new economics foundation

WORLD CONSERVATION MONITORING CENTRE

LIVING PLANET REPORT

1999

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EXECUTIVE SUMMARY

THE *Living Planet Report* is WWF's attempt to provide a quantitative answer to the question: how fast is nature disappearing from the Earth? As a secondary ambition, the report also describes how human pressures on the natural environment are changing over time, and how these effects vary between countries.

This is the second edition of the *Living Planet Report.* Like the 1998 report, this one includes the Living Planet Index (LPI), an indicator of the overall state of the Earth's natural ecosystems (pages 2–9). It also includes national and global data on human pressures on natural ecosystems arising from the consumption of natural resources and pollution (pages 10–21).

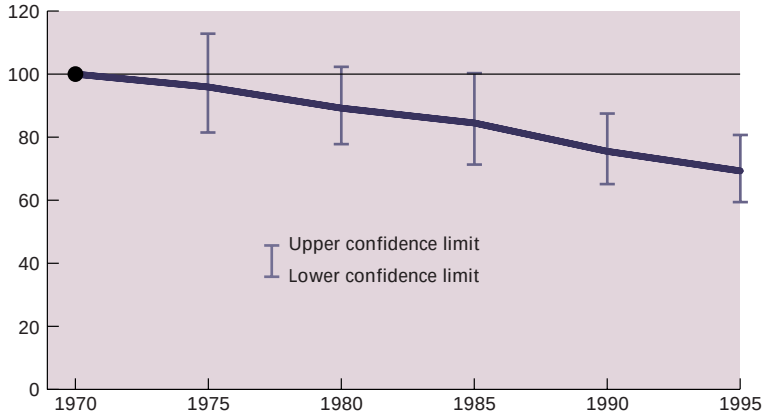
The LPI is an index which primarily measures abundance – the area of the world's forests and the populations of different marine and freshwater species. Thus it is essentially measuring natural wealth and, particularly, how this natural wealth has changed over time. The LPI declined by 30 per cent from 1970 to 1995 – implying that the world has lost 30 per cent of its natural wealth in the space of one generation.

One main reason behind the decline in the world's natural wealth is increasing human activity – higher economic activity and a larger population. The second part of the *Living Planet Report* looks at six causes of global environmental change. The first three relate to the consumption of renewable resources: grain and meat, fish and seafood, and wood and paper. These vital commodities are used directly by people for food, energy, or materials. The second three relate to impacts on the biosphere that are happening as a consequence of the consumption of food, energy, or materials: the use of artificial fertilizers, the emissions of carbon dioxide into the atmosphere, and the consumption of cement. Globally, the consumption of resources and pollution of the natural environment are increasing, on average by around 2 per cent per year since 1970, although a reduction in the growth rate over the last decade may possibly be discerned. But, on the other hand, humanity may have already exceeded the sustainable level, for example in fish consumption and carbon dioxide emissions.

WWF is particularly worried about the loss of biodiversity implied by the decline in the LPI and the environmental degradation caused by consumption and pollution. WWF believes that it is important to try to reverse these negative trends. Recommendations on what governments, businesses, and consumers can do, included in the second part of this report, are based on WWF policy and aim to slow down and eventually halt the degradation of the world's natural environments.

The *Living Planet Report* makes use of the most reliable data available on the consumption of resources and pollution by 151 of the world's countries and territories. The LPI and other global statistics in this report are based on original research. WWF will continue to improve the data in the *Living Planet Report*, which appears annually.

WWF LIVING PLANET INDEX
A measure of the health of the world's natural ecosystems, 1970–1995



THE LIVING PLANET INDEX

THE Living Planet Index (LPI) is a measure of the natural wealth of the Earth's forest, freshwater, and marine environments. Figure 1 shows that the index fell by approximately 30 per cent between 1970 and 1995, at an average rate of around 1 per cent per year.

The LPI is an aggregate of three different indicators of the state of natural ecosystems. These are: the area of natural forest cover around the world (Figure 2a); populations of freshwater species around the world (Figure 2b); populations of marine species around the world (Figure 2c).

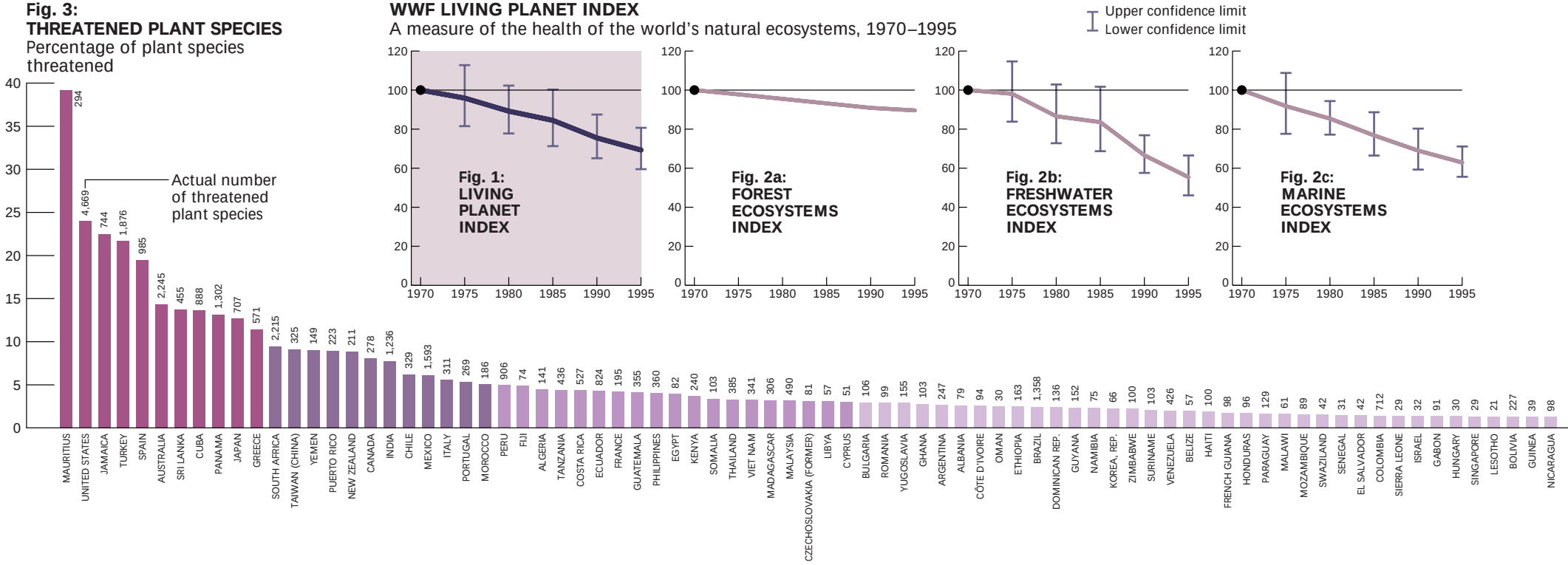
Natural forest cover, not including plantations, has been declining steadily since the 1960s; about 10 per cent of the cover was lost between 1970 and 1995. But the decline of natural forest cover probably masks a steeper, but unquantified, loss of biodiversity and forest quality, particularly in temperate forests. The freshwater component of the index shows an average decline of about 45 per cent from 1970 to 1995 in 102 freshwater species. The marine component of the LPI shows a similar average decline of about 35 per cent in 102 marine species over the same period.

These figures are slightly different from those in the *Living Planet Report 1998* (although within the 95 per cent confidence interval) because the underlying data set has been enlarged. However, they still need to be corroborated by further study and, especially, data on more species.

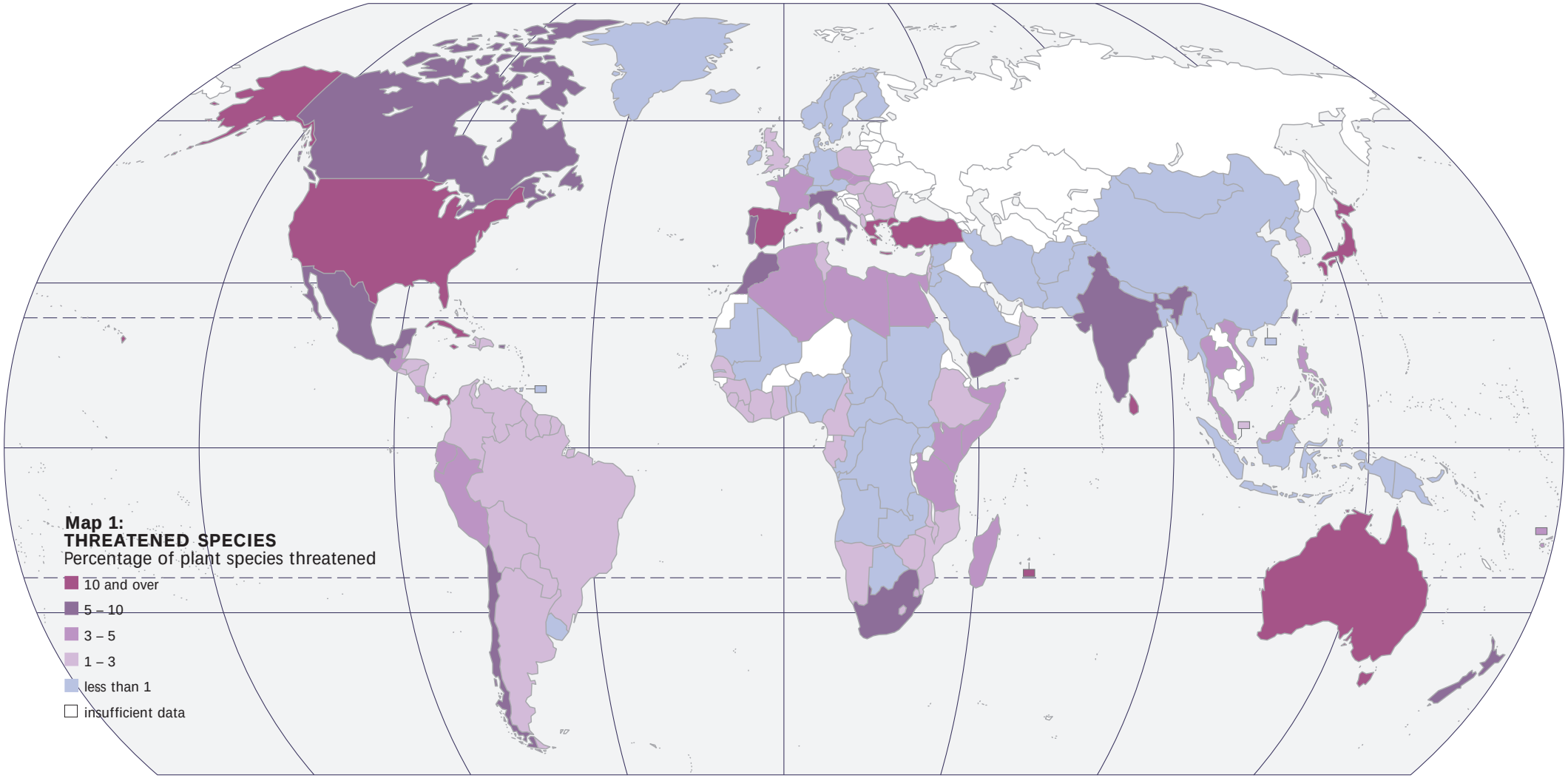
Many would see the rate at which species are going extinct as a more direct measure of the global loss of biodiversity. But nobody knows how many species are being lost each year, nor even the total number of species that exist. Biologists estimate that there are between 5 and 15 million species of plants, animals, and micro-organisms existing on the Earth today, of which only about 1.5 million have been described and named. The estimated total includes around 300,000 plant species, between 4 and 8 million insects, and about 50,000 vertebrate species (of which about 10,000 are birds and 4,000 are mammals).

To supplement the LPI's global perspective, Map 1 and Figure 3 show a measure of the current state of biodiversity at the national level, based on the percentage of each country's known plant species that are classified as globally vulnerable, endangered, or critically endangered in the *1997 IUCN Red List of Threatened Plants*. The data of course depend strongly on the thoroughness of the assessment. Map 1 shows that, to some extent, island countries tend to have higher percentages of threatened plants because of high levels of endemism, i.e. many of their species are found nowhere else in the world.

Fig. 3:
THREATENED PLANT SPECIES
Percentage of plant species threatened



WWF LIVING PLANET INDEX
A measure of the health of the world's natural ecosystems, 1970–1995



LIBERIA	25
UNITED KINGDOM	18
POLAND	27
TUNISIA	24
CAMEROON	89
SWITZERLAND	30
CHINA (MAINLAND)	312
GREENLAND	5
TRINIDAD AND TOBAGO	21
INDONESIA	264
MALI	15
PAPUA NEW GUINEA	92
NIGERIA	37
CHAD	12
AUSTRIA	23
SWEDEN	13
CONGO, DEM. REP. (ZAIRE)	78
NORWAY	12
URUGUAY	15
ANGOLA	30
FINLAND	6
GERMANY	14
BANGLADESH	24
MYANMAR	32
HONG KONG (CHINA)	9
JORDAN	9
BHUTAN	23
SAUDI ARABIA	7
BOTSWANA	7
SUDAN	10
NEPAL	20
PAKISTAN	14
UGANDA	15
ICELAND	1
MAURITANIA	3
SYRIA	8
ZAMBIA	12
BENIN	4
TOGO	4
LEBANON	5
DENMARK	2
KOREA, D.P.R.	4
BELGIUM/LUXEMBOURG	2
IRELAND	1
AFGHANISTAN	4
GAMBIA, THE	1
NETHERLANDS	1
CONGO	3
CENTRAL AFRICAN REP.	1
IRAN	2
MONGOLIA	0
ARMENIA	31
AZERBAIJAN	28
BELARUS	1
BOSNIA AND HERZEGOVINA	64
BURKINA FASO	
BURUNDI	
CAMBODIA	5
CROATIA	6
ERITREA	
ESTONIA	2
GEORGIA	29
GUINEA-BISSAU	
IRAQ	
KAZAKHSTAN	71
KUWAIT	
KYRGYZSTAN	34
LAOS	2
LATVIA	
LITHUANIA	1
MACEDONIA	
MOLDOVA	5
NIGER	
RUSSIAN FEDERATION	214
RWANDA	
SLOVENIA	13
TAJIKISTAN	50
TURKMENISTAN	17
UKRAINE	52
UNITED ARAB EMIRATES	
UZBEKISTAN	41

FOREST ECOSYSTEMS

BETWEEN 1970 and 1995, the world's natural forest cover was reduced by some 10 per cent, from about 35 million square kilometres (km²) to around 32 million km², a decrease of about 0.5 per cent per year (see Figure 4). This is equivalent to the loss every year of nearly 150,000 km², an area larger than Bangladesh, Florida, or Greece. Today, about half the world's forests are found in Europe, North America, and the Russian Federation and half are found in Africa, Asia, and Latin America. While the forested area of the temperate northern regions has remained constant since 1970, or increased slightly, the forested area of Africa, Asia, and Latin America has decreased by about 20 per cent.

However, northern forests have suffered a less obvious decline in quality. Much temperate forest, especially in Europe and North America, is not original but replacement forest, either regrowth or plantation, which neither supports the same levels of biodiversity nor performs the same ecological functions as old-growth forest. Many forests are fragmented into areas too small to support populations of species that require large contiguous blocks of natural habitat (see Figure 5). However, some forest types, such as the tropical dry forests of Africa, are naturally more patchy than others, so fragmentation is not always a good indicator of forest quality.

Original forest cover

Forests were lost in all regions and most countries of the world (Figures 5 and 6) long before 1970. In Europe (excluding the Russian Federation) and Asia, almost 70 per cent of the once-forested land has been cleared, primarily for agriculture and grazing. Today, largely intact tracts of undisturbed forest remain only in the boreal zones of the Russian Federation and Canada and, in the tropics, in the Amazon and the Congo basins.

The data in Figures 5 and 6 include an estimate of original forest cover. This is the area of forest that would exist under current climatic conditions, if there was no human interference. It is equivalent, hypothetically, to the maximum extent of forest at a point in time after the last glaciation and before the subsequent spread of agriculture, or around 6,000–8,000 years ago. In total, only half of the world's original forest cover remains.

Fig. 6:
ORIGINAL AND CURRENT FOREST COVER BY COUNTRY/TERRITORY
Million square kilometres

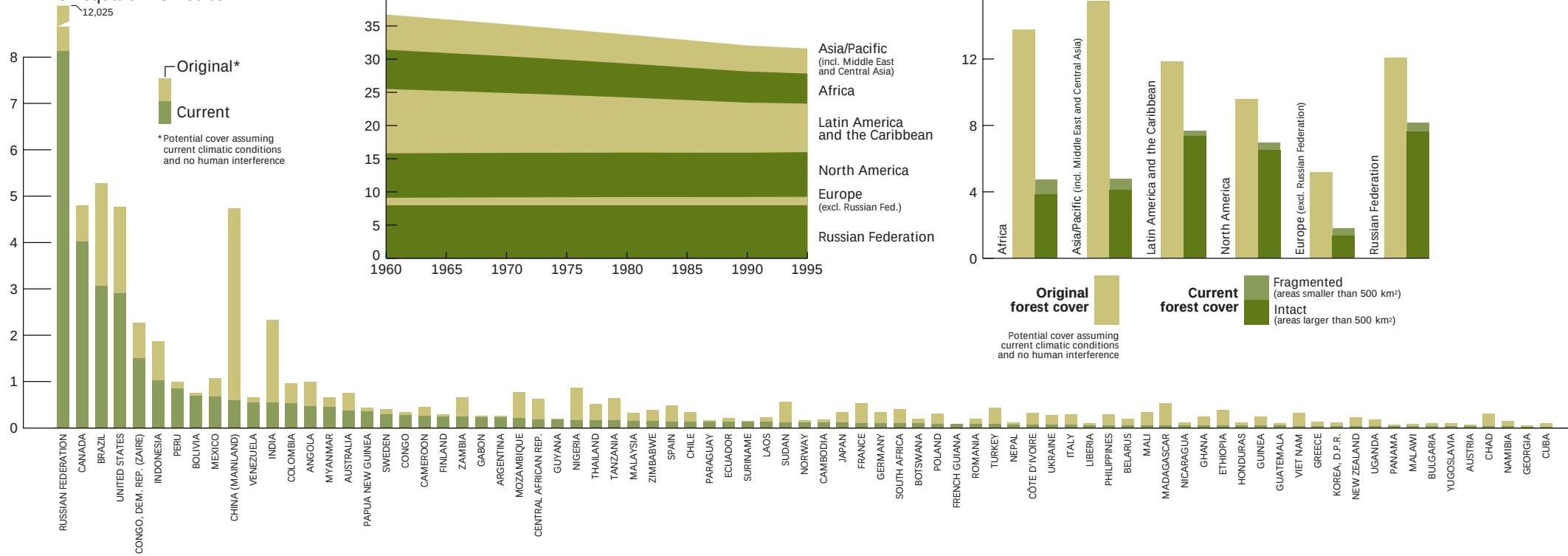
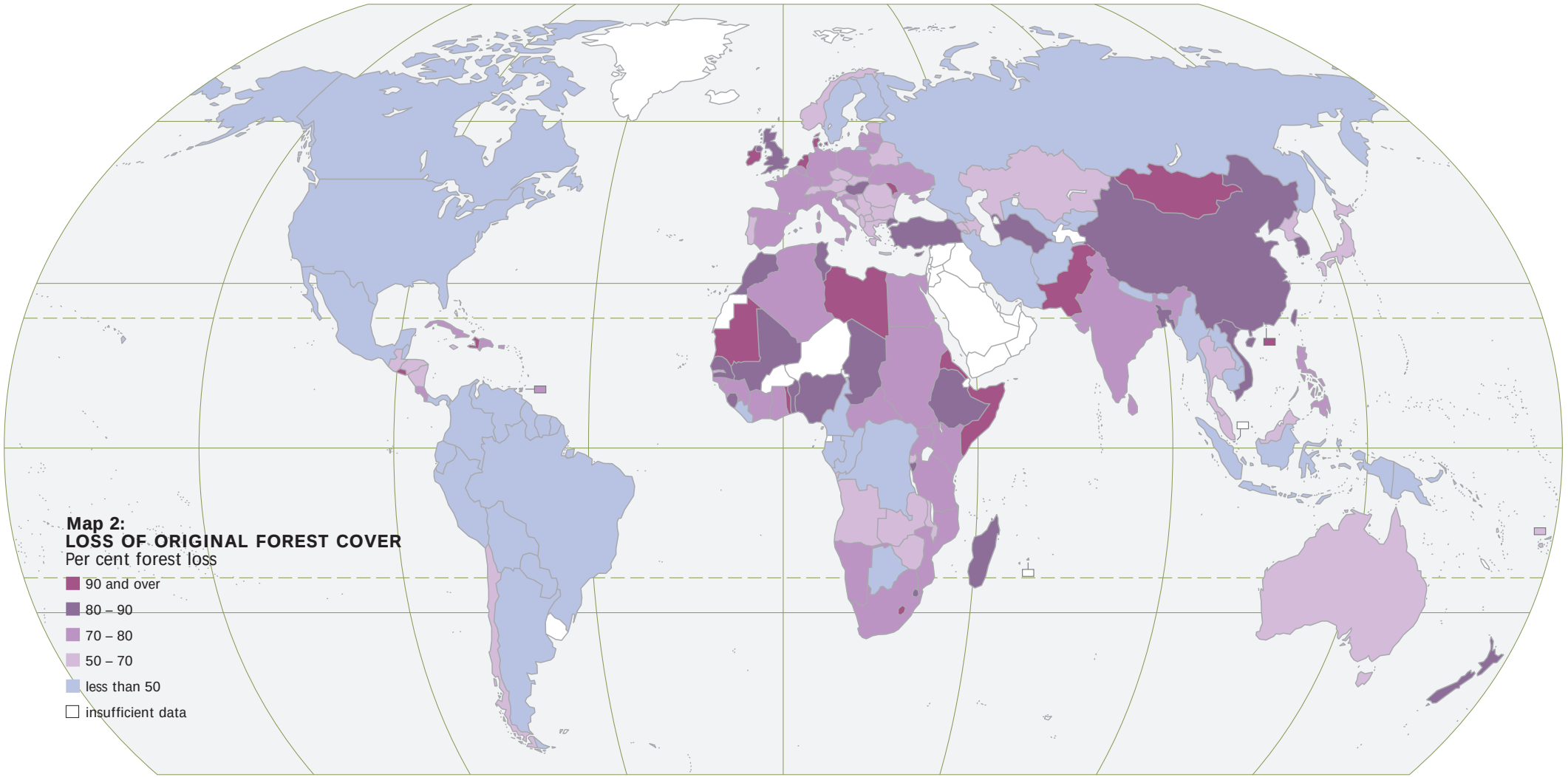
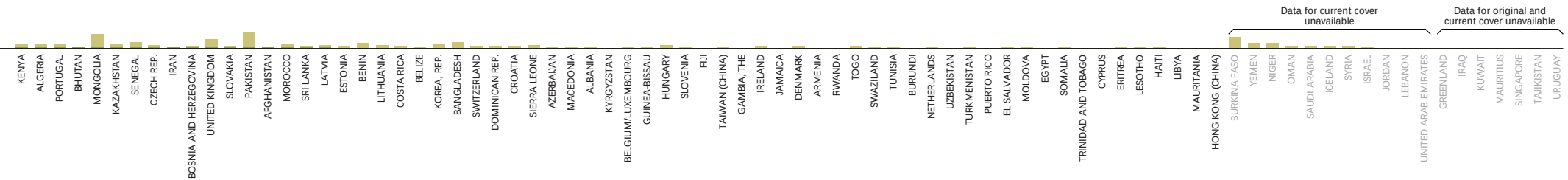


