

1363.82

1044

1990   1995

319.82

Unit : 000 Metric Tonnes

Republic of Korea

3290.60

2429.87

1990   1995

860.73

Unit : 000 Metric Tonnes

Japan

2162.11

2084.85

1990   1995

77.92

Unit : 000 Metric Tonnes
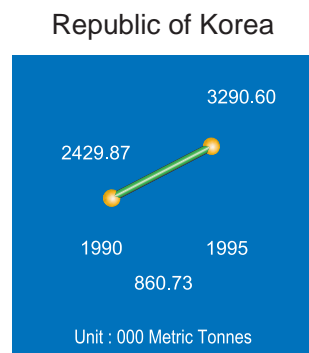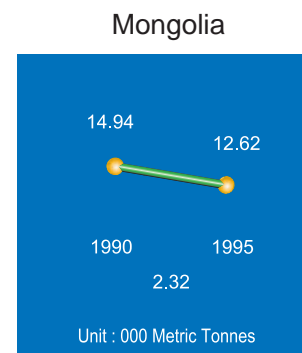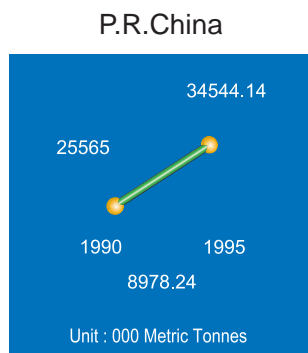
Note: China has the highest SO$_2$ emissions, the emissions being of a magnitude higher than the rest of the region at 34,544 thousand metric tonnes. DPR Korea had the lowest emissions – 1044 thousand metric tonnes. China's emissions increased by the largest amount. Mongolia , DPR Korea saw slight reduction, while Japan and Republic of Korea saw increase in emissions.

Source: United Nation Environmental Program. (Citing the National Institute of Public Health and the Environment (RIVM)). Global Environmental Outlook Data Portal . March-April 2003.

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Air Indicator - NO$_x$ Emissions

P.R.China

Unit : 000 Metric Tonnes

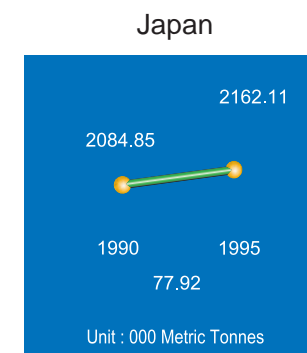| 1990	1995
8712.71	12357.03
3644.32	

Mongolia

Unit : 000 Metric Tonnes

1990	1995
45.56	42.8
2.76	

DPR Korea

Unit : 000 Metric Tonnes

1990	1995
475.85	353.97
121.88	

Republic of Korea

Unit : 000 Metric Tonnes

1990	1995
914.82	1514.84
600.12	

Japan

Unit : 000 Metric Tonnes

1990	1995
2586.91	2864.82
277.91	
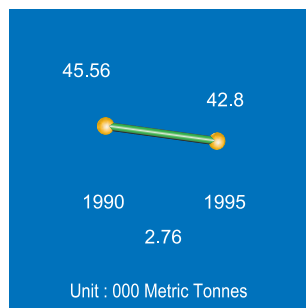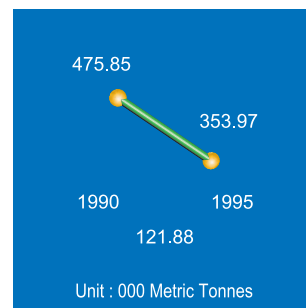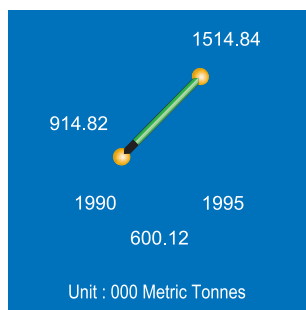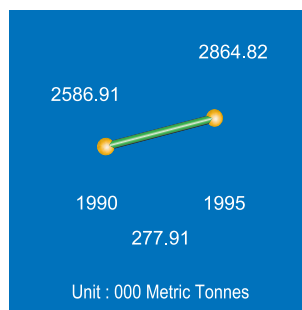
Note: The largest net increase in NOx emissions occurred in China. Emissions increased in Japan and Republic of Korea and decreased in Mongolia and DPR Korea. China had the highest emissions – 12,357 thousand metric tonnes, which is a magnitude (and more) higher than the rest of the region. Mongolia had the lowest emissions – 42.8 thousand metric tonnes.
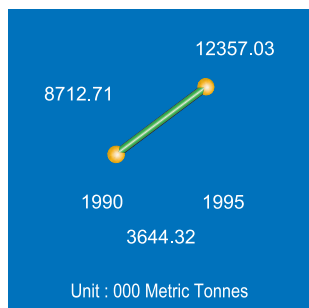
Source: United Nation Environmental Program. (Citing the National Institute of Public Health and the Environment (RIVM)). Global Environmental Outlook Data Portal . March-April 2003.