Fig. 4:
NATURAL FOREST COVER BY REGION
Million square kilometres

Fig. 5:
ORIGINAL AND CURRENT FOREST COVER BY REGION
Million square kilometres


Map 2:
LOSS OF ORIGINAL FOREST COVER
Per cent forest loss
90 and over
80 – 90
70 – 80
50 – 70
less than 50
insufficient data


Data for current cover unavailable
Data for original and current cover unavailable
KENYA
ALGERIA
PORTUGAL
BHUTAN
MONGOLIA
KAZAKHSTAN
SENEGAL
CZECH REP.
IRAN
BOSNIA AND HERZEGOVINA
UNITED KINGDOM
SLOVAKIA
PAKISTAN
AFGHANISTAN
MOROCCO
SRI LANKA
LATVIA
ESTONIA
BENIN
LITHUANIA
COSTA RICA
BELIZE
KOREA, REP.
BANGLADESH
SWITZERLAND
DOMINICAN REP.
CROATIA
SIERRA LEONE
AZERBAIJAN
MACEDONIA
ALBANIA
KYRGYZSTAN
BELGIUM/LUXEMBOURG
GUINEA-BISSAU
HUNGARY
SLOVENIA
FIJI
TAIWAN (CHINA)
GAMBIA, THE
IRELAND
JAMAICA
DENMARK
ARMENIA
RWANDA
TOGO
SWAZILAND
TUNISIA
BURUNDI
NETHERLANDS
UZBEKISTAN
TURKMENISTAN
PUERTO RICO
EL SALVADOR
MOLDOVA
EGYPT
SOMALIA
TRINIDAD AND TOBAGO
CYPRUS
ERITREA
LESOTHO
HAITI
LIBYA
MAURITANIA
HONG KONG (CHINA)
BURKINA FASO
YEMEN
NIGER
OMAN
SAUDI ARABIA
ICELAND
SYRIA
ISRAEL
JORDAN
LEBANON
UNITED ARAB EMIRATES
GREENLAND
IRAQ
KUWAIT
MAURITIUS
SINGAPORE
TAJIKISTAN
URUGUAY

FRESHWATER ECOSYSTEMS

UNLIKE forest ecosystems, it is not possible to indicate biological trends in freshwater ecosystems such as lakes, rivers, and wetlands by measuring changes in area. The Freshwater Ecosystems Index (Figure 2b) is based on the population trends of 102 freshwater vertebrate species. The species in the sample include every mammal, bird, reptile, amphibian, and fish species for which time-series population data could be obtained. The index indicates that freshwater species have, on average, declined by about 45 per cent since 1970.

There is a bias in the available data towards North American and European species. Since the publication of the first *Living Planet Report* in 1998, the Freshwater Ecosystems Index has been updated to include amphibian species, which were previously absent. The addition of 33 species of frogs, toads, and salamanders, however, did not make a significant difference to the overall trend. Fish species are still under-represented, and the available data on fish largely concern commercial species.

Map 3 shows an illustrative selection of species from the freshwater index and their approximate location in the world. All the species are listed in the technical notes on page 22.

Figure 7 shows whether population trends were positive, negative, or stable in a larger sample of 281 freshwater vertebrate species, including the 102 in the index. Since the 1970s, most freshwater species have been in decline.

Declining amphibian populations

Over the past decade, biologists have become alarmed by declines, including some extinctions, in a number of amphibian species all over the world. Many of the amphibian declines have been observed in national parks or nature reserves where their habitat is protected.

Numerous explanations of these declines have been proposed, such as water pollution and increased ultraviolet radiation, and evidence suggests that a number of forces are at work. For example, about 20 frog species in Australia, Panama, and the United States have been decimated by a disease caused by a previously unknown fungus, and the disappearance of the golden toad and other amphibians in Costa Rica has been attributed to climatic changes. Figure 8 shows an index of North American amphibian populations since 1975, based on available time-series data from the United States and Canada.

Fig. 2b:
FRESHWATER ECOSYSTEMS INDEX
1970–1995

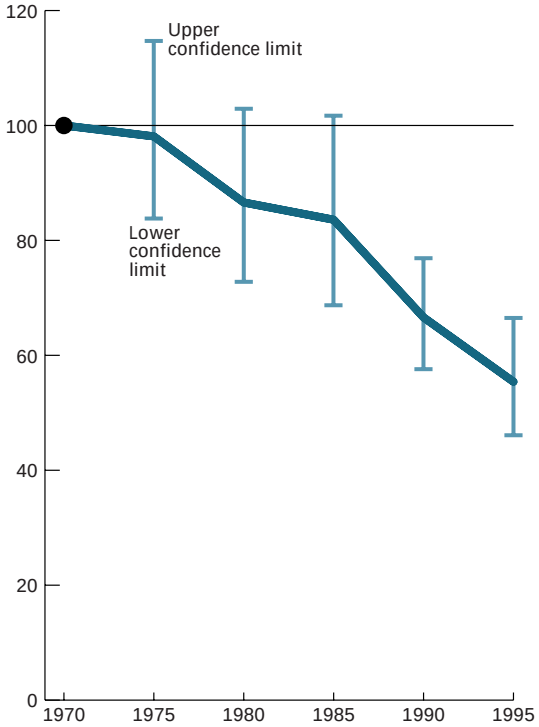


Fig. 7:
FRESHWATER SPECIES POPULATION TRENDS
Percentage of species worldwide, 1970–1999

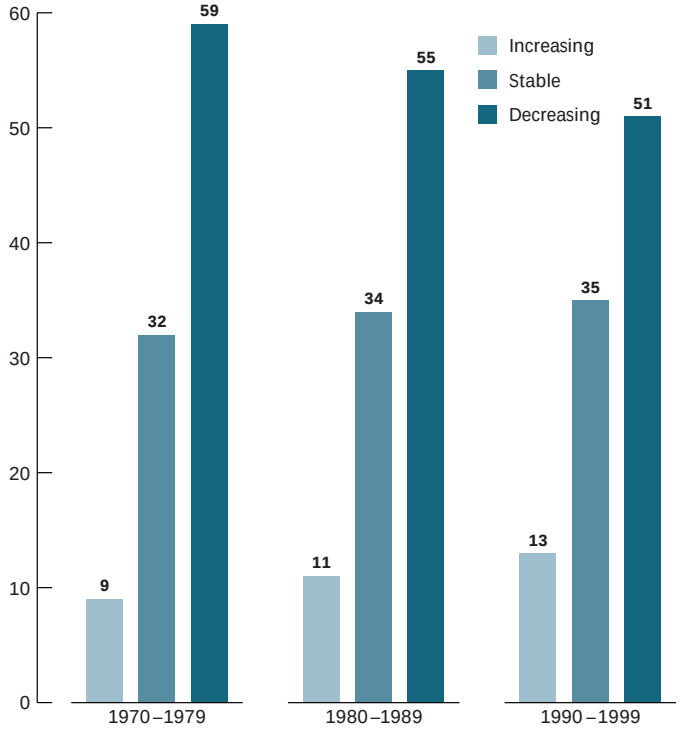
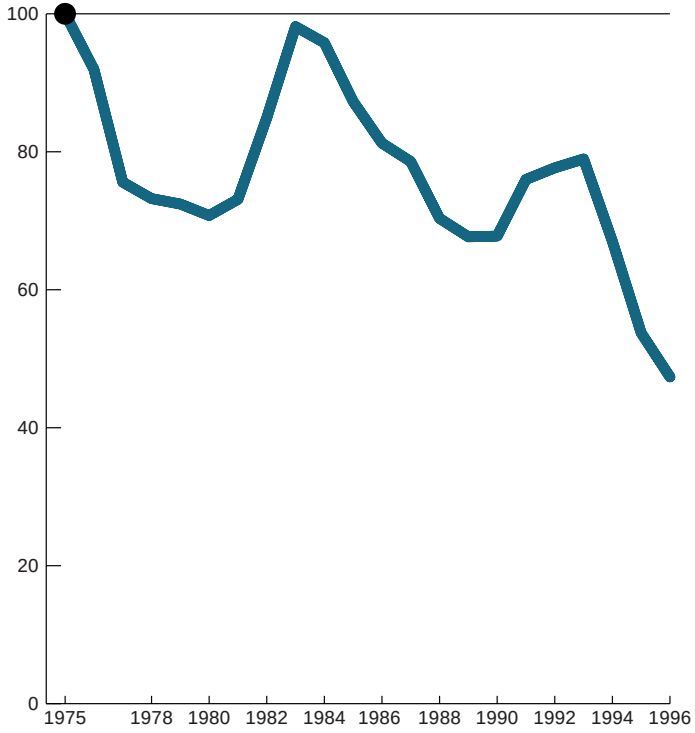
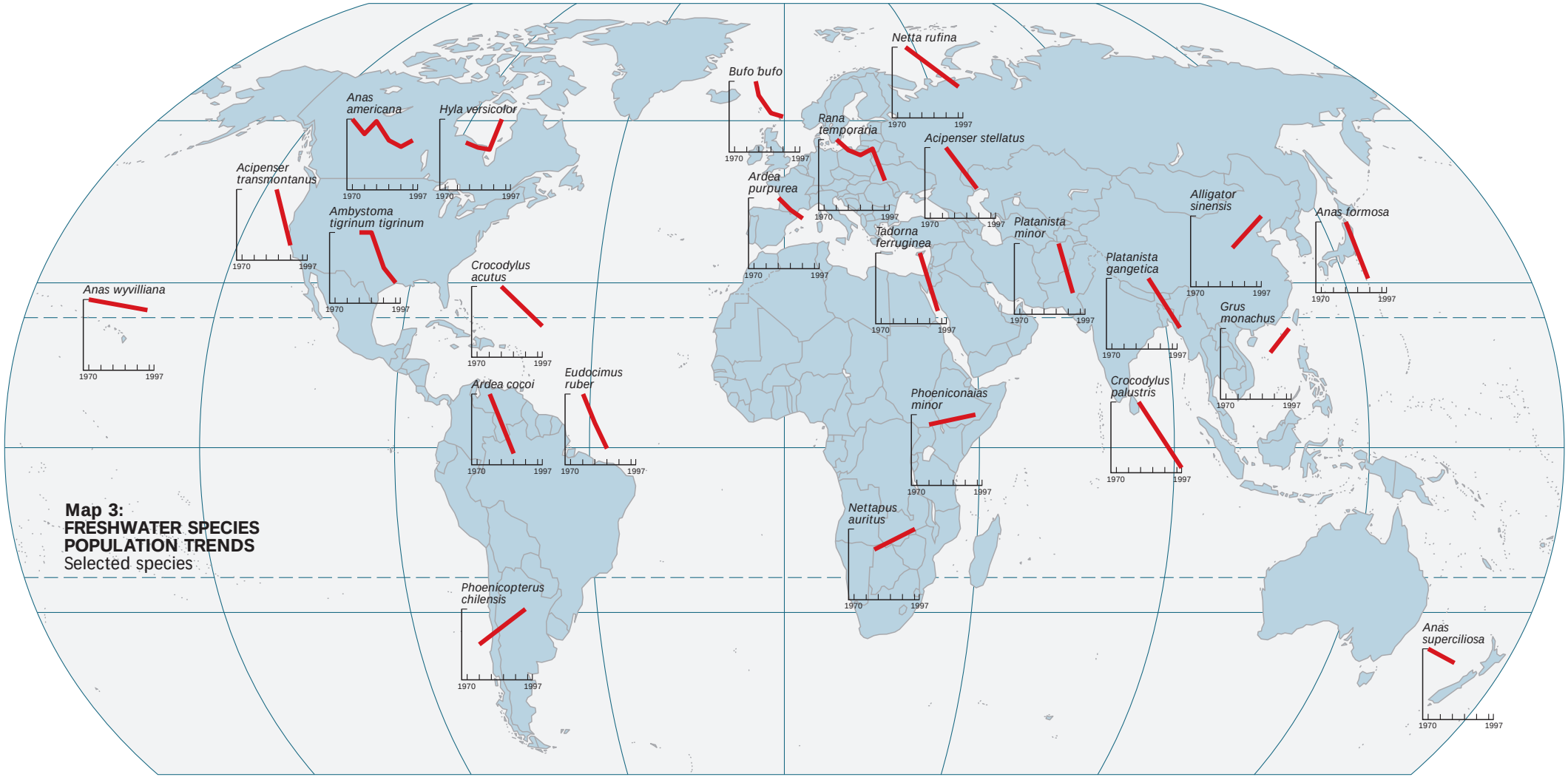


Fig. 8:
NORTH AMERICAN AMPHIBIAN POPULATION INDEX
1975–1996





Map 3:
FRESHWATER SPECIES POPULATION TRENDS
Selected species

Acipenser stellatus	**Stellate sturgeon**	***Ardea cocoi***	**Cocoi heron**	***Netta rufina***	**Red-crested pochard**
Acipenser transmontanus	**White sturgeon**	***Ardea purpurea***	**Purple heron**	***Nettapus auritus***	**African pygmy goose**
Alligator sinensis	**Chinese alligator**	***Bufo bufo***	**Common toad**	***Phoeniconaias minor***	**Lesser flamingo**
Ambystoma tigrinum tigrinum	**Eastern tiger salamander**	***Crocodylus acutus***	**American alligator**	***Phoenicopterus chilensis***	**Chilean flamingo**
Anas americana	**American wigeon**	***Crocodylus palustris***	**Mugger**	***Platanista gangetica***	**Ganges river dolphin**
Anas formosa	**Baikal teal**	***Eudocimus ruber***	**Scarlet ibis**	***Platanista minor***	**Indus river dolphin**
Anas superciliosa	**Pacific black duck**	***Grus monachus***	**Hooded crane**	***Rana temporaria***	**Common frog**
Anas wyvilliana	**Hawaiian duck**	***Hyla versicolor***	**Common grey treefrog**	***Tadorna ferruginea***	**Ruddy shelduck**

MARINE ECOSYSTEMS

THE Marine Ecosystems Index (Figure 2c) shows the average change in population of 102 species of marine fish, reptiles, birds, and mammals from all around the world. It has declined by about 35 per cent since 1970. Map 4 shows an illustrative selection of species population trends from the marine index. All the species are listed in the technical notes on page 22. Figure 9 shows the simpler positive or negative growth trends in a larger sample of 132 marine species, broken down into the percentages that were either declining, stable, or increasing in each decade since 1970.

The 102 species include every marine vertebrate species for which information on population over the last few decades could be found. Although most of the species in the index are fish, there is some over-representation of birds and mammals relative to their numbers in the world's oceans. Since the publication of the first *Living Planet Report* in 1998, more data have been incorporated on southern hemisphere and tropical fish stocks. However, little change resulted in the overall trend.

Coral reef bleaching events

Since 1980, marine biologists have reported an increase in the number of coral bleaching events in the world's tropical oceans. Bleaching is a reaction of corals to many types of stress, most frequently a prolonged increase in sea temperature by 1ºC or 2ºC, which results in the loss of colour and photosynthesis. Recovery usually takes place within a few weeks, but in severe cases the coral dies.

About 100 major coral bleaching episodes were reported over the decade 1980–1989, compared with only 3 reported during the preceding 100 years. There have been around 180 more bleaching episodes during the period 1990–1998 (see Figure 10). One possible explanation of this dramatic increase is the rise in average sea surface temperatures that has occurred all around the world, part of the global warming trend. Another possible explanation is El Niño, a periodic warming of the eastern Pacific that normally occurs every five to seven years, but which has returned more frequently and strongly since 1980. The worst mass bleachings coincided with El Niño peaks.

The 1997–1998 bleaching event was the most severe yet. In the Indian Ocean, particularly on the reefs of the Chagos Archipelago, the Maldives, Sri Lanka, and Tanzania, and in the Arabian Gulf, there was near to 95 per cent mortality of shallow corals.

Fig. 2c:
MARINE ECOSYSTEMS INDEX
1970–1995

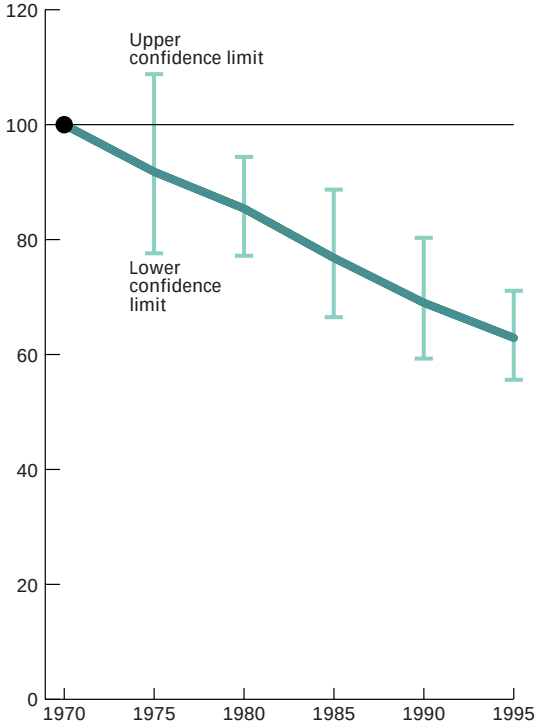


Fig. 9:
MARINE SPECIES POPULATION TRENDS
Percentage of vertebrate species worldwide, 1970–1999

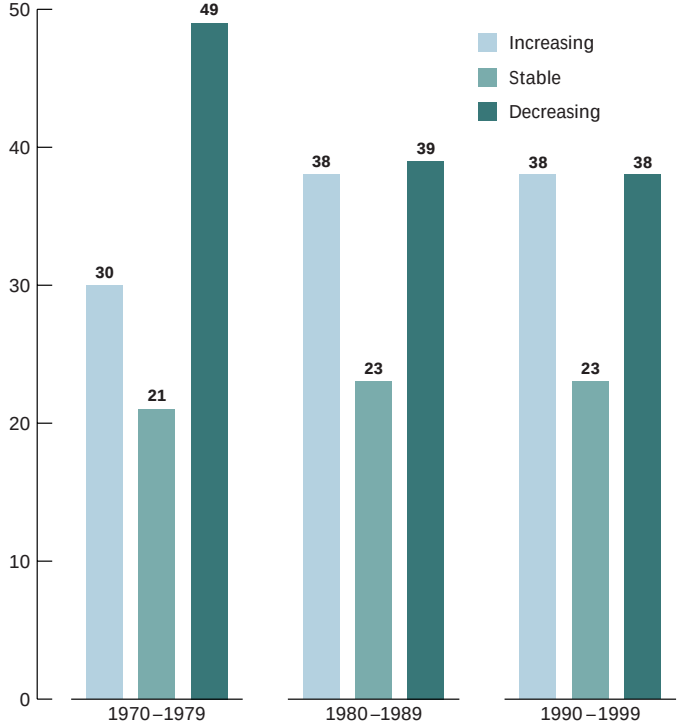
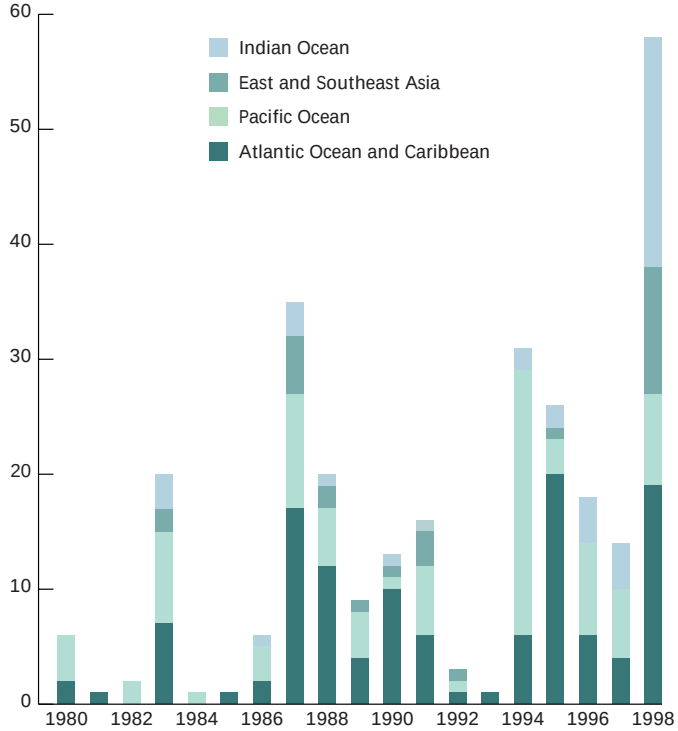
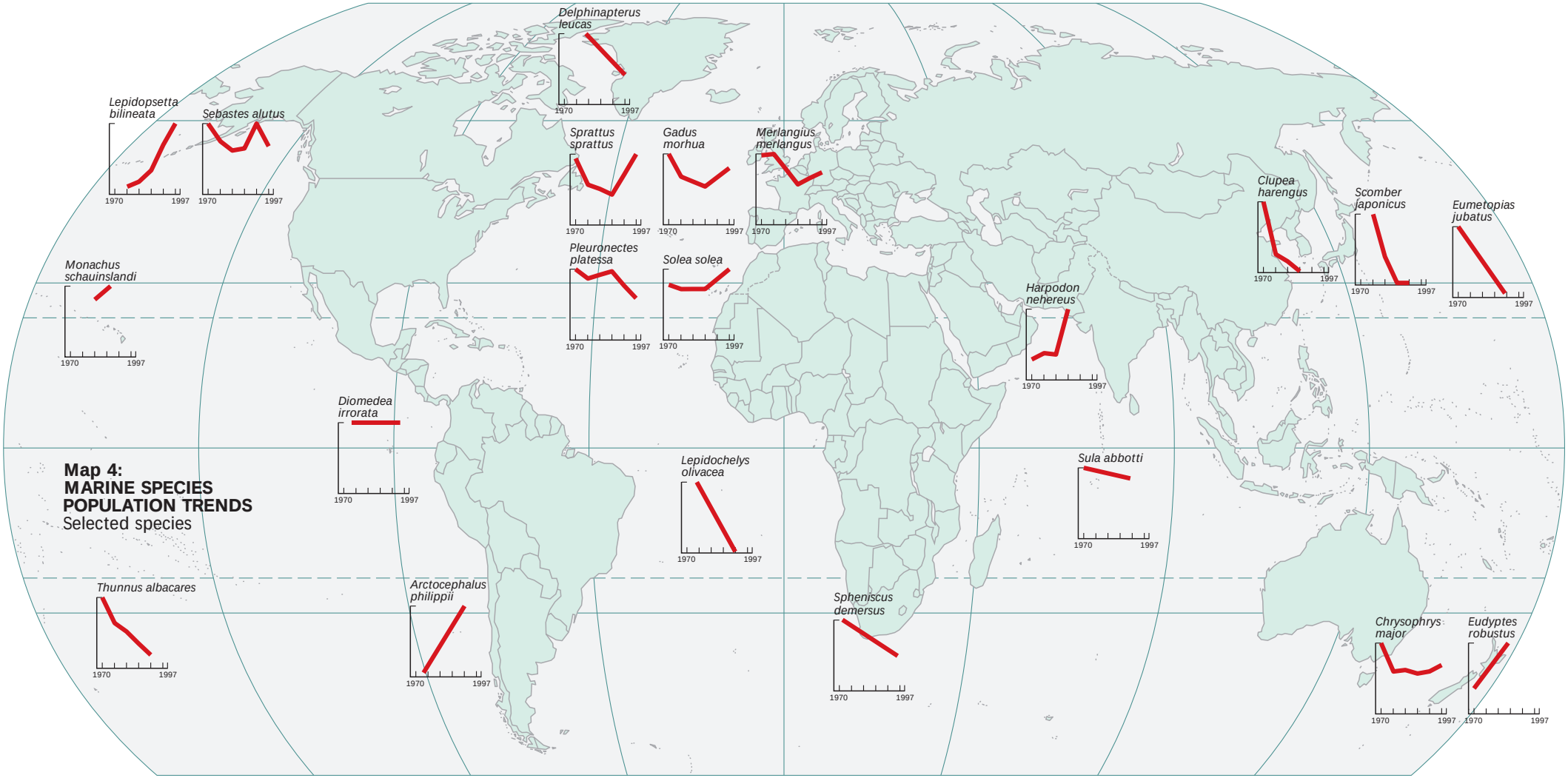


Fig. 10:
CORAL BLEACHING EVENTS
1980–1998





Map 4:
MARINE SPECIES POPULATION TRENDS
Selected species

Arctocephalus philippii	**Juan Fernandez fur seal**	***Harpodon nehereus***	**Bombay duck**	***Solea solea***	**Common sole**
Chrysophrys major	**Sea bream**	***Lepidochelys olivacea***	**Olive ridley turtle**	***Spheniscus demersus***	**Jackass penguin**
Clupea harengus	**Herring**	***Lepidopsetta bilineata***	**Rock sole**	***Sprattus sprattus***	**Sprat**
Delphinapterus leucas	**Beluga**	***Merlangius merlangus***	**Whiting**	***Sula abbotti***	**Abbott's booby**
Diomedea irrorata	**Waved albatross**	***Monachus schauinslandi***	**Hawaiian monk seal**	***Thunnus albacares***	**Yellowfin tuna**
Eudyptes robustus	**Snares penguin**	***Pleuronectes platessa***	**Plaice**		
Eumetopias jubatus	**Northern sea lion**	***Scomber japonicus***	**Chub mackerel**		
Gadus morhua	**Atlantic cod**	***Sebastes alutus***	**Pacific Ocean perch**		

GRAIN CONSUMPTION

GRAINS such as wheat and rice supply most of the world's dietary energy and protein. World grain consumption has more than doubled since 1960 (Figure 11), and the world average consumption per person has remained fairly constant at around 300 kilograms (kg) per person per year since the 1970s. However, about a third of the global grain harvest is fed to animals to produce meat and dairy products.

Grain production has kept up with the world's growing population thanks to increasing yields per hectare of land, but yields are no longer increasing in many developed countries where additional inputs, such as fertilizer, have little effect on production. Moreover, agricultural land is being lost to urban development and soil degradation.

Consequently, uncultivated land is being cleared each year for growing crops or grazing animals, which is responsible for most deforestation in the tropics. The current harvest of about 330kg per person per year, distributed evenly, would be sufficient to provide a healthy diet for the world's population. However, the industrialized countries consume around 500kg grain equivalent per person per year, mainly as meat.

Figures 12 and 13 and Map 5 show the consumption of grain-equivalent in each country and region, calculated as the consumption of grain consumed directly by humans, plus the amount consumed indirectly as meat, plus the amount used as seed, processed, and wasted. The data are corrected for exports and imports of grain and meat.

WWF recommendations to reduce pressure on ecosystems from grain and meat consumption:

■ Protect soil from erosion and degradation caused by overgrazing or salinization. ■ Preserve existing croplands for agriculture, rather than urban and industrial development, road building, or non-essential crops such as tobacco. ■ Increase water-use efficiency of irrigated cropland to cut water losses and expand the area under irrigation, especially in Africa and Latin America. ■ Reduce dependence on pesticides and increase the use of biological control and pest-resistant varieties. ■ Cut meat and dairy product consumption, especially in Europe and North America.

Fig. 11:
WORLD CONSUMPTION BY MAJOR COUNTRY/REGION
Million tonnes per year, 1961–1996

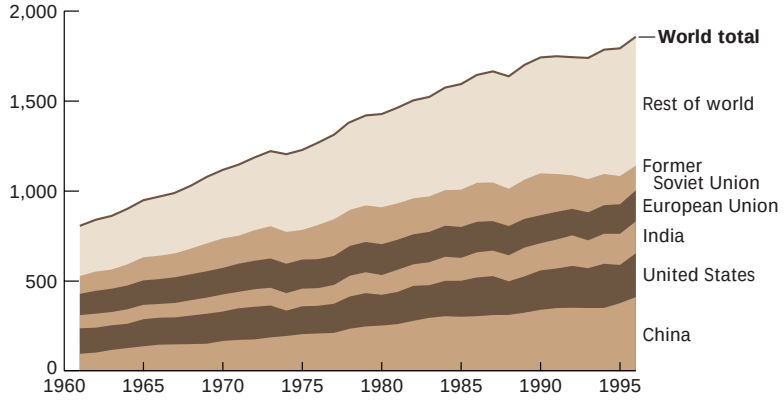


Fig. 12:
CONSUMPTION BY REGION
Kilograms per person per year, 1996

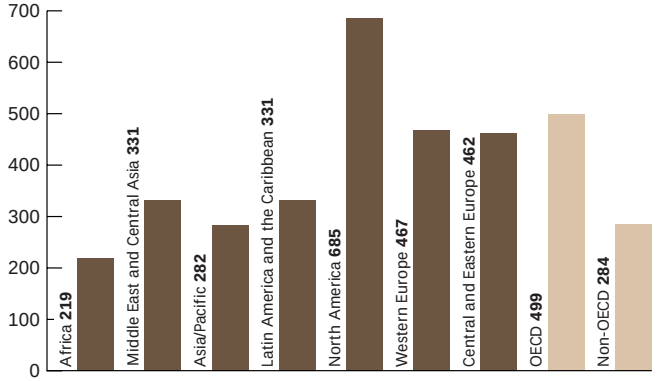
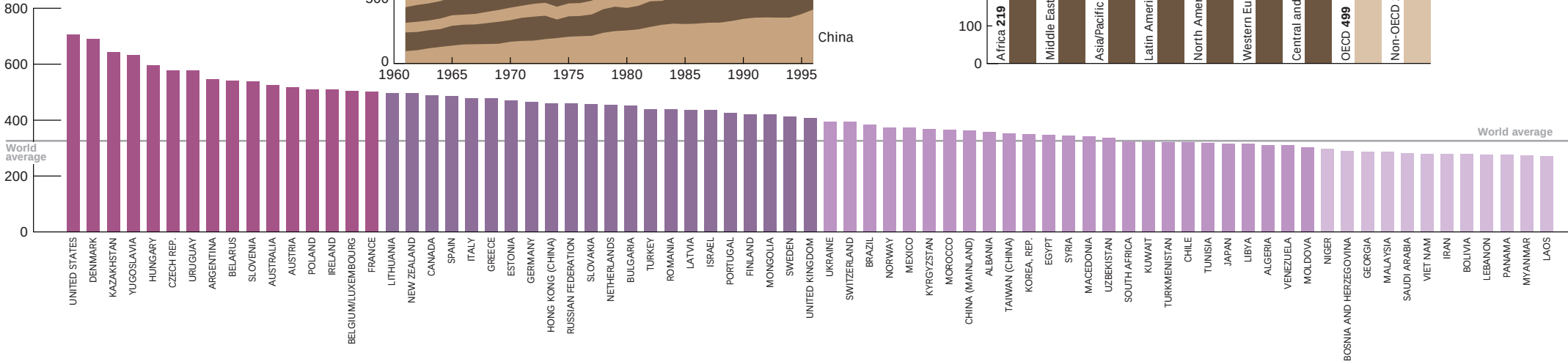
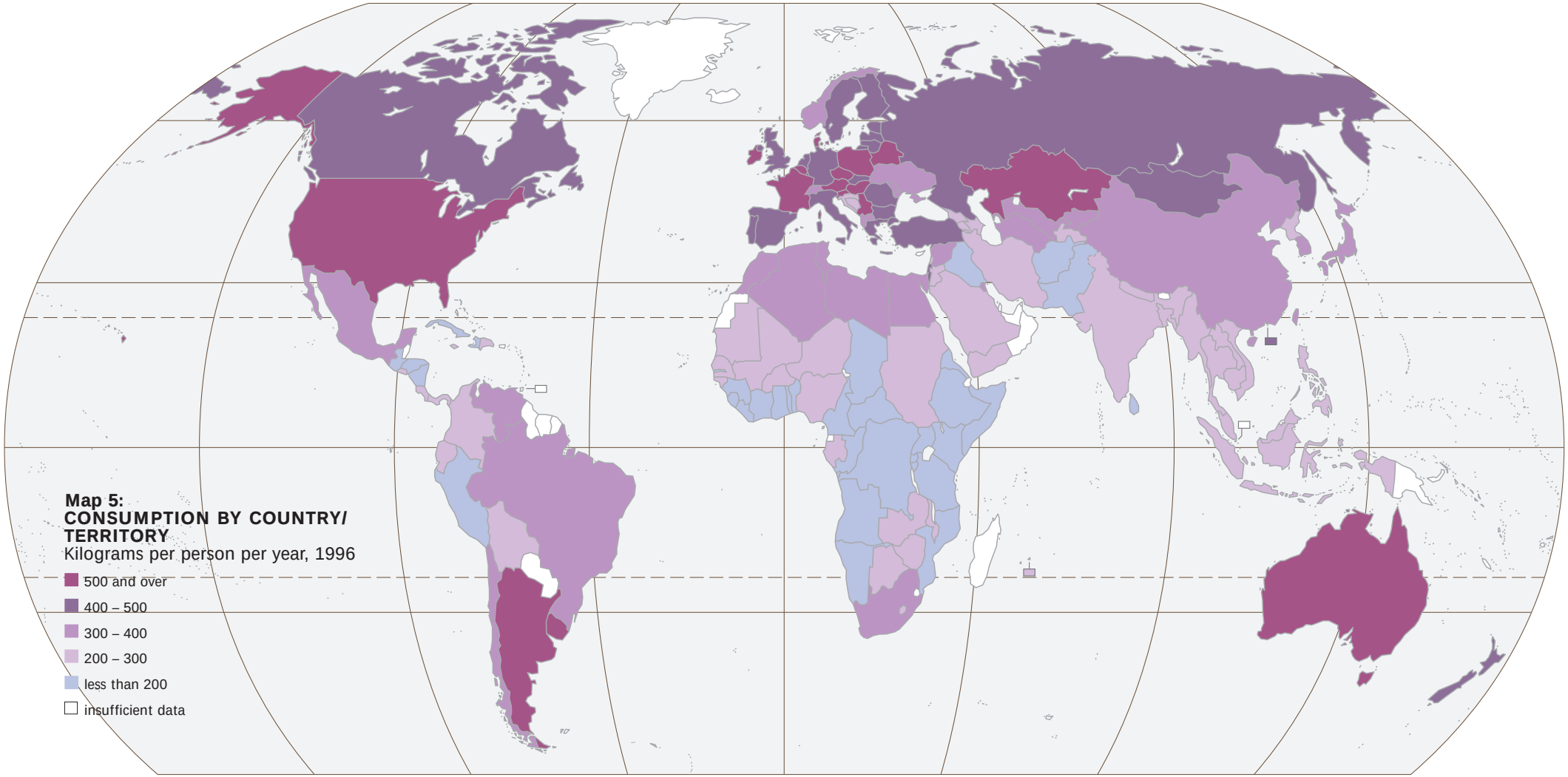
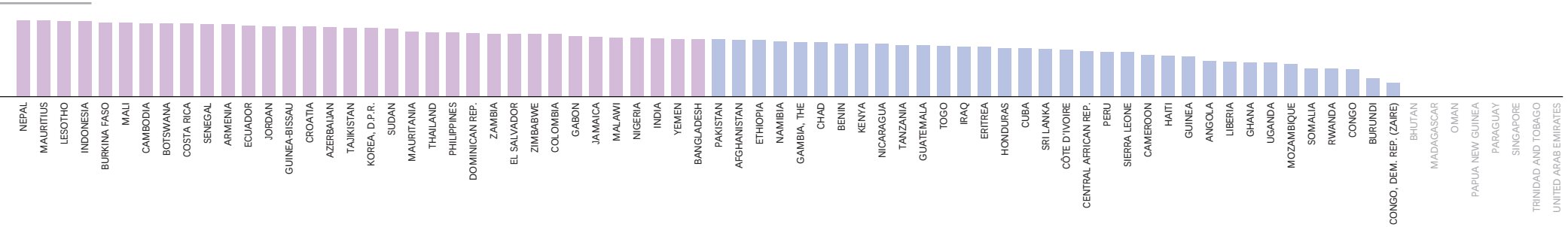


Fig. 13:
CONSUMPTION BY COUNTRY/ TERRITORY
Kilograms per person per year, 1996




Map 5:
CONSUMPTION BY COUNTRY/ TERRITORY
Kilograms per person per year, 1996
500 and over
400 – 500
300 – 400
200 – 300
less than 200
insufficient data


NEPAL
MAURITIUS
LESOTHO
INDONESIA
BURKINA FASO
MALI
CAMBODIA
BOTSWANA
COSTA RICA
SENEGAL
ARMENIA
ECUADOR
JORDAN
GUINEA-BISSAU
CROATIA
AZERBAIJAN
TAJIKISTAN
KOREA, D.P.R.
SUDAN
MAURITANIA
THAILAND
PHILIPPINES
DOMINICAN REP.
ZAMBIA
EL SALVADOR
ZIMBABWE
COLOMBIA
GABON
JAMAICA
MALAWI
NIGERIA
INDIA
YEMEN
BANGLADESH
PAKISTAN
AFGHANISTAN
ETHIOPIA
NAMIBIA
GAMBIA, THE
CHAD
BENIN
KENYA
NICARAGUA
TANZANIA
GUATEMALA
TOGO
IRAQ
ERITREA
HONDURAS
CUBA
SRI LANKA
CÔTE D'IVOIRE
CENTRAL AFRICAN REP.
PERU
SIERRA LEONE
CAMEROON
HAITI
GUINEA
ANGOLA
LIBERIA
GHANA
UGANDA
MOZAMBIQUE
SOMALIA
RWANDA
CONGO
BURUNDI
CONGO, DEM. REP. (ZAIRE)
BHUTAN
MADAGASCAR
OMAN
PAPUA NEW GUINEA
PARAGUAY
SINGAPORE
TRINIDAD AND TOBAGO
UNITED ARAB EMIRATES

FISH CONSUMPTION

FISH was traditionally a cheap source of protein for millions living in the coastal regions of the world, but is increasingly becoming a luxury. Many fish stocks are in decline (see Map 4), especially in the North Atlantic. The United Nations Food and Agriculture Organization (FAO) estimates that 60 per cent of the world's fisheries are exploited to the limit or overfished.