Bio-diversity Indicator

The sub-region is rich in biodiversity with China being ranked among the seventeen mega-diversity countries in the world.

Protected land in North-East Asia varied by a small amount over the 1990s. New protected lands were established in DPR Korea, and a small amount of protected land was lost in Japan and Republic of Korea. The amount of protected land in China was nearly constant over the decade.

Plant biodiversity as a percentage of species was under the greatest threat in Japan. In 1997, nineteen per cent of Japan's higher plan species were categorized threatened or vulnerable. The number of threatened plants in China and DPR Korea declined during the mid-1990s, and remained constant in the Republic of Korea.

In China, the number of threatened and vulnerable bird species dropped by approximately half over the decade. However, in the other four countries, the percentage of threatened or vulnerable bird species increased. The Republic of Korea had the highest percentage of threatened or vulnerable birds in the mid-1990s.

The threat to mammalian biodiversity, in terms of threatened and vulnerable species, increased in Japan and Mongolia during the 1990s. In China and the Republic of Korea, the levels remained constant. No data was available for DPR Korea.

Bio-diversity Indicator - Protected Area

P.R.China

6.40   6.40

1995   1999
0

Unit : % of Total Land Area

Mongolia

10.30   11.50

1995   1999
1.2

Unit : % of Total Land Area

DPR Korea

2.60   2.60

1995   1999
0

Unit : % of Total Land Area

Republic of Korea

6.90   6.90

1995   1999
0

Unit : % of Total Land Area

Japan

6.80   6.80

1995   1999
0

Unit : % of Total Land Area
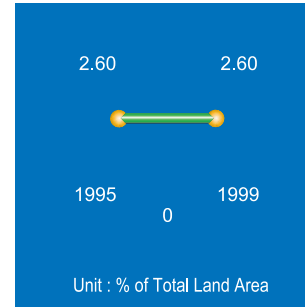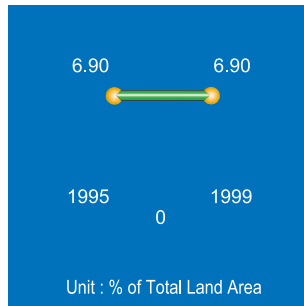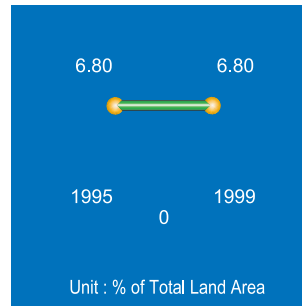
Note: Japan, Republic of Korea and China, despite varying country size had nearly the same percentage of protected area. Mongolia had the highest percentage of protected area – 11.5 per cent. DPR Korea had the lowest – 2.6 per cent. Percentage of protected area remained constant in the region except for Mongolia where it increased from 1995 – 1999.

Source: World Bank. 1998. World Development Indicators. (1994 data), World Bank. Millennium Development Goals . March-April 2003. (1995, 1999 data), World Bank. 2000. World Development Indicators. (1996 data).

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC

Bio-diversity Indicator - Threatened Plants

P.R.China

3.36

0.95

1994   1996
2.4

Unit : % of Total Number of Plants

DPR Korea

0.24

0.13

1994   1996
1.1

Unit : % of Total Number of Plants

Republic of Korea

2.38   2.28

1994   1996
0.1

Unit : % of Total Number of Plants

Japan

14.98   19.74

1994   1999
4.76

Unit : % of Total Number of Plants
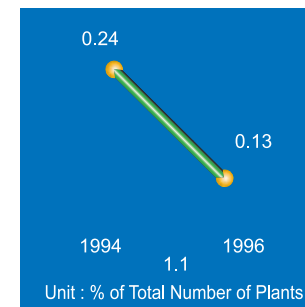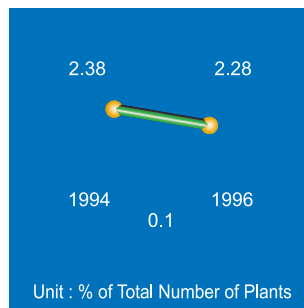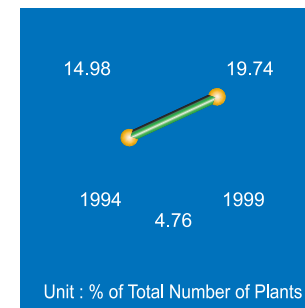
Note: Plant biodiversity as percentage of species, was under the greatest threat in Japan. In 1997, 19 percent of Japan's higher plant species were categorized as threatened or vulnerable. The threat in China and DPR Korea declined during the mid 1990s, and remained constant in the Republic of Korea.
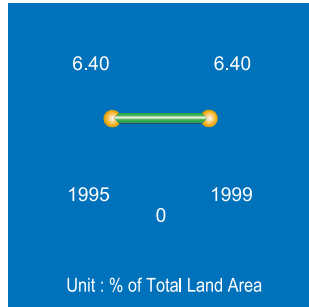
Source: World Bank. 1998. World Development Indicators. (1994 data), World Bank. 2000. World Development Indicators. (1997 data), Biological Diversity. Japan Integrated Biodiversity Information System . April 2003. (1999 data)

REGIONAL RESOURCE CENTRE FOR ASIA AND THE PACIFIC
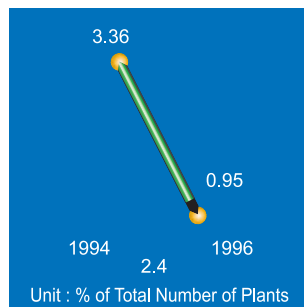
Bio-diversity Indicator - Threatened Birds

P.R.China

15.43
8.18
1994   1996
7.25
Unit : % of Total Number of Birds

Mongolia

3.59
2.82
1994   1996
0.77
Unit : % of Total Number of Birds

DPR Korea

16.52
4.10
1994   1996
12.42
Unit : % of Total Number of Birds

Republic of Korea

16.96
5.11
1994   1996
11.86
Unit : % of Total Number of Birds

Japan

12.86
5.32
1994   1999
7.54
Unit : % of Total Number of Birds
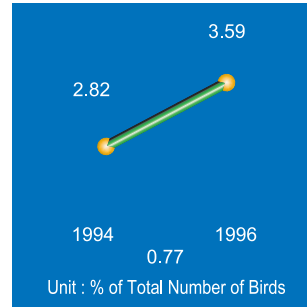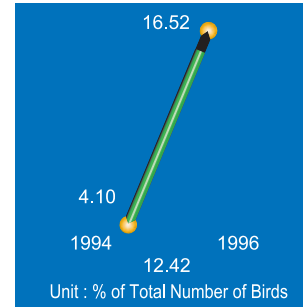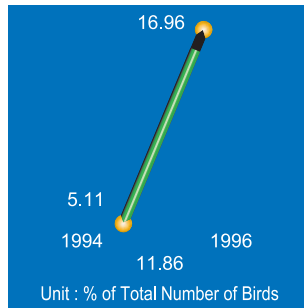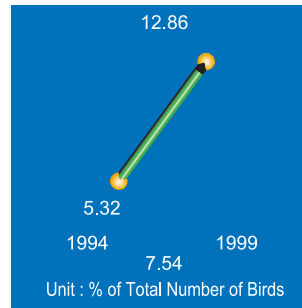
Note: Threatened birds, as a percentage of total number of birds was the highest in Republic of Korea. In China, the number of threatened and vulnerable bird species dropped by approximately 50 per cent. However, in the other four countries, there was an increase in the percentage of threatened birds