The total marine and inland fish catch reached a record level of about 95 million tonnes in 1996. In addition, fish farms supplied approximately 25 million tonnes, mainly from China and other Asian countries. Of the total, over a quarter was fed to animals as fishmeal or oil.

Although global fish consumption has tripled since 1960, consumption per person has remained at15–17kg per year since the 1970s. The FAO estimates that the world's oceans can sustain a harvest of 82–100 million tonnes of fish a year. As the world's population grows, maintaining the current per capita level of fish consumption will rely increasingly on aquaculture. Aquaculture, as practised today, is often unsustainable.

Raising 1kg of shrimp or salmon in a fish farm requires about 5kg of feed in the form of fishmeal. There is also the ecological impact of the fish farm itself. Thailand has lost half its mangrove forests to shrimp ponds.

The consumption data used in Figures 15 and 16 and Map 6 include freshwater fish and marine fish, crustaceans, and cephalopods, but not processed products such as fishmeal. Farmed fish and seafood are included, but bycatch is not as this is difficult to attribute to a consumer country. The data are corrected for exports and imports.

WWF recommendations to reduce pressure on fisheries:

■ Reduce fisheries bycatch – the incidental killing of unwanted fish and other marine wildlife that accounts for more than a quarter of the world catch. ■ Eliminate destructive fishing practices, such as cyanide and blast fishing on coral reefs. ■ Cut the tens of billions of dollars in government subsidies that contribute to overfishing. ■ Promote market incentives for sustainable fishing, such as the Marine Stewardship Council, an initiative to label seafood from independently certified, well-managed sources. ■ Designate no-fishing zones to safeguard marine ecosystems and to give depleted fish populations a chance to recover.

Fig. 14:
WORLD CONSUMPTION BY MAJOR COUNTRY/REGION
Million tonnes per year, 1961–1996

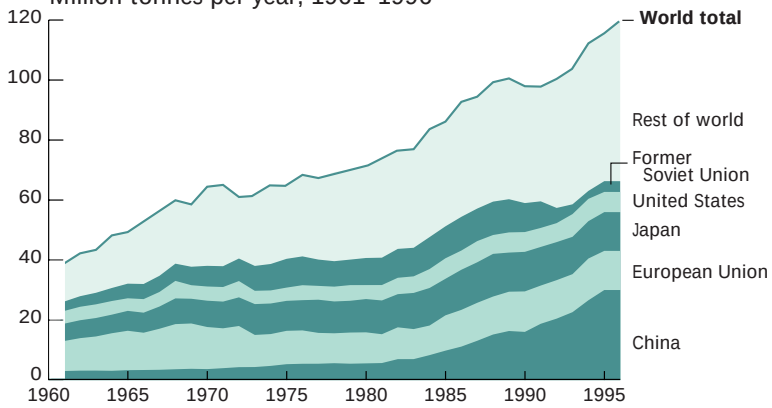


Fig. 15:
CONSUMPTION BY REGION
Kilograms per person per year, 1996

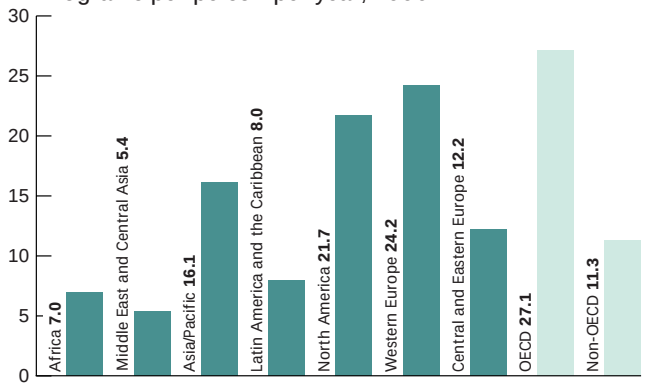
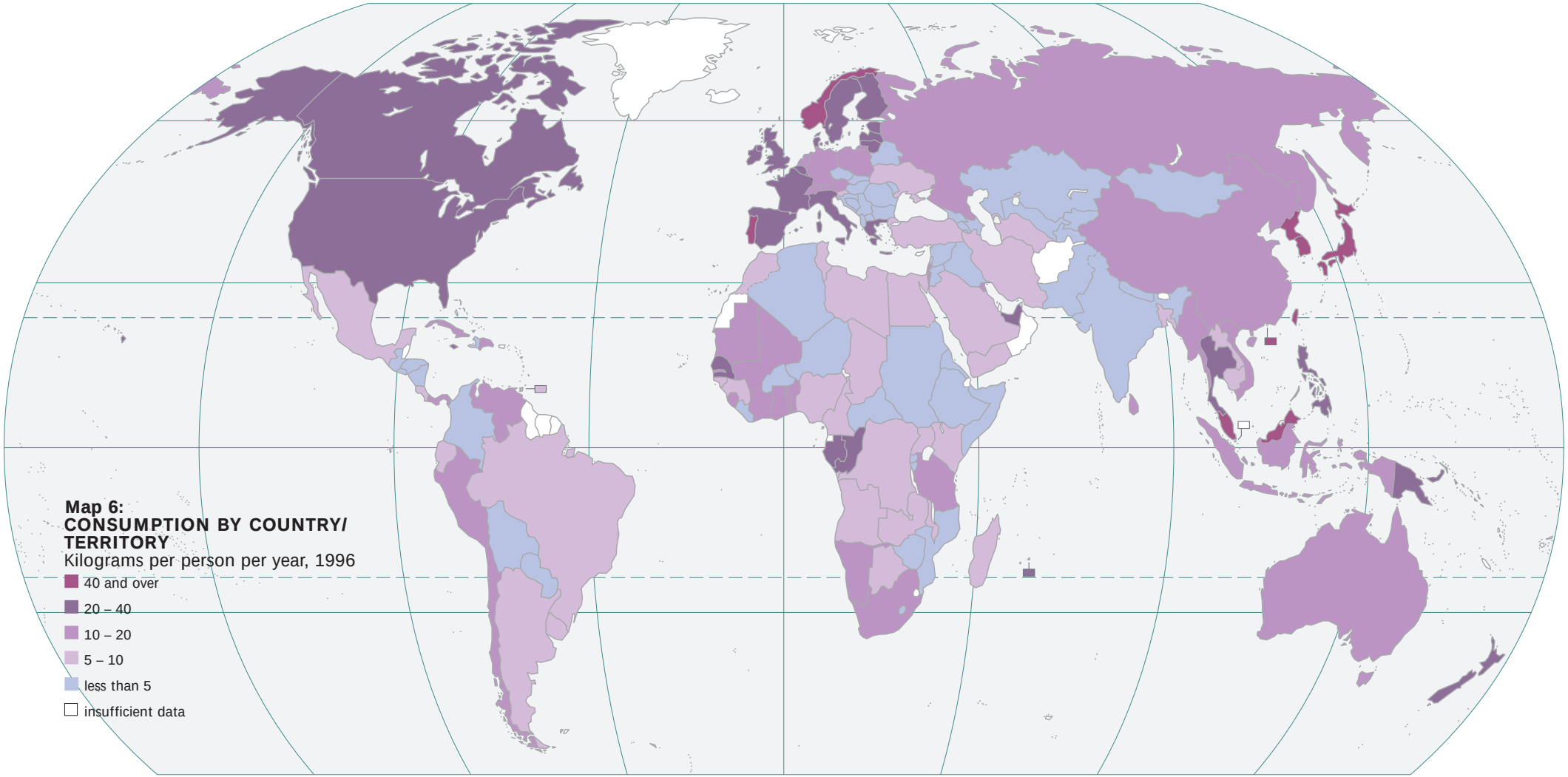
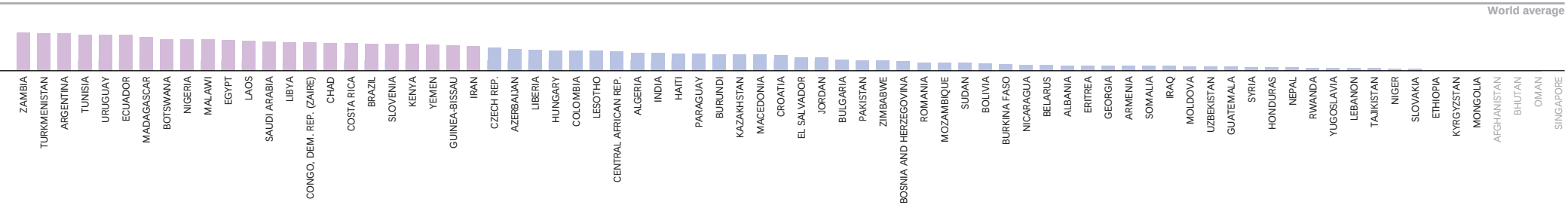


Fig. 16:
CONSUMPTION BY COUNTRY/ TERRITORY
Kilograms per person per year, 1996


Map 6:
CONSUMPTION BY COUNTRY/ TERRITORY
Kilograms per person per year, 1996
40 and over
20 – 40
10 – 20
5 – 10
less than 5
insufficient data


World average
ZAMBIA
TURKMENISTAN
ARGENTINA
TUNISIA
URUGUAY
ECUADOR
MADAGASCAR
BOTSWANA
NIGERIA
MALAWI
EGYPT
LAOS
SAUDI ARABIA
LIBYA
CONGO, DEM. REP. (ZAIRE)
CHAD
COSTA RICA
BRAZIL
SLOVENIA
KENYA
YEMEN
GUINEA-BISSAU
IRAN
CZECH REP.
AZERBAIJAN
LIBERIA
HUNGARY
COLOMBIA
LESOTHO
CENTRAL AFRICAN REP.
ALGERIA
INDIA
HAITI
PARAGUAY
BURUNDI
KAZAKHSTAN
MACEDONIA
CROATIA
EL SALVADOR
JORDAN
BULGARIA
PAKISTAN
ZIMBABWE
BOSNIA AND HERZEGOVINA
ROMANIA
MOZAMBIQUE
SUDAN
BOLIVIA
BURKINA FASO
NICARAGUA
BELARUS
ALBANIA
ERITREA
GEORGIA
ARMENIA
SOMALIA
IRAQ
MOLDOVA
UZBEKISTAN
GUATEMALA
SYRIA
HONDURAS
NEPAL
RWANDA
YUGOSLAVIA
LEBANON
TAJIKISTAN
NIGER
SLOVAKIA
ETHIOPIA
KYRGYZSTAN
MONGOLIA
AFGHANISTAN
BHUTAN
OMAN
SINGAPORE

WOOD CONSUMPTION

WORLD wood consumption has increased by two-thirds since 1960 (Figure 17). In 1996, consumption of fuelwood, industrial roundwood, woodpulp, and paper globally was about 3.4 billion m^3 per year. Unlike the consumption of grain and fish, wood consumption per person has decreased slightly over the last five to ten years from about 0.65 m^3 per year to about 0.58 m^3 per year, partly due to the more efficient use of wood and greater recycling of paper. Fuelwood consumption per person has remained almost constant at about 0.33 m^3 per year.

Slightly more than half the world's annual use of wood is for fuel. Wood is the most important energy source for 2 billion people who have limited access to commercial energy supplies such as electricity. Africa, therefore, has a relatively high per capita consumption of wood (Figure 18).

The world's forests are currently diminishing in area and biological quality, partly because of the high consumption of wood and paper. Even so, the world's forests, if managed well, could provide more than enough wood to cover current use. On the basis of the world's current forest cover and its potential sustainable yield, and setting aside 10 per cent of each forest type for protection, total annual yield could be 4 billion m^3, or 0.67 m^3 per person per year.

Figures 18 and 19 and Map 7 are calculated in cubic metres from data on national production, imports and exports of wood and wood products. Pulp and paper consumption, which is measured in tonnes, has been converted back into cubic metres of wood raw material equivalent.

WWF recommendations to reduce pressure on forests:

- Establish a network of ecologically representative protected areas covering at least 10 per cent of each forest type.
- Ensure forests outside protected areas are well managed according to standards set by the Forest Stewardship Council.
- Develop ecologically and socially appropriate forest restoration programmes.
- Reduce forest damage from pollution and climate change.
- Use forest goods and services within the regenerative capacity of the forest estate and eliminate the wasteful consumption of wood.

Fig. 17:
WORLD PRODUCTION BY MAJOR COUNTRY/REGION
Million cubic metres per year, 1961–1996

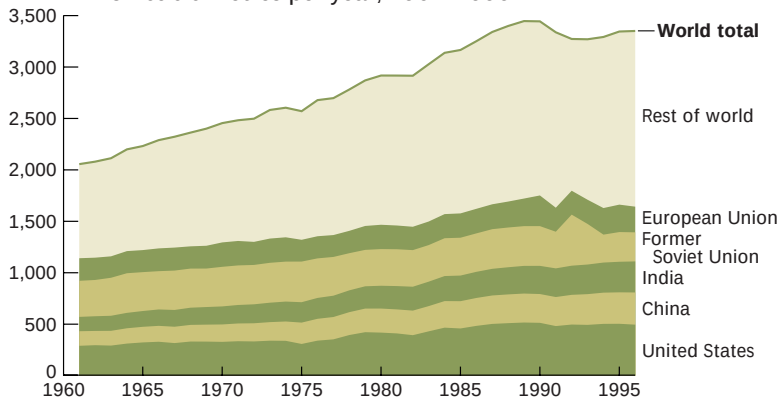


Fig. 18:
CONSUMPTION BY REGION
Cubic metres per person per year, 1996

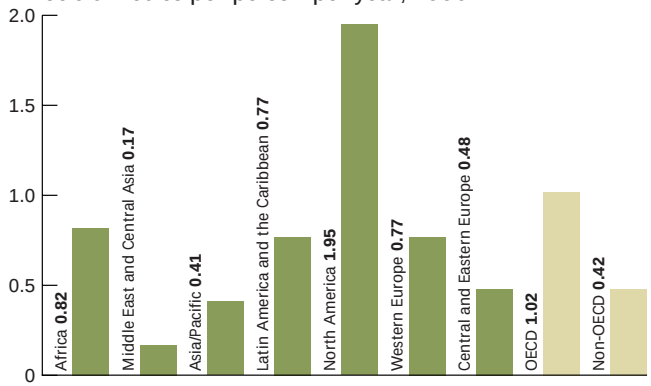
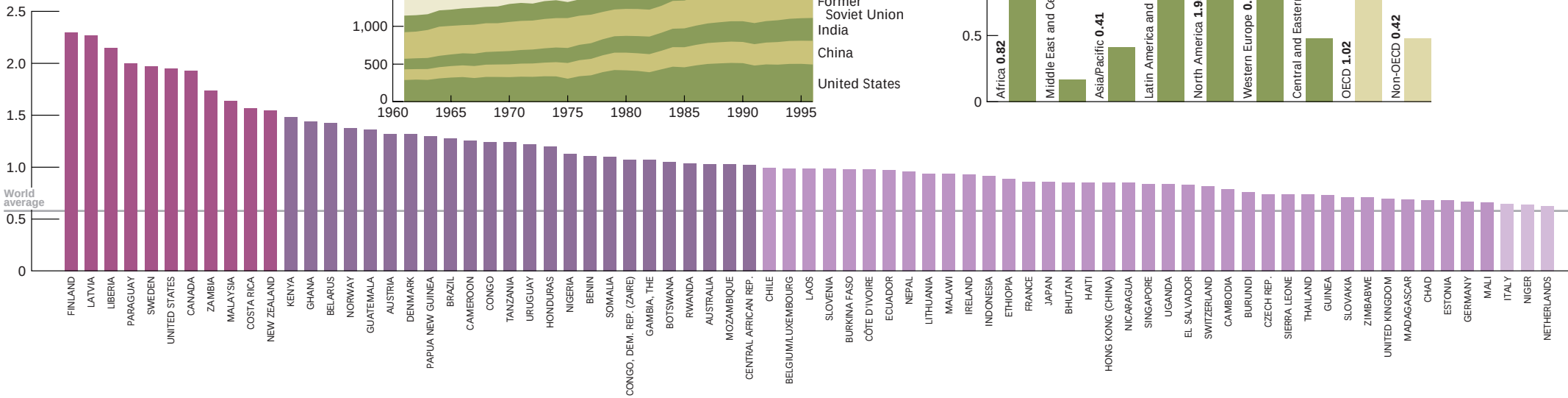
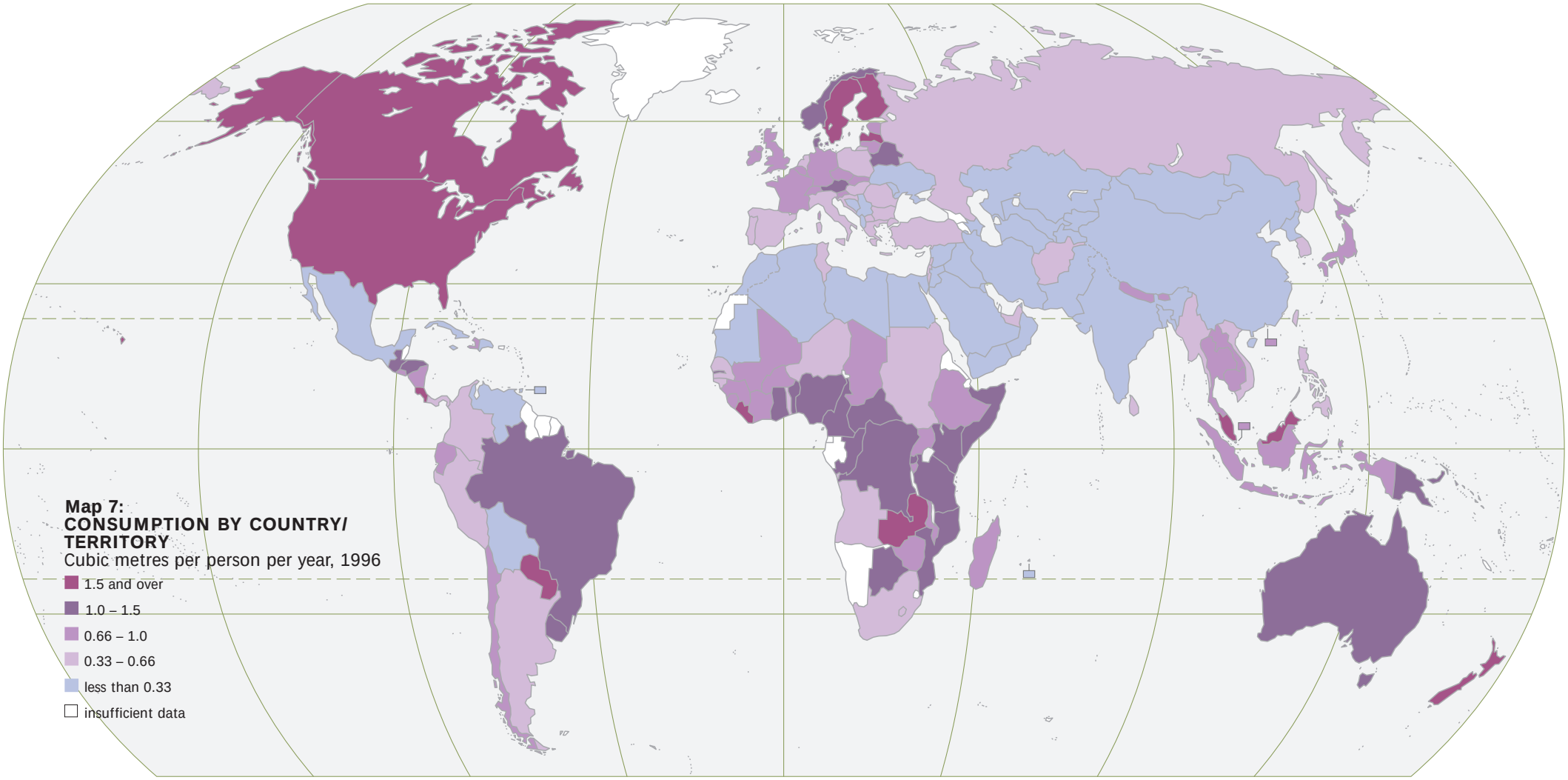
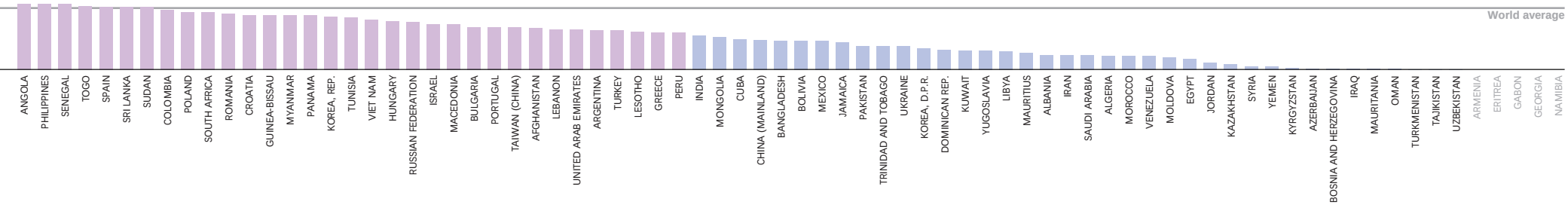


Fig. 19:
CONSUMPTION BY COUNTRY/ TERRITORY
Cubic metres per person per year, 1996




Map 7:
CONSUMPTION BY COUNTRY/
TERRITORY
Cubic metres per person per year, 1996
1.5 and over
1.0 – 1.5
0.66 – 1.0
0.33 – 0.66
less than 0.33
insufficient data


World average
ANGOLA
PHILIPPINES
SENEGAL
TOGO
SPAIN
SRI LANKA
SUDAN
COLOMBIA
POLAND
SOUTH AFRICA
ROMANIA
CROATIA
GUINEA-BISSAU
MYANMAR
PANAMA
KOREA, REP.
TUNISIA
VIET NAM
HUNGARY
RUSSIAN FEDERATION
ISRAEL
MACEDONIA
BULGARIA
PORTUGAL
TAIWAN (CHINA)
AFGHANISTAN
LEBANON
UNITED ARAB EMIRATES
ARGENTINA
TURKEY
LESOTHO
GREECE
PERU
INDIA
MONGOLIA
CUBA
CHINA (MAINLAND)
BANGLADESH
BOLIVIA
MEXICO
JAMAICA
PAKISTAN
TRINIDAD AND TOBAGO
UKRAINE
KOREA, D.P.R.
DOMINICAN REP.
KUWAIT
YUGOSLAVIA
LIBYA
MAURITIUS
ALBANIA
IRAN
SAUDI ARABIA
ALGERIA
MOROCCO
VENEZUELA
MOLDOVA
EGYPT
JORDAN
KAZAKHSTAN
SYRIA
YEMEN
KYRGYZSTAN
AZERBAIJAN
BOSNIA AND HERZEGOVINA
IRAQ
MAURITANIA
OMAN
TURKMENISTAN
TAJIKISTAN
UZBEKISTAN
ARMENIA
ERITREA
GABON
GEORGIA
NAMIBIA

CARBON DIOXIDE EMISSIONS

HUMAN activities – primarily fossil fuel combustion – have increased the concentration of carbon dioxide (CO_2) in the atmosphere by over a quarter since the industrial revolution, from about 280 parts per million (ppm) to about 360 ppm. This concentration of CO_2 is greater than any in the last 160,000 years and is the major cause of global climate change. Fossil fuels – coal, oil, and natural gas – provide about 90 per cent of the world's commercial energy used for electricity generation, transport, industry, and in homes and businesses.

Global CO_2 emissions more than doubled between 1960 and 1996, from less than 10 billion tonnes per year to almost 23 billion tonnes per year (Figure 20). This does not include the emissions from deforestation, which add between 2 billion and 10 billion tonnes per year.

To stabilize the atmospheric concentration, global CO_2 emissions would have to be cut to about 10 billion tonnes per year, which is within the capacity of the oceans and terrestrial ecosystems, especially forests, to remove CO_2 from the atmosphere.

Figures 21 and 22 and Map 8 show that, on average, each person in the world emits about 4 tonnes of CO_2 per year. Per person CO_2 emissions in North America are over 19 tonnes per person per year, five times the world average and almost ten times the developing world average.

WWF recommendations to reduce energy consumption and CO_2 emissions:

■ Increase the use of energy-saving technologies and eliminate wasteful energy consumption in transport, industry, and the home. ■ Increase the supply of energy from sources which reduce or eliminate pollution, especially renewable sources such as solar and wind. ■ Assist developing countries to invest in sustainable energy technologies as they industrialize. ■ Increase energy prices to cover the full environmental costs of energy use, and remove government subsidies on energy. ■ Stop deforestation and promote reforestation of deforested areas in an ecologically and socially appropriate manner.

Fig. 22:
EMISSIONS BY COUNTRY/ TERRITORY
Tonnes per person per year,1996

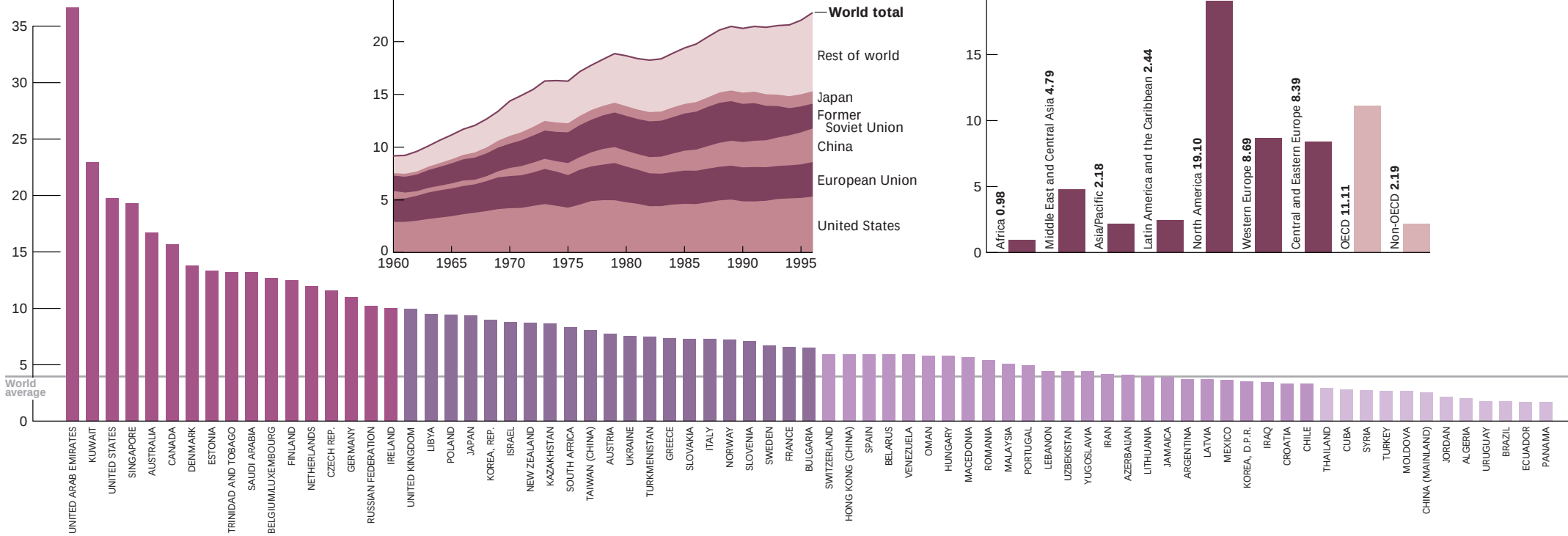
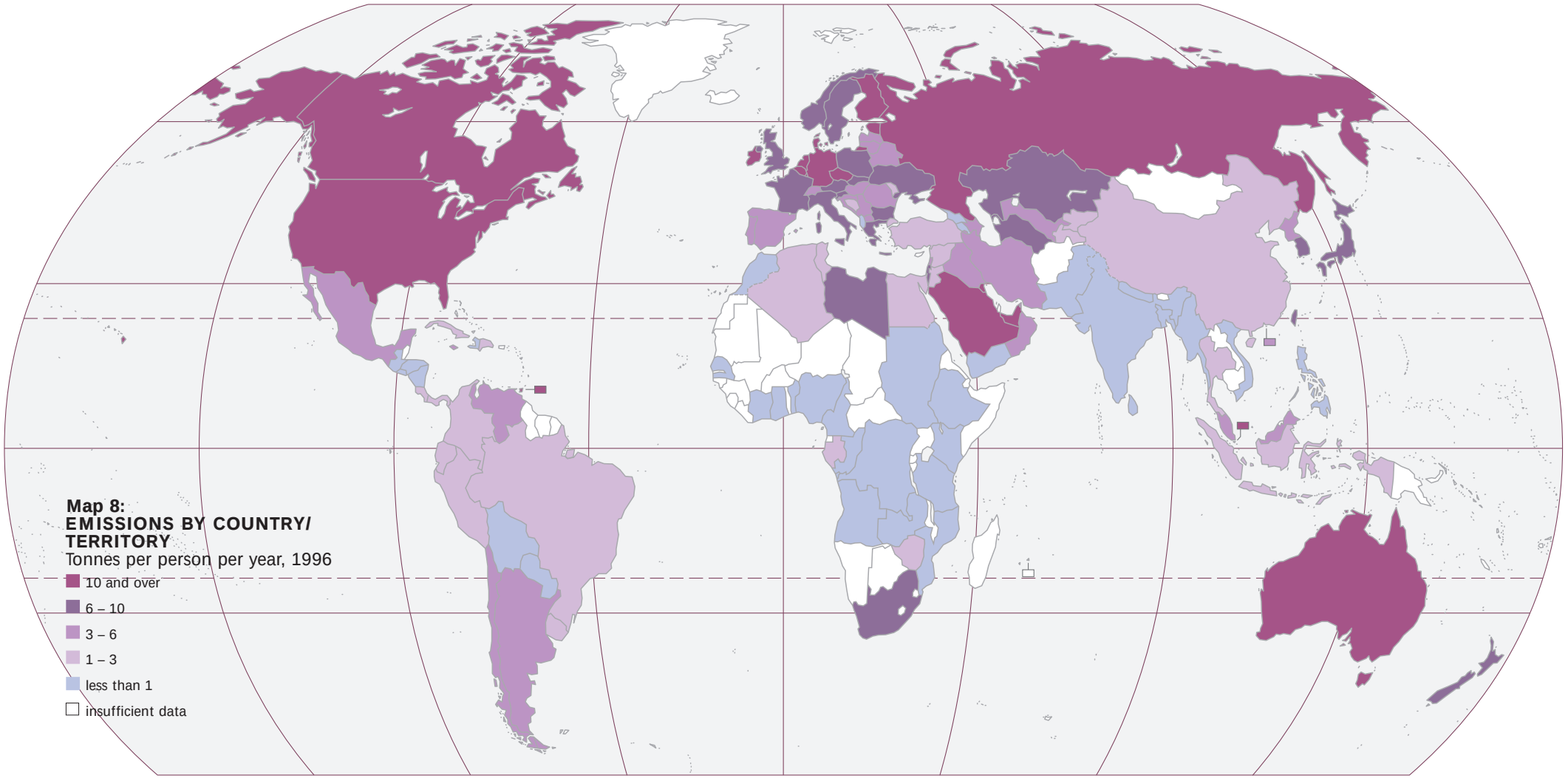
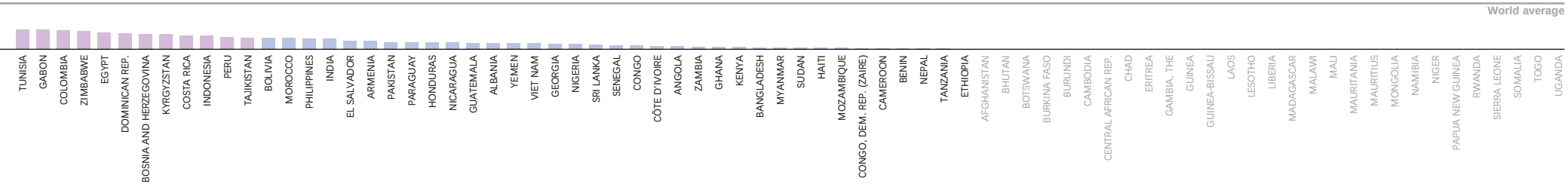


Fig. 20:
WORLD EMISSIONS BY MAJOR COUNTRY/REGION
Billion tonnes per year, 1960–1996

Fig. 21:
EMISSIONS BY REGION
Tonnes per person per year, 1996


Map 8:
EMISSIONS BY COUNTRY/
TERRITORY
Tonnes per person per year, 1996
10 and over
6 – 10
3 – 6
1 – 3
less than 1
insufficient data


World average
TUNISIA
GABON
COLOMBIA
ZIMBABWE
EGYPT
DOMINICAN REP.
BOSNIA AND HERZEGOVINA
KYRGYZSTAN
COSTA RICA
INDONESIA
PERU
TAJIKISTAN
BOLIVIA
MOROCCO
PHILIPPINES
INDIA
EL SALVADOR
ARMENIA
PAKISTAN
PARAGUAY
HONDURAS
NICARAGUA
GUATEMALA
ALBANIA
YEMEN
VIET NAM
GEORGIA
NIGERIA
SRI LANKA
SENEGAL
CONGO
CÔTE D'IVOIRE
ANGOLA
ZAMBIA
GHANA
KENYA
BANGLADESH
MYANMAR
SUDAN
HAITI
MOZAMBIQUE
CONGO, DEM. REP. (ZAIRE)
CAMEROON
BENIN
NEPAL
TANZANIA
ETHIOPIA
AFGHANISTAN
BHUTAN
BOTSWANA
BURKINA FASO
BURUNDI
CAMBODIA
CENTRAL AFRICAN REP.
CHAD
ERITREA
GAMBIA, THE
GUINEA
GUINEA-BISSAU
LAOS
LESOTHO
LIBERIA
MADAGASCAR
MALAWI
MALI
MAURITANIA
MAURITIUS
MONGOLIA
NAMIBIA
NIGER
PAPUA NEW GUINEA
RWANDA
SIERRA LEONE
SOMALIA
TOGO
UGANDA

FERTILIZER USE

THE world's use of chemical fertilizers has increased fivefold since the 1960s (Figure 23), particularly the use of inorganic nitrogenous fertilizer which has leapt from about 12 million tonnes to more than 80 million tonnes per year. Thanks in part to this growth, global food production has kept pace with human population over the same period. But the human fixation of nitrogen, primarily for fertilizer manufacture but also as a result of burning fossil fuel (which adds an additional 25 or more million tonnes per year) and the cultivation of nitrogen-fixing legumes such as beans, now exceeds the rate of nitrogen fixation by natural processes.

Since the 1980s, in developed countries, ever higher rates of fertilizer application have ceased to improve crop yields. Above a certain threshold, additional nutrients have little effect on productivity. Nutrients that are not taken up by crops are either washed out of the soil by rain, into streams, rivers, or underground aquifers, or volatilize into the atmosphere.

Nitrogen and phosphorus are critical plant nutrients and their release into natural ecosystems alters the growth and composition of species. While plant growth and biomass increase with nutrient availability, the diversity or richness of species is generally reduced, sometimes dramatically. In extreme cases, such as when agricultural run-off pollutes a lake, nutrient-limited algae may proliferate to the exclusion of all other life. Rivers also flush excess nutrients out to sea, periodically causing algal blooms such as the toxic red tides that occur in the Adriatic and North Seas.

Western Europe is the region with the most intensive fertilizer use (see Figure 24), and the worst affected by excess nutrient pollution, although fertilizer use has diminished slightly since the mid-1980s. Most of the recent growth in fertilizer use has been in Asia, especially in China and the Indian subcontinent, and is likely to continue as long as there is potential for increasing yields. Figure 25 shows the use of fertilizer per hectare of agricultural land, including grazing land. The data do not include the use of animal manure as fertilizer.