Source: World Bank. 1998. World Development Indicators. (1994 data), World Bank. 2000. World Development Indicators. (1996 data), Biological Diversity. Japan Integrated Biodiversity Information System . April 2003. (1999 data)

Bio-diversity Indicator - Threatened Mammals

P.R.China

18.84   19.04

1994   1996
        0.2

Unit : % of Total Number of Mammals

Mongolia

                    8.95

5.97

1994   1996
        2.98

Unit : % of Total Number of Mammals

Republic of Korea

12.25   12.25

1994   1996
        0

Unit : % of Total Number of Mammals

Japan

                    23.50

12.88

1994   1999
        10.62
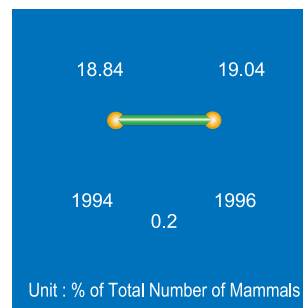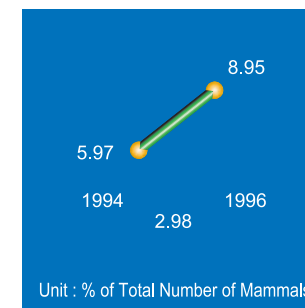
Unit : % of Total Number of Mammals
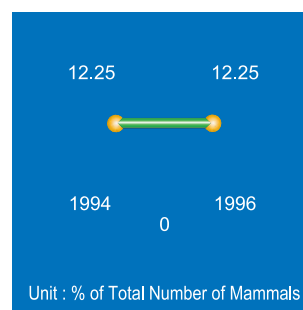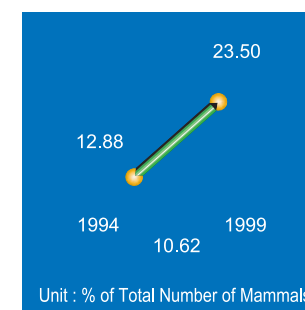
Note: Threatened mammals, as a percentage of total number of mammals was the highest in Japan. In China and Republic of Korea the number of threatened mammals remained stable while the number increased in Japan and Mongolia.
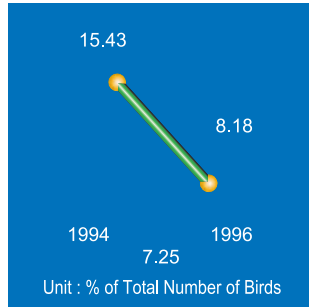
Source: World Bank. 1998. World Development Indicators. (1994 data), World Bank. 2000. World Development Indicators. (1996 data), Biological Diversity. Japan Integrated Biodiversity Information System . April 2003. (1999 data)

Bio-diversity Indicator - Wetlands of International Importance
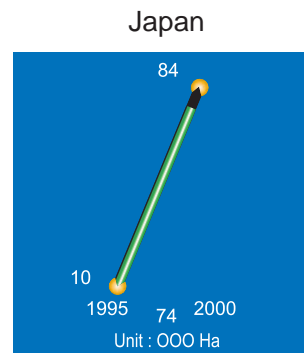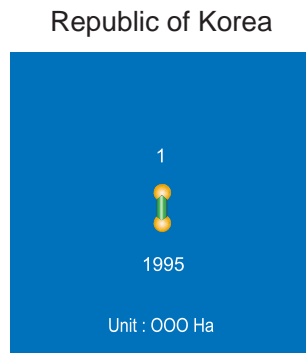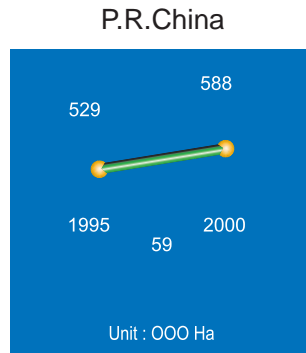
P.R.China

588
529
1995   2000
59

Unit : OOO Ha

Mongolia

631

1995

Unit : OOO Ha

Republic of Korea

1

1995

Unit : OOO Ha

Japan

84

10
1995   74   2000
Unit : OOO Ha

Note: Available data is not sufficient to make proper assessment. Emphasis should be put on data generation and reporting. From the available data, Mongolia had the largest wetland area in the region. Wetland area increase in Japan and China between 1995 and 2000.