Fig. 25:
USE BY COUNTRY/TERRITORY
Kilograms per hectare* per year, 1996

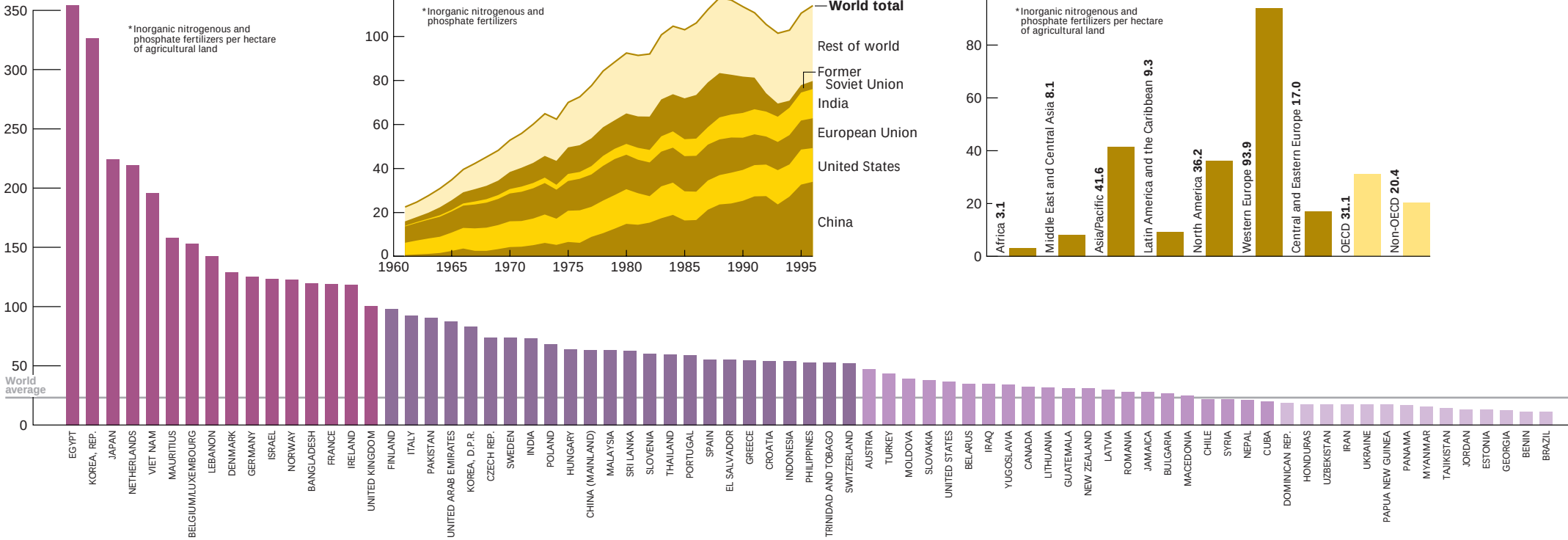
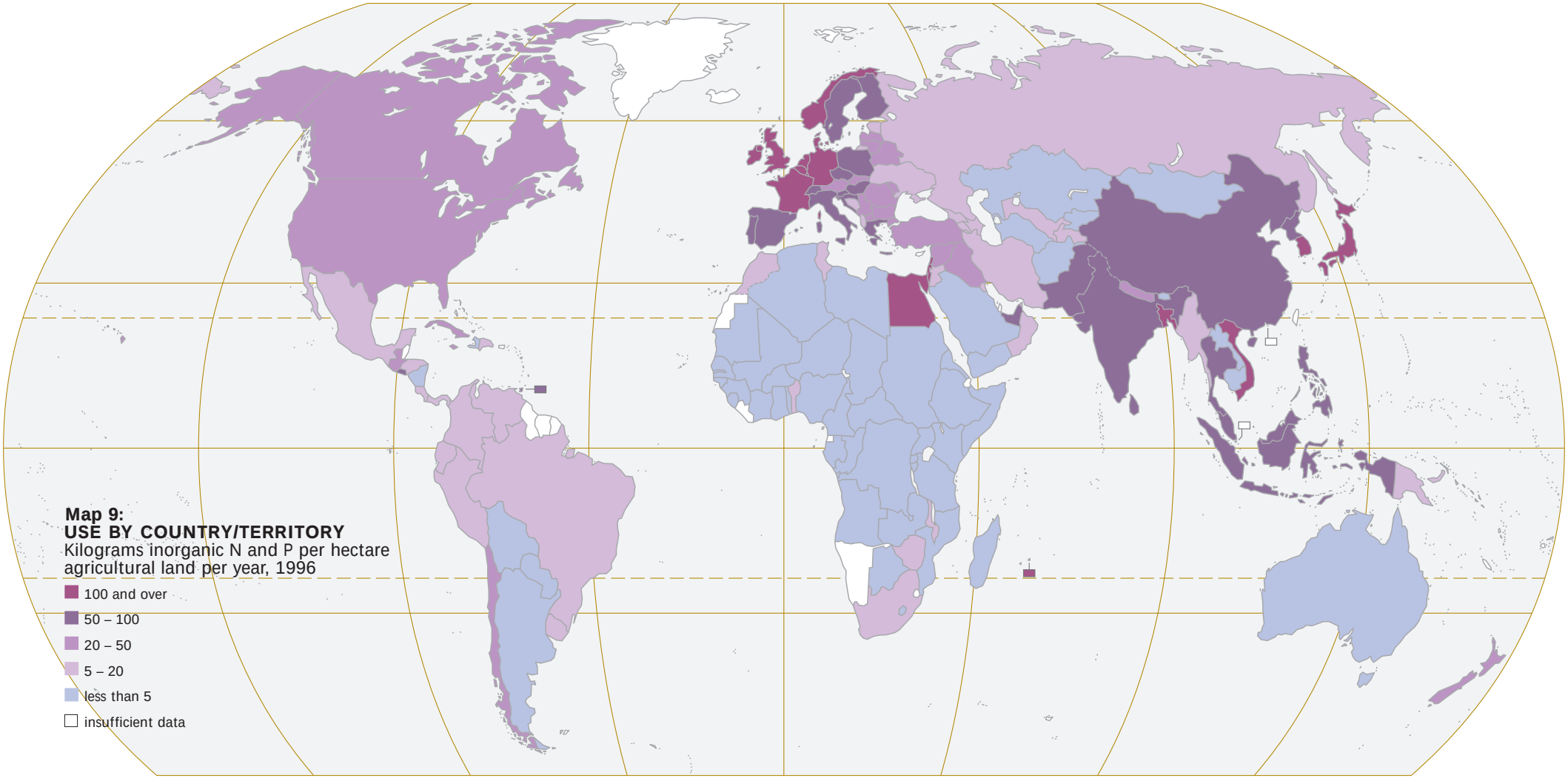


Fig. 23:
WORLD USE BY MAJOR COUNTRY/REGION
Million tonnes* per year, 1961–1996

Fig. 24:
USE BY REGION
Kilograms per hectare* per year, 1996


Map 9:
USE BY COUNTRY/TERRITORY
Kilograms inorganic N and P per hectare agricultural land per year, 1996
100 and over
50 – 100
20 – 50
5 – 20
less than 5
insufficient data


World average
MEXICO
ECUADOR
VENEZUELA
TUNISIA
MALAWI
COSTA RICA
COLOMBIA
OMAN
AZERBAIJAN
MOROCCO
URUGUAY
KUWAIT
BOSNIA AND HERZEGOVINA
ZIMBABWE
SOUTH AFRICA
RUSSIAN FEDERATION
ALBANIA
ARMENIA
PERU
NICARAGUA
TOGO
ETHIOPIA
ARGENTINA
KENYA
LIBYA
TURKMENISTAN
AUSTRALIA
LAOS
HAITI
CÔTE D'IVOIRE
LESOTHO
CAMEROON
SAUDI ARABIA
KYRGYZSTAN
CAMBODIA
BURKINA FASO
BURUNDI
NIGERIA
GAMBIA, THE
SENEGAL
AFGHANISTAN
ZAMBIA
ALGERIA
TANZANIA
PARAGUAY
SUDAN
SIERRA LEONE
GHANA
ERITREA
MALI
YEMEN
NIGER
KAZAKHSTAN
MADAGASCAR
GUINEA-BISSAU
BOLIVIA
UGANDA
CONGO, DEM. REP. (ZAIRE)
BHUTAN
CENTRAL AFRICAN REP.
CONGO
GUINEA
MOZAMBIQUE
BOTSWANA
CHAD
MAURITANIA
ANGOLA
RWANDA
GABON
MONGOLIA
SOMALIA
HONG KONG (CHINA)
LIBERIA
NAMIBIA
SINGAPORE
TAIWAN (CHINA)

CEMENT CONSUMPTION

ONLY around one quarter of the Earth's habitable surface is undisturbed. Over one third is human dominated. The most complete alteration of natural habitat occurs through urbanization – the construction of buildings, roads, or other infrastructure for human purposes.

Since cement is used for much of this construction work, national cement consumption is an indicator, albeit indirect, of the rate at which forest, agricultural land, or natural habitat is lost each year to urban expansion or infrastructure development. World cement consumption has increased almost fivefold since 1960 (Figure 26), and the consumption per capita in OECD countries is more than double that of non-OECD countries (Figure 27).

Figure 28 and Map 10 show that world average cement consumption per person in 1996 was about 260kg per year, with many rapidly developing or industrializing countries well above that average.

It should be noted that in a number of countries/territories with very high cement consumption, much of the construction goes upwards rather than along the ground because of the scarcity of available land, and does not therefore represent an indicator of land-use change. For the relevant cement consumption data see the technical note on page 25.

WWF recommendations to reduce land consumption and control urbanization:

■ Use industrial and residential zoning and greenbelt controls to regenerate inner cities and reduce urban sprawl. ■ Promote compact and car-free cities to minimize transport and energy demand as well as land take. ■ Integrate transport and land-use planning and promote transport by rail or water rather than road. ■ Protect ecologically sensitive areas near human settlements and mining operations.

Fig. 28:
CONSUMPTION BY COUNTRY/ TERRITORY
Kilograms per person per year, 1996

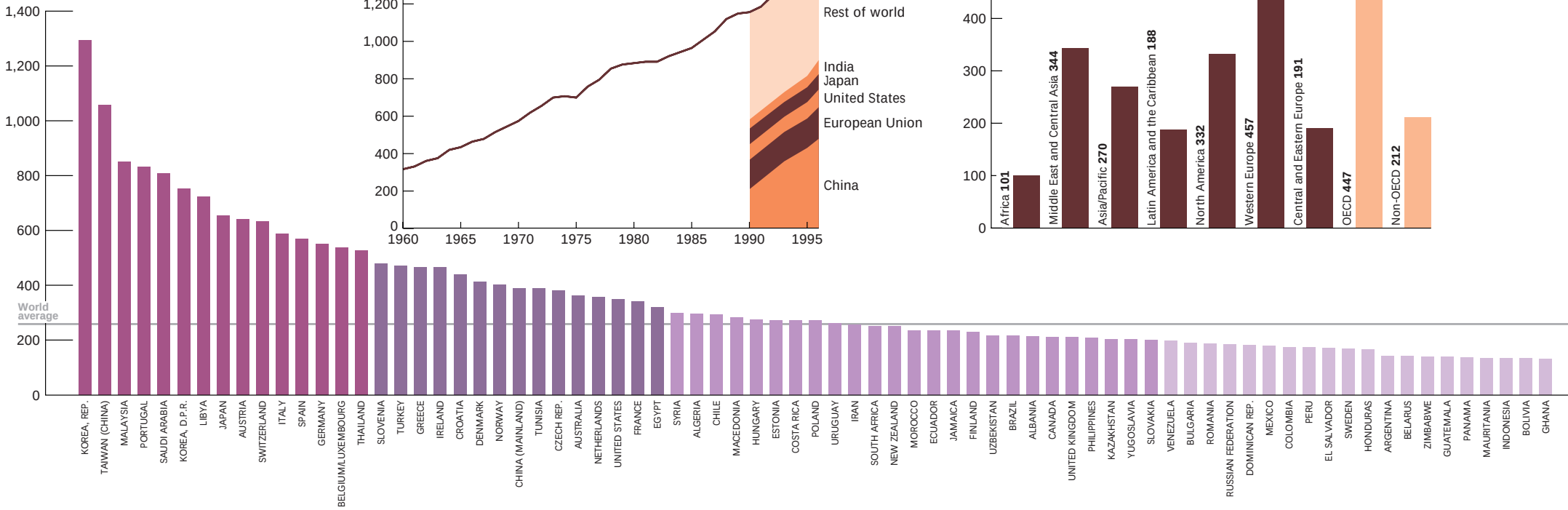
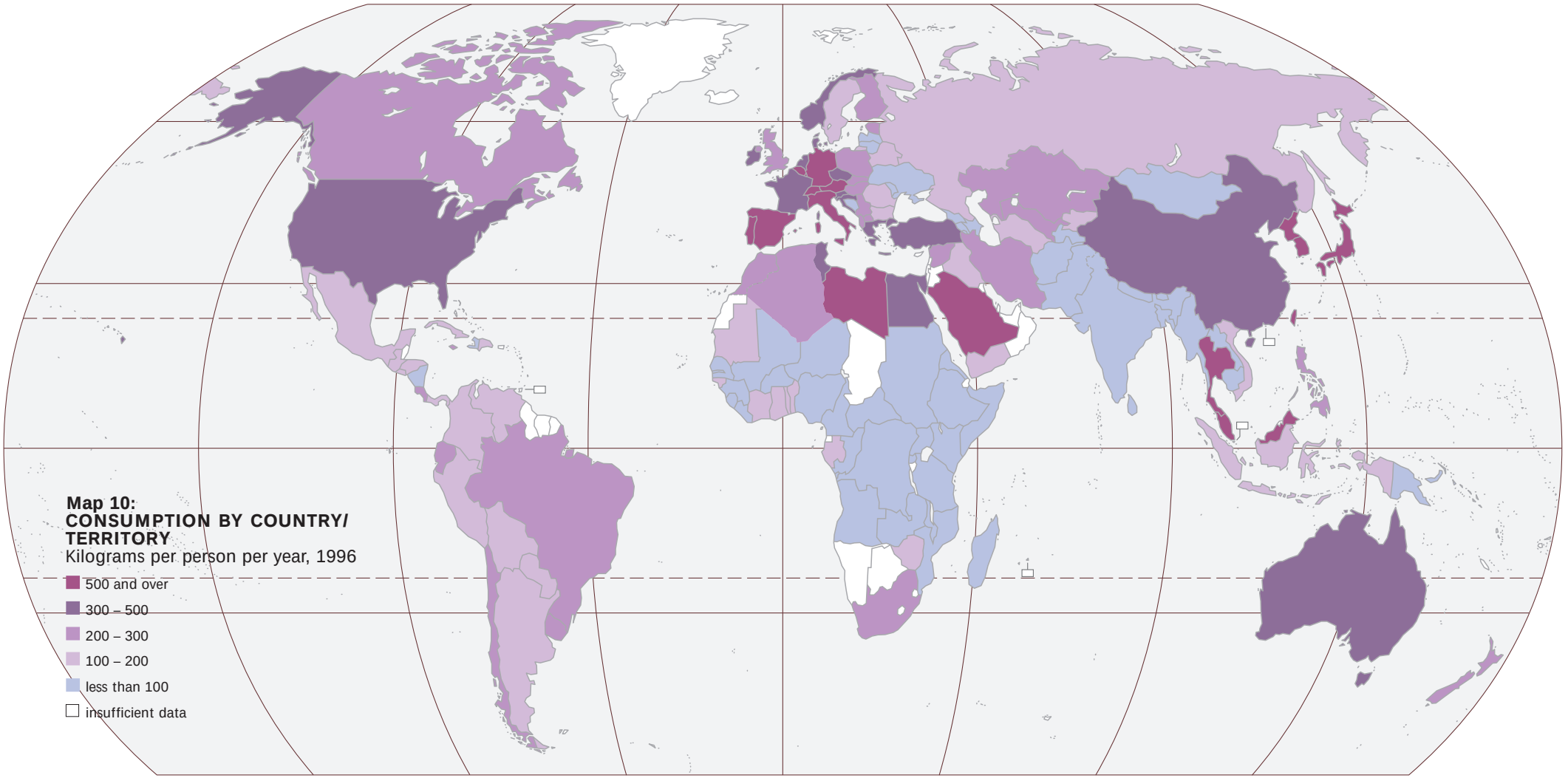


Fig. 26:
WORLD CONSUMPTION BY MAJOR COUNTRY/REGION
Million tonnes per year, 1960–1996

Fig. 27:
CONSUMPTION BY REGION
Kilograms per person per year, 1996



World average

See technical note, page 25

GABON
PARAGUAY
CUBA
BENIN
TOGO
CÔTE D'IVOIRE
TURKMENISTAN
KYRGYZSTAN
IRAQ
VIET NAM
YEMEN
GUINEA-BISSAU
LITHUANIA
UKRAINE
BOSNIA AND HERZEGOVINA
SENEGAL
SRI LANKA
NICARAGUA
BHUTAN
ARMENIA
INDIA
LATVIA
GAMBIA, THE
PAKISTAN
CONGO
LAOS
SIERRA LEONE
CAMEROON
MONGOLIA
ZAMBIA
NIGERIA
CAMBODIA
HAITI
KENYA
AZERBAIJAN
ANGOLA
MYANMAR
BANGLADESH
TANZANIA
PAPUA NEW GUINEA
NEPAL
GUINEA
GEORGIA
SUDAN
MALAWI
UGANDA
MOLDOVA
ERITREA
ETHIOPIA
TAJIKISTAN
LIBERIA
MADAGASCAR
AFGHANISTAN
MOZAMBIQUE
SOMALIA
NIGER
CENTRAL AFRICAN REP.
MALI
RWANDA
CONGO, DEM. REP. (ZAIRE)
BURKINA FASO
BOTSWANA
BURUNDI
CHAD
LESOTHO
NAMIBIA
HONG KONG (CHINA)
ISRAEL
JORDAN
KUWAIT
LEBANON
MAURITIUS
OMAN
SINGAPORE
TRINIDAD AND TOBAGO
UNITED ARAB EMIRATES

TECHNICAL NOTES

BIODIVERSITY AND ECOSYSTEMS (Pages 2–9)

Page 2 THE LIVING PLANET INDEX

Figures 1 and 2. The LPI is generated by averaging three separate indices for the forest, freshwater, and marine biomes. Each is set at 100 in 1970 and given an equal weighting.

The forest index is based on the change in the area of natural forest cover, corrected for plantations, worldwide from 1970 to 1995 (see below, under Figure 4). The freshwater and marine indices are based on the changes in populations of samples of freshwater and marine vertebrate species worldwide from 1970 to 1995 (see Figures 2b and 2c below). The samples include over 100 freshwater and over 100 marine species, which represent all the species for which population statistics from more than one point in time could be found.

There are of course limitations to these indices. First, forest area is not directly proportional to forest biodiversity, and there is an underlying decline in forest quality in many regions that is not reflected in the change in area of forest cover, which in many countries is increasing. Some indicators of forest quality have been proposed, but agreement has yet to be reached on what the best measures should be.

Second, it is difficult to ensure the representativeness of the freshwater and marine indices because the number of species in each sample compared with the total numbers of freshwater and marine species is relatively small. In both samples there is some bias towards birds and mammals, while reptiles, amphibians, and fishes are under-represented, reflecting the level of knowledge of these groups.

Statistics on the number of eukaryotic species in the world come from May (1998) and the World Conservation Monitoring Centre (WCMC 1992). This does not include prokaryotic species, such as bacteria.

Figure 3 and Map 1. The number of threatened plant species recorded for each country, and the percentage this represents of their national flora, are given in Figure 3. The number of threatened plant species refers to the number that are globally vulnerable, endangered, or critically endangered (IUCN 1997), and not necessarily the number of species that are threatened within each country: a species may be highly threatened in one country but in a lower risk category globally.

A relatively high figure of threatened species for a particular country may only reflect the effort that has been put into gathering data in that country, while a low figure for another country may reflect that similar research efforts have not yet been undertaken there. Countries with high levels of endemism, particularly islands, show high percentages of threatened species partly because the IUCN *Red List of Threatened Plants*, unlike the corresponding animal list, treats all rare plants as threatened.

Page 4 FOREST ECOSYSTEMS

Figure 4. Data for 1990 are WCMC figures for current forest area for each region. The current forest cover data are based on WCMC's holdings of spatial data. These come from a variety of national and international sources, including remote sensing, and a variety of dates. Forest cover is defined as closed forest, which in general refers to canopy cover of more than 30 per cent. Plantation area has been deducted to give an estimate of natural forest area. Plantation areas in all tropical regions as well as in Argentina, Australia, Canada, Chile, China, Japan, Morocco, New Zealand, the Republic of Korea, South Africa, the United States, Uruguay, and the former USSR were obtained from FAO sources. For Europe, the area of forest stands less than 30 years old was calculated for 21 countries from Kuusela (1994), as a proxy for plantations. This gives a minimum estimate, as many plantations are more than 30 years old. It is assumed that the average proportion of plantation to total forest area for these countries, 31 per cent, was representative of the whole of Europe. The estimated area of plantation in Armenia, Azerbaijan, Belarus, Estonia, Georgia, Latvia, Lithuania, Moldova, and Ukraine was subtracted from the former USSR's total plantation area, and the remainder was attributed to the Russian Federation.

Time series data were generated by projecting deforestation rates back and forward from 1990. For Africa, Asia/Pacific, and Latin America and the Caribbean, deforestation rates for 1980–1990 and 1990–1995 are from the FAO *Forest Resources Assessment* (1995) and *The State of the World's Forests* (FAO 1997). For 1960–1970 and 1970–1980, deforestation rates from Singh and Marzoli (1995) have been applied to each region. The latter only applied to the tropical parts of these regions. For Europe, changes are taken from the *Dobris Assessment* (European Commission 1995) which has figures for changes in forest extent for 29 European countries, including Eastern Europe, for the decades from 1960–1990. The total forest area summed over these countries is assumed to be representative of Europe as a whole. Figures for changes in Australasia and North America are from FAO (1995). Data are missing for forest changes in North America before 1980 so it is assumed that no overall change has taken place. It is also assumed that there was no change in forest area in the Russian Federation from 1980 to 1990: FAO (1995) notes that this is the safest assumption, as data from different sources conflict.

Figures 5 and 6 and Map 2. Original and current forest cover were compiled by WCMC from a variety of national and international source maps. Original forest cover was compiled from six potential vegetation data sets which, between them, cover the globe. Forest fragmentation was evaluated using geographic information systems (GIS) analysis of large regional sections from the global current forest cover data set, without dividing forest cover into different types. Neither national boundaries nor rivers less than 0.5 km wide are considered to disrupt patches of forest. Europe's forests are the most fragmented, with about a quarter of the total, including plantations, in blocks of less than 500 km^2. Around 14 per cent of Asia's forests are fragmented into areas smaller than 500 km^2, whereas in the Russian Federation and North America the figure is less than 10 per cent. Although it is possible to see a significant reduction in the area of forest, the figures underestimate the true magnitude of impacts on forest biodiversity because much of the current forest cover has regrown or been planted and is therefore generally of lower biological quality.

Page 6 FRESHWATER ECOSYSTEMS

Figure 7. For 281 freshwater species it was possible to locate qualitative information on population trends and estimate whether numbers were decreasing, stable, or increasing. The species in the sample comprise 19 mammals – desmans, manatees, otters, and river dolphins; 92 birds – cranes, ducks, geese and swans, flamingos, grebes, herons, ibises and spoonbills, rails, skimmers and dippers, stilts and avocets, and storks; 72 reptiles – crocodilians and turtles; 54 amphibians – true frogs, true toads, tree frogs, tropical frogs, narrowmouth and spadefoot toads, mole salamanders, lungless salamanders, and newts; and 44 fishes – grayling, lampreys, paddlefish, and sturgeons.

The total number of species in each category for each time period is used to demonstrate the general status of global freshwater biodiversity at that time. The status for each time period is an indication of any changes in the general status of global freshwater ecosystems from the 1970s through to the present.

Figure 2b and Map 3. The Freshwater Ecosystems Index is calculated using quantitative population data from more than one point in time for 102 species, which represent all freshwater species for which time series data could be found. These data points were used to estimate trends in population for each species (it was assumed that the change in population between two points in time was linear). The populations of each species were then estimated for the beginning and mid-points of each decade 1970–1979, 1980–1989, and 1990–1999 or, for species where the population data do not span the entire period, for as many of those points as the data would allow without extrapolating more than two years. For species with annual population data, three-year running averages were calculated at each end and mid-decadal point (e.g. the population in 1980 was taken as the average of 1979–1981).

Populations of each species at each five-year point were logged to give equal weighting to large and small populations and to upward and downward changes in population. For the populations spanning each five-year interval, the

geometric means at the beginning and end of each interval were compared to generate the index, which is set to 100 in 1970. The Freshwater Ecosystems Index represents the changes from 1970 to 1995 in a population that is typical of the sample. Map 3 shows the approximate locations of a selection of the species used to construct the index. The 102 species in the index are:

MAMMALS

Insectivores
Desmana moschata

River dolphins
Lipotes vexillifer
Platanista gangetica
Platanista minor

BIRDS

Cranes
Grus americana
Grus japonensis
Grus monachus
Grus vipio

Ducks, geese, swans
Anas acuta
Anas americana
Anas clypeata
Anas crecca
Anas discors
Anas formosa
Anas platyrhynchos
Anas querquedula
Anas strepera
Anas superciliosa
Anas wyvilliana
Aythya marila
Aythya americana
Aythya nyroca
Aythya valisineria
Cygnus olor
Marmaronetta angustirostris
Mergus albellus
Mergus merganser
Netta rufina
Nettapus auritus
Tadorna ferruginea

Flamingos
Phoeniconaias minor
Phoenicopterus andinus
Phoenicopterus chilensis
Phoenicopterus jamesi
Phoenicopterus ruber

Grebes
Podiceps taczanowskii
Tachybaptus rufolavatus

Herons
Ardea cinerea
Ardea cocoi
Ardea purpurea
Ardeola ralloides
Botaurus stellaris
Ixobrychus minutus
Nycticorax nyticorax

Ibises and spoonbills
Eudocimus ruber
Platalea leucorodia
Platalea minor
Plegadis falcinellus

Rails and gallinules
Fulica cristata
Porphyrio porphyrio

Stilts and avocets
Himantopus novaezelandiae

Storks
Ciconia ciconia
Ciconia nigra

REPTILES

Crocodiles and alligators
Alligator sinensis
Crocodylus acutus
Crocodylus mindorensis
Crocodylus palustris
Crocodylus porosus

Gharial
Gavialis gangeticus

Turtles
Batagur baska
Callagur borneoensis

AMPHIBIANS

True toads
Bufo bufo
Bufo calamita
Bufo canorus
Bufo terrestris

Tree frogs
Hyla versicolor
Pseudacris crucifer
Pseudacris nigrita
Pseudacris ornata
Pseudacris regilla

Narrowmouth toads
Gastrophryne carolinensis

Spadefoot toads
Scaphiopus holbrooki

True frogs
Rana catesbeiana
Rana clamitans
Rana dalmatina
Rana septentrionalis
Rana sylvatica
Rana temporaria
Rana utricularia

Mole salamanders
Ambystoma maculatum
Ambystoma opacum
Ambystoma talpoideum
Ambystoma tigrinum tigrinum

Lungless salamanders
Aneides hardii
Desmognathus aeneus
Desmognathus monticola
Desmognathus ochrophaeus
Desmognathus quadramaculatus
Eurycia quadridigitata
Plethodon cinereus
Plethodon glutinosus
Plethodon jordoni

Newts
Notophthalmus viridescens
Triturus helviticus

FISHES

Paddlefish
Polyodon spathula

Sturgeons
Acipenser baerii
Acipenser gueldenstaedtii
Acipenser naccarii
Acipenser sinensis
Acipenser stellatus
Acipenser transmontanus
Amur River Fishery-China
Amur River Fishery-Russia
Huso huso

Figure 8. The North American Amphibian Population Index was generated in the same way as the Freshwater Ecosystems Index, based on 33 species of North American frogs, toads, and salamanders. All amphibian population data come from the US Geological Survey amphibian count database, which represents the largest available data set on amphibian population declines. It should be noted that the amphibian data in both the Freshwater Ecosystems Index and the North American Amphibian Population Index do not represent entire species but relatively localized populations, but these are the best data that could be found documenting amphibian trends.

Page 8 MARINE ECOSYSTEMS

Figure 9. It was possible to locate qualitative information on population trends for 132 marine vertebrate species and estimate whether their numbers were decreasing, stable, or increasing. The total number of species in each category for each time period was used to demonstrate the general status of global marine biodiversity at that time. The species in the sample consist of 36 mammals – sea otters, seacows, and manatees, seals, fur seals, and sea lions, baleen whales, toothed whales, and dolphins; 40 birds – albatrosses, gannets and boobies, and penguins;

7 reptiles – marine turtles; and 45 fishes – cods, flatfish, herrings, sole, seaperch and redfish, tuna and mackerel, and other marine fish; and 4 invertebrates – gastropods and crustaceans.

Figure 2c and Map 4. Marine Ecosystems Index. Quantitative population data from more than one point in time were available for 102 out of the 132 species. These data points were used to calculate the Marine Ecosystems Index, using the same methodology as the Freshwater Ecosystems Index. As with the freshwater ecosystems, the Marine Ecosystems Index represents the changes from 1970 to 1995 of a hypothetical population that is typical of the sample as a whole. The approximate locations of a selection of the populations used are shown in Map 4. The 102 species are:

MAMMALS

Sea otter
Enhydra lutris

Fur seals
Arctocephalus australis
Arctocephalus forsteri
Arctocephalus galapagoensis
Arctocephalus philippi
Arctocephalus pusillus
Arctocephalus townsendi
Arctocephalus tropicalis
Callorhinus ursinus

Monk seals
Monachus monachus
Monachus schauinslandi

Sea lions
Eumetopias jubatus
Neophoca cinerea
Otaria byronia
Phocarctos hookeri
Zalophus californianus

Baleen whales
Balaena mysticetus
Balaenoptera borealis
Balaenoptera edeni
Balaenoptera musculus
Balaenoptera physalus
Eschrichtius robustus
Megaptera novaeangliae

Toothed whale
Delphinapterus leucas

Manatee
Trichechus manatus

BIRDS

Albatrosses
Diomedea albatrus
Diomedea amsterdamensis
Diomedea cauta
Diomedea chlororhynchos
Diomedea exulans
Diomedea immutabilis
Diomedea irrorata
Diomedea melanophris

Gannets and boobies
Sula abbotti
Sula bassana
Sula capensis
Sula dactylatra
Sula sula
Sula variegata

Penguins
Aptenodytes forsteri
Aptenodytes patagonicus
Eudyptes pachyrhynchus
Eudyptes robustus
Megadytes antipodes
Pygoscelis adeliae
Pygoscelis papua
Spheniscus demersus
Spheniscus humboldti
Spheniscus mendiculus

REPTILES

Turtles
Caretta caretta
Chelonia mydas
Dermochelys coriacea
Lepidochelys kempii
Lepidochelys olivacea

FISHES

Cods
Gadus macrocephalus
Gadus morhua
Melanogrammus aeglefinus
Merlangius merlangus
Merluccius productus
Micromesistius australis
Pollachius virens
Theragra chalcogramma
Trisopterus esmarkii

Flatfish
Atheresthes stomias
Hippoglossoides ellassodon
Hippoglossoides platessoides
Lepidopsetta bilineata
Limanda aspera
Pleuronectes ferrugineus
Pleuronectes platessa
Pleuronectes quadrituberculatus
Pseudopleuronectes americanus
Reinhardtius hippoglossoides
Solea solea

Herrings
Brevooria patronus
Clupea harengus
Clupea pallasi
Sprattus sprattus

Seaperch and redfish
Sebastes alutus
Sebastes mentella
Sebastolobus alascanus

Tunas and mackerels
Scomber japonicus
Scomber scombrus
Scomberomorus cavalla
Thunnus alalunga
Thunnus albacares
Thunnus obesus
Thunnus maccoyii
Thunnus thynnus

Other marine fishes
Anoplopoma fimbria
Argyrosomus argentatus
Chrysophrys major
Harpodon nehereus
Lepidonotothen squamifrons
Mallotus villosus
Pagrus auratus
Pleurogrammus monopterygius
Urophycis tenuis

INVERTEBRATES

Gastropods
Haliotis laevigata

Crustaceans
Penaeus esculentus
Penaeus orientalis
Portunus trituberculatus

Figure 10. Statistics on the number of coral reef bleaching events occurring each year were taken from Glynn (1996), Hopley (1997), Wilkinson (1998), and Goreau. The data were split up by ocean, and the highest number of events recorded by one or more of the sources was plotted on the chart.

CONSUMPTION AND POLLUTION **(Pages 10–21)**

Population: Countries with populations of less than 1 million in 1996 were not included in the analysis: 77 countries or territories, with a combined population of about 17 million people, were therefore excluded. Luxembourg was aggregated with Belgium. Regional information was based on data for regional subsets of the 151 countries, while global information includes all countries of the world. (For details of the regions, see map inside the back cover.) National population statistics were from the United Nations Population Division (1998), median estimate.

Total national consumption was divided by the country's population to give national per capita consumption. Regional consumption per person was calculated as a region's total consumption, divided by the region's population. Global per capita consumption was calculated by dividing the world's total consumption by the world's total population.

Page 10 GRAIN CONSUMPTION

Figure 11. Grain consumption time series data are from FAOSTAT.

Figures 12 and 13 and Map 5. All grain and meat consumption data come from the FAOSTAT database, except Taiwan data which comes from the Council of Agriculture (COA 1996). Grain-equivalent consumption is calculated as the consumption of grain, plus its indirect consumption in the form of meat, plus seed, processed, and waste grain. All imports and exports of both grain and meat are taken into account. The following conversion factors were used to convert from meat into grain consumption (kg of grain per kg of meat): beef and veal 5.0; pig meat 3.5; mutton and goat 1.8; poultry 2.25.

Page 12 FISH CONSUMPTION

Figure 14. Fish consumption time series data are from FAOSTAT.

Figures 15 and 16 and Map 6. The statistics on fish consumption come from the FAOSTAT database, except Taiwan data which come from COA (1996). Consumption includes freshwater fish, marine fish, crustaceans, cephalopods and other molluscs. Fish meal, oil, and other products are not included. All imports and exports are taken into account. Discarded bycatch is not included as this is difficult to attribute to a consumer country. Norwegian fishing boats are required to land their bycatch, which therefore contributes to Norway's fish consumption.

Page 14 WOOD CONSUMPTION

Figure 17. Wood production time series data are from FAOSTAT.

Figures 18 and 19 and Map 7. Wood consumption was calculated using data from the FAOSTAT database of national production, imports and exports of wood and wood products. Taiwan data come from COA (1996). Total national consumption was calculated as roundwood production, plus imports minus exports, plus imports of wood-derived products minus corresponding exports. The wood-derived products include fuelwood and charcoal, sawnwood, wood-based panels, and pulp and paper. Wood used for fuel or timber is measured in m^3. Pulp and paper consumption, which is measured in tonnes, has been converted back into m^3 of wood raw material equivalent (wrme). Conversion factors vary for each product from paper mill to paper mill and from country to country but, for reasons of practicality, a general set of factors was used to convert different types of pulp and paper into wrme (in m^3 wrme per tonne): mechanical pulp 2.5; chemical pulp 5.0; semi-chemical pulp 2.75; dissolving pulp 2.5; newsprint 2.8; writing and printing paper 3.5; other paper and paperboard 2.5. Sawnwood, wood-based panels, and fibreboard have not been converted into wrme as the wood-waste generated in their production is usually used elsewhere in the industry for fibre, pulp, or energy.

Page 16 CARBON DIOXIDE EMISSIONS

Figure 20. Time series data for 1960–1976 are from Marland and Boden (1999) and for 1977–1996 from the International Energy Agency (IEA 1998).

Figures 21 and 22 and Map 8. The national and regional emissions per person were calculated as the total emissions arising from the combustion of fossil fuels (coal, oil, and natural gas) given in IEA (1998), divided by population. A large number of countries are not listed separately by this source, but they are included in the regional totals.

Page 18 FERTILIZER USE

Figure 23. Fertilizer use time series data are from FAOSTAT. Data are for inorganic nitrogenous and phosphate fertilizers only. Animal manure is not included.

Figures 24 and 25 and Map 9. Inorganic nitrogenous and phosphate fertilizer use data come from the FAOSTAT database. Countries and regions were compared in terms of fertilizer use intensity, not fertilizer use per capita. Fertilizer intensity is the consumption per hectare of agricultural land, including arable and permanent crop land and pasture. Pasture was included as many countries fertilize pastures for grazing. However, some countries such as Australia, Argentina, Brazil, Kazakhstan, and the United States have vast areas of grazing land which are not fertilized. Singapore was excluded from this calculation as it has a negligible area of agricultural land.

Page 20 CEMENT CONSUMPTION

Figure 26. Global cement consumption time series data are from Marland and Boden (1999). Data for major countries and regions 1990–1995 are from the Centre for Concrete Information (1997). Data for major countries and regions 1996, see Figure 28 below.

Figures 27 and 28 and Map 10. National data on cement consumption were calculated from US Geological Survey data on production (van Oss n.d.), plus imports minus exports from the UN commodity trade statistics database (COMTRADE). Total consumption was divided by population to give per capita consumption. Countries/territories with less than 5,000 km^2 of agricultural and forest land were excluded from the main analysis. However, the relevant per capita consumption data for those countries/territories are as follows (kilograms per person per year):

Hong Kong (China)	942
Israel	1 051
Jordan	565
Kuwait	2 980
Lebanon	1 450
Mauritius	535
Oman	786
Singapore	2 566
Trinidad and Tobago	225
United Arab Emirates	2 647

SOURCES and further reading

Bohn, U. and Katenina, G.D. (1994)
Map of Natural Vegetation. Scale 1:2,500,000. Komarov Botanical Institute, St Petersburg.

Carnahan, J.A. (n.d.)
Australia – Natural Vegetation. Australian Surveying and Land Information Group, Department of Administrative Services. 1:5 million scale.

Centre for Concrete Information (1997)
The Global Cement Report. Trade Ship Publications Ltd, Dorking.

Council of Agriculture (COA) (1996)
Basic Agricultural Statistics. Council of Agriculture, Executive Yuan, Taipei.

Dinerstein, E., Olson, D.M., Graham, D.J., Webster, A.L., Primm, S.A., Bookbinder, M.P., and Ledec, G. (1995)
A Conservation Assessment of the Terrestrial Ecoregions of Latin America and the Caribbean. Published in association with the World Wildlife Fund. The World Bank, Washington, DC.

European Commission (1995)
Europe's Environment: Statistical Compendium to the Dobris Assessment. Office for Official Publications of the European Communities.

Food and Agriculture Organization of the UN (FAO) (1995)
Forest Resources Assessment 1990; Global Synthesis. FAO Forestry Paper 124. FAO, Rome.

FAO (1997)
The State of the World's Forests 1997. FAO, Rome.

FAO (1997*b*)
The State of the World's Fisheries and Aquaculture 1996. FAO Fisheries Department, FAO, Rome.

FAOSTAT
FAO online statistical database.
Website: apps.fao.org/default.htm

Gaston, K.J. (ed.) **(1996)**
Biodiversity: A Biology of Numbers and Difference. Blackwell Science Ltd, Oxford.

Glynn, P.W. (1996)
Coral reef bleaching: facts, hypothesis and implications. *Global Change Biology*, Vol. 2, No. 6.

Goreau, T.J.
Coral Bleaching and Sea Surface Temperature.
Website: www.fas.harvard.edu/~goreau/bleaching.htm

Hannah, L., Lohse, D., Hutchinson, C., Carr, J.L., and Lankerani, L. (1994)
A preliminary inventory of human disturbance of world ecosystems. *Ambio*, Vol. 23, No. 4–5.

Hopley, D. (1997)
Coral Reefs and Global Climate Change. WWF International, Gland, Switzerland.

International Energy Agency (IEA) (1998)
CO_2 Emissions from Fuel Combustion 1971–1996. OECD/IEA, Paris.

IPCC (1995)
Climate Change 1994. Radiative Forcing of Climate Change and An Evaluation of Emission Scenarios. Houghton, J.T. *et al*. (eds) Cambridge University Press.

IUCN (1996)
1996 IUCN Red List of Threatened Animals. IUCN, Gland, Switzerland.
Website: www.wcmc.org.uk/species/animals/

IUCN (1997)
1997 IUCN Red List of Threatened Plants. IUCN, Gland, Switzerland.
Website: www.wcmc.org.uk/species/plants/red_list.htm

Kuusela, K. (1994)
Forest Resources in Europe, 1950-1990. European Forest Research Institute Research Report 1. Cambridge University Press.

Marland, G. and Boden, T.A. (1999)
Global, regional and national CO_2 emissions. *Trends: A Compendium of Data on Global Change.* Carbon Dioxide Information Analysis Centre, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
Website: cdiac.esd.ornl.gov/trends/trends.htm

May, R. (1998)
The Future of Wildlife in a Crowded World. Peter Scott Lecture, 1998.

Milanova, E.V. and Kushlin, A.V. (eds) **(1993)**
World Map of Present-Day Landscapes. An Explanatory Note. Prepared by Moscow State University and the United Nations Environment Programme.

MacKinnon, J. unpublished (1996)
Review of the Indomalayan Protected Areas. Asian Bureau for Conservation, UK.

van Oss, H.G. (n.d.)
USGS Minerals Information 1996. Cement. United States Geological Survey.
Website: minerals.usgs.gov/minerals/pubs/commodity/cement/

Singh, K.D. and Marzoli, A. (1995)
Deforestation Trends in the Tropics: a Time Series Analysis. Paper presented at WWF Conference on the Potential Impacts of Climate Change on Tropical Forests, Puerto Rico, April 1995.

United Nations Commodity Trade Statistics Database (COMTRADE)

United Nations Population Division (1998)
Annual Populations, 1950-2050 (The 1998 Revision). Dataset on diskette. United Nations, Department of Social and Economic Affairs, New York, USA.

USGS Amphibian Count Database
Online database.
Website: www.mp2-pwrc.usgs.gov/ampCV/ampdb.cfm

Vitousek, P. M. (1994)
Beyond global warming: ecology and global change. *Ecology*, 75(7), pp. 1861–1876.

White, F. (1983)
The Vegetation of Africa. UNESCO, Paris.

Wilkinson, C. (1998)
Status of Coral Reefs of the World: 1998. Global Coral Reef Monitoring Network/Australian Institute of Marine Science, Cape Ferguson, Queensland, and Dampier, Western Australia.

World Bank (1998)
World Bank Atlas 1998. The World Bank, Washington, DC.

World Conservation Monitoring Centre (WCMC) (1992)
Global Biodiversity: Status of the Earth's Living Resources. Chapman and Hall, London.

Worldwatch Institute (1997)
Vital Signs 1997–1998. Earthscan Publications Ltd, London.

Worldwatch Institute (1999)
State of the World 1999. W W Norton and Company, New York, USA.