Source: World Resource Institute 2000 and 1995

Reference

World Bank (2002). World Development Indicators. http://www.developmentgoals.com/. World Bank.

United Nations Development Program (2002). Human Development Reports. http://hdr.undp.org/reports/global/2002/en/. UNDP.

Asian Development Bank (2002). The Key Indicators of Developing Asian and Pacific Countries 2002. http://www.adb.org/Documents/Books/Key_Indicators/2002/default.asp. ADB.

World Bank (2003). Global Economic Prospects and the Developing Countries: Investing to Unlock Global Opportunities. World Bank.

United Nations Environment Programme (1993). United Nations Environment Programme Environmental Data Report 1993 – 94. Blackwell Publishers, Oxford.

Economic and Social Commission for Asia and the Pacific (2003). Promoting the Millennium Development Goals in Asia and the Pacific. United Nations.

Asian Development Bank (2001). Asian Environmental Outlook 2001. ADB.

United Nations Environment Programme (2001). Asia-Pacific Environment Outlook 2. UNEP.

International Monetary Fund (2003). World Economic Outlook. IMF.

ESCAP, ADB (2000). State of the Environment in Asia and the Pacific. United Nations.

United Nations Environment Programme (2002). Global Environment Outlook 3. http://www.grid.unep.ch/data/other/GEO3_Comp_www/index.htm Earthscan Publications.

Food And Agriculture Organization of the United Nations (2000). Global Forest Resources Assessment. http://www.fao.org/forestry/fo/country/nav_world.jsp?lang_id=1. FAO.

Asian Development Bank (2003). Basic Water Sector Information. http://www.adb.org/Water/Indicators/. ADB.

Consultative Group on International Agricultural Research (2000). http://www.cgiar.org/index.html.

Environmental Sustainability Index (2002). ESI Report 2002. http://www.ciesin.columbia.edu/indicators/ESI.

World Economic Forum, Yale Center for Environmental Law and Policy, and CIESIN.

World Resources Institute (1992). World Resources 1992 –93: A Guide to the Global Environment, Towards Sustainable Development. Oxford University Press.

World Resources Institute (1994). World Resources 1996 –97: A Guide to the Global Environment, People and the Environment. Oxford University Press.

World Resources Institute (1996). World Resources 1996 –97: A Guide to the Global Environment, The Urban Environment. Oxford University Press.

World Resources Institute (1998). World Resources 1998 –99: A Guide to the Global Environment, Environmental Change and Human Health. Oxford University Press.

World Resources Institute (2000). World Resources 2000 – 2001: People and Ecosystems: The fraying web of life. World Resources Institute.

United Nations Convention to Combat Desertification (2002). China National Report To Implement The United Nation's Convention To Combat Desertification. http://www.unccd.int/cop/reports/asia/national/2002/china-eng.pdf. United Nations.

Secretariat of China National Committee for the Implementation of the United Nations Convention to Combat Desertification (2000). China National Report on the Implementation of UNCCD and NAP. http://www.unccd.int/cop/reports/asia/national/2000/china-eng.pdf. United Nations.

World Health Organization (1999). Weekly Epidemiological Record. V. 74, p. 265-272.
World Bank (2003). New Ideas in Pollution Regulation. http://www.worldbank.org/nipr/.

United Nations Statistics Division (2003). The World's Women 2000: Trends and Statistics.
http://unstats.un.org/unsd/demographic/ww2000/index.htm. United Nations.

Water Korea (2003).
http://www.water.or.kr/engwater/ewk_main.html. Department of Water, Korea.

Ministry of Environment, Republic of Korea (2001). Green Korea 2001: In pursuit of economic and environmental sustainability. Government of Korea.

Ministry of Nature and Environment, Mongolia (2002). Mongolia: State of the Environment 2002. United Nations Environmental Programme.

Ministry of Nature and Environment, Mongolia (1996). Nature and Environment in Mongolia. Government of Mongolia.

UNAIDS, World Health Organization (2002). Epidemiological Fact Sheets on HIV/AIDS and Sexually Transmitted Infections: 2002 Update. http://www.who.int/GlobalAtlas/PDFFactory/HIV/index.asp. World Health Organization.

Korea Environmental Institute (1998). Pilot Compilation of Environmental – Economic Accounts, Republic of Korea. KEI.

Janjaadorj, J. and Bulgan, T. (2002). Country report of Mongolia.

International Union for Conservation of Nature and Natural Resources (2002). IUCN Red List of Threatened Species. http://www.redlist.org/. IUCN.

Environment Agency, Japan (1995). Quality of the Environment in Japan, 1995. Government of Japan.

China National Environment Monitoring Center (2000). Ambient Air Quality Monitoring in China. Government of China.

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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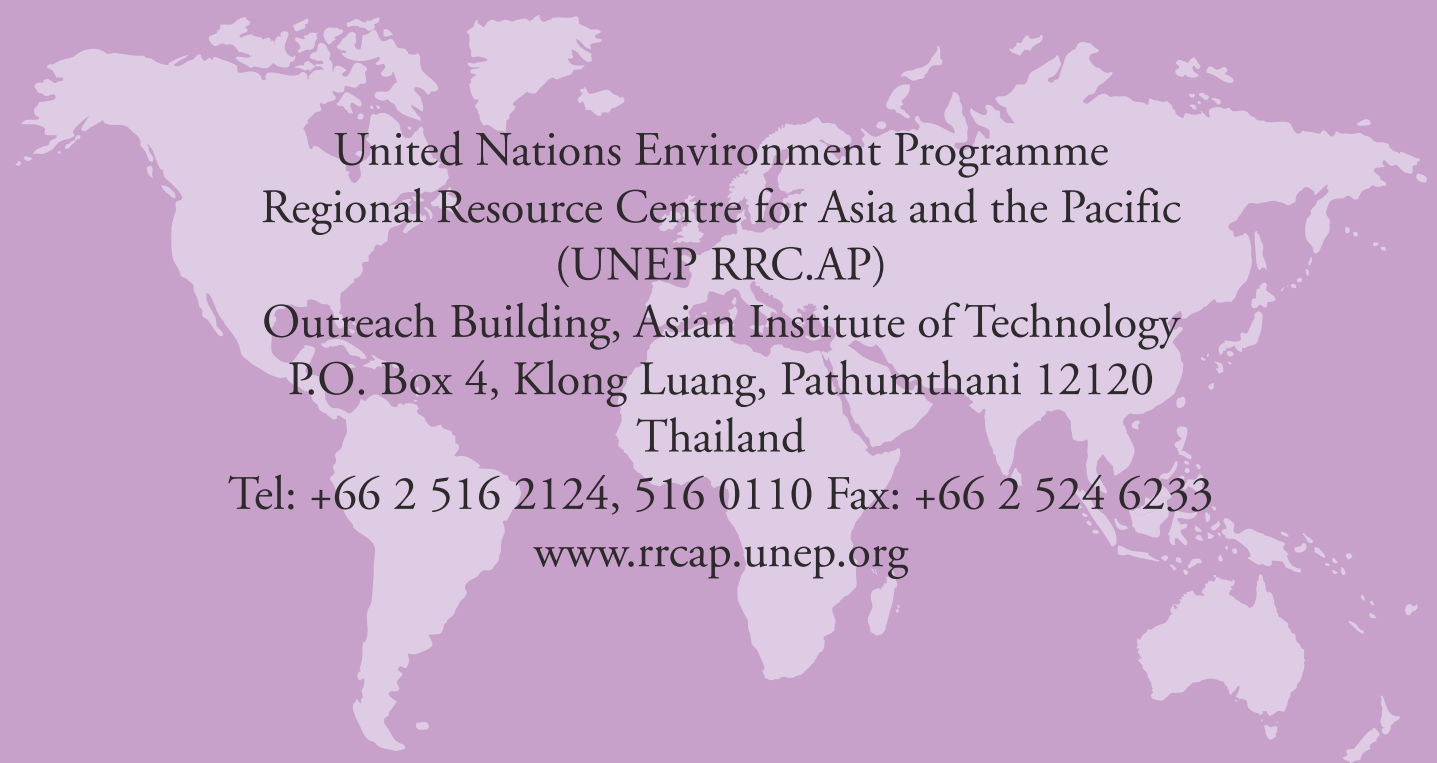
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