LIVING PLANET INDEX tables

Table 1: WWF LIVING PLANET INDEX: 1970-1995

Year	1970	1975	1980	1985	1990	1995
Living Planet Index	100.0	95.9	89.2	84.5	75.5	69.3
upper confidence limit		112.8	102.3	100.3	87.5	80.7
lower confidence limit		81.5	77.8	71.3	65.1	59.5
Forest Index	100.0	97.8	95.5	93.2	90.9	89.6
Freshwater Index	100.0	98.1	86.6	83.6	66.6	55.4
upper confidence limit		114.7	102.9	101.7	76.9	66.5
lower confidence limit		83.8	72.8	68.7	57.6	46.1
Marine Index	100.0	91.8	85.4	76.8	69.0	62.9
upper confidence limit		108.8	94.4	88.7	80.3	71.1
lower confidence limit		77.6	77.2	66.5	59.3	55.6

Table 2: NATURAL FOREST COVER (million km^2)

Year	Original	Excluding plantations								Including plantations 1990	
		1960	1965	1970	1975	1980	1985	1990	1995	Intact	Fragments <500 km^2
Africa	13.76	5.91	5.72	5.53	5.32	5.11	4.90	4.69	4.52	3.86	0.88
Asia/Pacific	15.49	5.30	5.07	4.83	4.59	4.36	4.14	3.92	3.77	4.11	0.66
Latin America and the Caribbean	11.84	9.69	9.36	9.03	8.68	8.32	7.93	7.55	7.32	7.34	0.32
North America	9.60	6.70	6.70	6.70	6.70	6.70	6.69	6.67	6.73	6.52	0.44
Europe (excl. Russian Federation)	5.19	1.14	1.17	1.20	1.22	1.24	1.24	1.25	1.28	1.34	0.47
Russian Federation	12.05	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.62	0.53
Total	**67.92**	**36.72**	**36.01**	**35.29**	**34.50**	**33.71**	**32.89**	**32.07**	**31.61**	**30.13**	**3.97**

NOTE:
The figures given in Table 2 and in Figures 4 and 5 are based on higher resolution data than those in Table 3 overleaf, which were derived from forest cover data generalized to 1 kilometre resolution. Regional totals may therefore differ between the two data sets. Generalization of mapped data causes the size of some small patches to be exaggerated while the smallest patches may disappear completely from the analysis. Therefore, the discrepancies are likely to be greatest where forest cover is fragmented or otherwise discontinuous.

Table 3: NATIONAL AND REGIONAL DATA, 1996

	Population (millions)	Agricultural land (thousand km²)	Forest cover current (thousand km²)	Forest cover original (thousand km²)	Threatened plant species (number)	Threatened plant species (per cent)	GNP per person (thousand $/yr)	Grain-equivalent per person (kg/yr)	Fish per person (kg/yr)	Wood-equivalent per person (m³/yr)	CO_2 emissions per person (tonnes/yr)	Fertilizers per hectare agricultural land (kg/yr)	Cement per person (kg/yr)
World	**5 744.9**	**49 101**	**34 127**	**67 693**	**I.D.**	**I.D.**	**5.02**	**326**	**14.3**	**0.58**	**3.96**	**23.2**	**258**
AFRICA	**710.0**	**10 736**	**4 944**	**13 582**	**I.D.**	**I.D.**	**0.66**	**219**	**7.0**	**0.82**	**0.98**	**3.1**	**101**
Algeria	28.7	396	27	111	141	4.5	1.52	311	3.9	0.13	2.04	1.0	296
Angola	11.3	575	467	992	30	0.6	0.27	124	8.9	0.62	0.27	0.1	28
Benin	5.5	23	15	116	4	0.2	0.35	185	10.8	1.11	0.08	11.6	118
Botswana	1.5	259	103	198	7	0.3	I.D.	255	6.7	1.05	I.D.	0.1	I.D.
Burkina Faso	10.7	94	I.D.	251	I.D.	I.D.	0.23	258	1.5	0.98	I.D.	1.9	0
Burundi	6.3	22	3	14	I.D.	I.D.	0.17	65	3.6	0.76	I.D.	1.8	I.D.
Cameroon	13.5	90	265	448	89	1.1	0.61	146	8.7	1.26	0.09	2.5	49
Central African Rep.	3.4	50	184	623	1	0.0	0.31	158	4.2	1.02	I.D.	0.2	3
Chad	6.9	483	35	305	12	0.8	0.16	189	6.0	0.68	I.D.	0.1	I.D.
Congo	2.6	102	277	343	3	0.1	0.67	97	22.5	1.24	0.36	0.2	55
Congo, Dem. Rep. (Zaire)	46.8	229	1 507	2 266	78	0.7	0.13	49	6.1	1.07	0.10	0.3	0
Côte d'Ivoire	13.8	202	72	319	94	2.6	0.66	163	12.1	0.98	0.31	2.7	114
Egypt	63.5	33	1	6	82	3.9	1.08	347	6.6	0.10	1.48	354.6	319
Eritrea	3.3	75	1	18	I.D.	I.D.	I.D.	173	1.2	I.D.	I.D.	0.7	12
Ethiopia	56.8	320	56	383	163	2.5	0.10	198	0.1	0.89	0.05	4.8	11
Gabon	1.1	52	237	263	91	1.4	I.D.	210	36.0	I.D.	1.69	0.0	125
Gambia, The	1.1	4	5	11	1	0.1	1.28	191	17.6	1.07	I.D.	1.6	73
Ghana	18.2	129	57	239	103	2.8	0.36	118	19.4	1.44	0.24	0.7	130
Guinea	7.3	116	50	244	39	1.3	0.56	140	9.8	0.73	I.D.	0.2	20
Guinea-Bissau	1.1	14	7	32	I.D.	I.D.	0.25	244	5.4	0.51	I.D.	0.4	101
Kenya	27.9	258	30	101	240	3.7	0.32	184	5.7	1.48	0.22	4.4	32
Lesotho	2.0	23	1	21	21	1.3	0.66	263	4.3	0.36	I.D.	2.6	I.D.
Liberia	2.2	23	63	96	25	1.1	I.D.	121	4.4	2.15	I.D.	I.D.	7
Libya	5.1	154	1	13	57	3.1	I.D.	314	6.1	0.17	9.52	4.2	724
Madagascar	14.2	271	61	536	306	3.2	0.25	I.D.	7.3	0.69	I.D.	0.4	6
Malawi	9.8	35	39	94	61	1.6	0.18	207	6.7	0.94	I.D.	9.9	14
Mali	10.2	347	61	346	15	0.9	0.24	258	13.2	0.66	I.D.	0.6	2
Mauritania	2.4	398	0	1	3	0.3	0.47	228	16.2	0.01	I.D.	0.1	134
Mauritius	1.1	1	I.D.	I.D.	294	39.2	3.71	266	29.1	0.16	I.D.	158.0	535*
Morocco	26.4	307	19	97	186	5.1	1.29	365	8.4	0.13	0.98	8.1	235
Mozambique	18.0	472	216	772	89	1.6	0.08	114	1.8	1.03	0.13	0.2	4
Namibia	1.6	388	34	158	75	2.4	2.25	192	11.2	I.D.	I.D.	I.D.	I.D.
Niger	9.5	154	I.D.	114	I.D.	I.D.	0.20	297	0.6	0.64	I.D.	0.6	3
Nigeria	101.4	729	172	870	37	0.8	0.24	206	6.7	1.13	0.47	1.8	40
Rwanda	5.5	18	3	9	I.D.	I.D.	0.19	98	0.8	1.04	I.D.	0.1	2
Senegal	8.5	80	25	143	31	1.5	0.57	253	26.8	0.62	0.37	1.4	89
Sierra Leone	4.3	27	12	71	29	1.4	0.20	155	14.1	0.74	I.D.	0.7	49
Somalia	8.5	440	1	27	103	3.4	I.D.	100	1.1	1.10	I.D.	0.0	4
South Africa	38.1	973	104	399	2 215	9.5	3.52	324	10.4	0.54	8.32	6.7	250
Sudan	27.2	1 230	122	567	10	0.3	I.D.	236	1.7	0.59	0.16	0.7	18

* = see technical note, page 25 0 = negligible I.D. = insufficient data Totals may not add up due to rounding

	Population (millions)	Agricultural land (thousand km²)	Forest cover current (thousand km²)	Forest cover original (thousand km²)	Threatened plant species (number)	Threatened plant species (per cent)	GNP per person (thousand $/yr)	Grain-equivalent per person (kg/yr)	Fish per person (kg/yr)	Wood-equivalent per person (m³/yr)	CO_2 emissions per person (tonnes/yr)	Fertilizers per hectare agricultural land (kg/yr)	Cement per person (kg/yr)
Tanzania	30.7	390	161	651	436	4.4	0.17	179	11.2	1.24	0.07	0.9	26
Togo	4.2	26	3	57	4	0.2	0.30	178	12.3	0.60	I.D.	4.9	116
Tunisia	9.1	80	3	28	24	1.1	1.93	318	7.7	0.49	1.70	10.3	388
Uganda	19.5	86	39	179	15	0.3	0.30	118	9.6	0.84	I.D.	0.3	14
Zambia	8.4	353	248	661	12	0.3	0.36	220	8.2	1.74	0.25	1.0	42
Zimbabwe	11.0	204	155	389	100	2.3	0.61	218	2.2	0.71	1.61	6.7	140
MIDDLE EAST AND CENTRAL ASIA	**307.0**	**6 087**	**210**	**982**	**I.D.**	**I.D.**	**1.56**	**331**	**5.4**	**0.17**	**4.79**	**8.1**	**344**
Afghanistan	20.4	381	21	21	4	0.1	I.D.	198	I.D.	0.39	I.D.	1.3	6
Armenia	3.6	14	4	8	31	I.D.	0.63	253	1.1	I.D.	0.72	5.8	79
Azerbaijan	7.6	42	11	28	28	I.D.	0.48	242	4.7	0.01	4.13	8.1	30
Georgia	5.2	30	32	51	29	I.D.	0.85	286	1.1	I.D.	0.50	12.4	20
Iran	63.5	634	23	24	2	0.0	I.D.	279	5.3	0.14	4.17	17.7	257
Iraq	20.6	98	I.D.	I.D.	I.D.	I.D.	I.D.	175	1.1	0.01	3.46	34.7	103
Israel	5.7	6	I.D.	24	32	1.4	15.87	437	19.0	0.43	8.81	123.7	1 051*
Jordan	5.9	12	I.D.	12	9	0.4	1.65	246	2.9	0.07	2.20	13.3	565*
Kazakhstan	16.4	2 189	26	83	71	I.D.	1.35	642	3.5	0.05	8.69	0.5	204
Kuwait	1.7	1	I.D.	I.D.	I.D.	I.D.	I.D.	323	13.1	0.18	22.97	7.0	2 980*
Kyrgyzstan	4.6	104	8	7	34	I.D.	0.55	368	0.1	0.02	1.34	2.5	109
Lebanon	3.1	3	I.D.	8	5	0.2	2.97	277	0.7	0.38	4.46	142.9	1 450*
Oman	2.2	11	I.D.	54	30	2.5	I.D.	I.D.	I.D.	0.01	5.83	8.5	786*
Saudi Arabia	18.8	1 238	I.D.	47	7	0.3	I.D.	282	6.3	0.14	13.21	2.5	808
Syria	14.6	135	I.D.	34	8	0.3	1.16	345	0.9	0.03	2.77	22.0	300
Tajikistan	5.8	44	I.D.	I.D.	50	I.D.	0.34	241	0.6	0.00	1.02	14.4	9
Turkey	62.3	393	80	441	1 876	21.7	2.83	439	9.3	0.37	2.70	43.9	471
Turkmenistan	4.2	315	2	16	17	I.D.	0.94	321	8.0	0.00	7.52	4.1	110
United Arab Emirates	2.3	4	I.D.	3	I.D.	I.D.	I.D.	I.D.	26.3	0.38	36.69	87.7	2 647*
Uzbekistan	22.8	257	2	2	41	I.D.	1.01	337	1.0	0.00	4.46	17.7	217
Yemen	15.7	176	I.D.	120	149	9.0	0.38	201	5.6	0.03	0.53	0.6	101
ASIA/PACIFIC	**3 222.3**	**14 774**	**4 423**	**14 475**	**I.D.**	**I.D.**	**2.71**	**282**	**16.1**	**0.41**	**2.18**	**41.6**	**270**
Australia	18.1	4 647	367	762	2 245	14.4	20.09	525	19.1	1.03	16.70	3.6	362
Bangladesh	120.6	94	14	135	24	0.5	0.26	201	9.3	0.27	0.17	119.7	27
Bhutan	1.9	4	26	32	23	0.4	0.39	I.D.	I.D.	0.85	I.D.	0.2	84
Cambodia	10.2	53	116	177	5	I.D.	0.30	255	8.7	0.79	I.D.	2.3	38
China	1 232.5	5 351	596	4 733	312	1.0	0.75	363	19.0	0.28	2.55	63.5	388
Hong Kong	6.4	0	0	1	9	0.5	24.29	460	46.0	0.85	5.95	I.D.	942*
India	950.0	1 810	543	2 330	1 236	7.7	0.38	202	3.8	0.32	0.91	73.4	79
Indonesia	200.4	428	1 027	1 879	264	0.9	1.08	262	15.2	0.92	1.19	54.1	133
Japan	125.8	50	114	335	707	12.7	40.94	316	70.8	0.86	9.36	224.5	655
Korea, D.P.R.	22.6	21	40	117	4	0.1	I.D.	239	44.5	0.20	3.55	82.9	752
Korea, Rep.	45.3	20	14	88	66	2.3	10.61	350	50.2	0.50	9.02	326.5	1 295
Laos	4.9	17	130	229	2	I.D.	0.40	272	6.4	0.99	I.D.	3.6	50
Malaysia	20.5	79	157	329	490	3.2	4.37	286	53.6	1.64	5.13	63.4	850
Mongolia	2.5	1 185	26	312	0	0.0	0.36	421	0.1	0.31	I.D.	0.0	43

	Population (millions)	Agricultural land (thousand km²)	Forest cover current (thousand km²)	Forest cover original (thousand km²)	Threatened plant species (number)	Threatened plant species (per cent)	GNP per person (thousand $/yr)	Grain-equivalent per person (kg/yr)	Fish per person (kg/yr)	Wood-equivalent per person (m³/yr)	CO_2 emissions per person (tonnes/yr)	Fertilizers per hectare agricultural land (kg/yr)	Cement per person (kg/yr)
Myanmar	43.4	105	460	658	32	0.5	I.D.	273	16.5	0.51	0.16	15.5	27
Nepal	21.8	47	75	120	20	0.3	0.21	266	0.8	0.96	0.08	21.2	23
New Zealand	3.7	168	39	228	211	8.9	15.72	496	23.0	1.55	8.71	31.3	250
Pakistan	140.1	266	22	349	14	0.3	0.48	199	2.3	0.22	0.64	90.4	63
Papua New Guinea	4.4	6	357	438	92	0.8	1.15	I.D.	26.2	1.30	I.D.	17.5	24
Philippines	69.9	108	63	292	360	4.0	1.16	223	32.4	0.62	0.94	53.1	208
Singapore	3.4	0	I.D.	I.D.	29	1.3	30.55	I.D.	I.D.	0.84	19.34	I.D.	2 566*
Sri Lanka	18.1	23	17	61	455	13.7	0.74	166	15.4	0.59	0.43	62.6	87
Taiwan	21.5	9	5	31	325	9.1	12.87	353	45.5	0.40	8.11	I.D.	1 059
Thailand	59.2	212	170	514	385	3.3	2.96	224	25.7	0.74	2.96	59.6	528
Viet Nam	75.2	71	45	325	341	3.2	0.29	280	12.6	0.47	0.52	196.0	102
LATIN AMERICA AND THE CARIBBEAN	**483.8**	**7 515**	**7 264**	**11 395**	**I.D.**	**I.D.**	**3.72**	**331**	**8.0**	**0.77**	**2.44**	**9.3**	**188**
Argentina	35.2	1 692	229	257	247	2.6	8.38	547	7.9	0.37	3.75	4.7	143
Bolivia	7.6	288	686	749	227	1.3	0.83	278	1.6	0.27	0.99	0.3	133
Brazil	161.5	2 505	3 061	5 277	1 358	2.4	4.40	383	5.8	1.28	1.77	11.6	216
Chile	14.4	167	142	335	329	6.2	4.86	320	17.0	1.00	3.33	22.1	292
Colombia	39.3	445	537	963	712	1.4	2.14	218	4.3	0.56	1.63	9.2	174
Costa Rica	3.7	29	15	51	527	4.3	2.64	254	6.0	1.57	1.23	9.6	272
Cuba	11.0	67	31	106	888	13.6	I.D.	169	11.3	0.29	2.82	20.3	124
Dominican Rep.	8.0	40	12	48	136	2.4	1.60	221	11.9	0.19	1.42	18.8	183
Ecuador	11.7	81	135	217	824	4.3	1.50	248	7.7	0.97	1.72	10.7	235
El Salvador	5.8	14	1	21	42	1.4	1.70	219	3.0	0.83	0.75	55.4	171
Guatemala	10.2	45	48	107	355	4.1	1.47	178	0.9	1.36	0.58	31.5	139
Haiti	7.7	14	1	27	100	1.9	0.31	144	3.7	0.85	0.14	2.8	37
Honduras	5.8	36	55	113	96	1.7	0.66	169	0.8	1.20	0.61	17.9	165
Jamaica	2.5	5	4	11	744	22.5	1.60	208	21.6	0.26	3.92	27.8	234
Mexico	92.7	1 068	673	1 072	1 593	6.1	3.67	372	9.4	0.27	3.69	11.5	179
Nicaragua	4.6	76	57	120	98	1.3	0.38	184	1.4	0.85	0.60	4.9	86
Panama	2.7	21	39	74	1 302	13.1	3.08	276	16.8	0.51	1.70	16.9	137
Paraguay	5.0	240	139	175	129	1.6	1.85	I.D.	3.6	2.00	0.64	0.8	124
Peru	23.9	313	853	996	906	5.0	2.24	157	19.3	0.35	1.07	5.3	173
Puerto Rico	3.7	3	2	9	223	8.9	I.D.	I.D.	I.D.	I.D.	I.D.	I.D.	I.D.
Trinidad and Tobago	1.3	1	1	5	21	0.9	3.87	I.D.	9.5	0.22	13.24	52.6	225*
Uruguay	3.2	148	I.D.	I.D.	15	0.7	5.76	577	7.7	1.22	1.80	7.8	261
Venezuela	22.3	217	544	662	426	2.0	3.02	310	14.8	0.13	5.92	10.4	199
NORTH AMERICA	**299.4**	**4 896**	**6 927**	**9 570**	**I.D.**	**I.D.**	**26.73**	**685**	**21.7**	**1.95**	**19.10**	**36.2**	**332**
Canada	29.9	734	4 017	4 796	278	8.5	19.02	488	22.5	1.93	15.68	32.3	211
United States of America	269.4	4 162	2 911	4 775	4 669	24.0	28.02	707	21.6	1.95	19.76	36.8	350
WESTERN EUROPE	**384.5**	**1 464**	**1 213**	**3 288**	**I.D.**	**I.D.**	**23.24**	**467**	**24.2**	**0.77**	**8.69**	**93.9**	**457**
Austria	8.1	35	36	78	23	0.7	28.11	518	12.3	1.32	7.78	47.3	640
Belgium/Luxembourg	10.5	14	8	32	2	0.1	27.32	504	21.1	0.99	12.71	153.4	537
Denmark	5.2	26	4	43	2	0.1	32.10	691	23.1	1.32	13.80	128.8	412

* = see technical note, page 25

	Population (millions)	Agricultural land (thousand km²)	Forest cover current (thousand km²)	Forest cover original (thousand km²)	Threatened plant species (number)	Threatened plant species (per cent)	GNP per person (thousand $/yr)	Grain-equivalent per person (kg/yr)	Fish per person (kg/yr)	Wood-equivalent per person (m³/yr)	CO_2 emissions per person (tonnes/yr)	Fertilizers per hectare agricultural land (kg/yr)	Cement per person (kg/yr)
Finland	5.1	26	253	302	6	0.5	23.24	421	34.5	2.30	12.53	98.2	231
France	58.3	301	108	536	195	4.2	26.27	501	28.0	0.86	6.60	118.9	340
Germany	81.9	173	104	349	14	0.5	28.87	465	15.6	0.67	11.04	125.4	550
Greece	10.5	92	45	130	571	11.4	11.46	477	25.5	0.35	7.37	54.7	465
Ireland	3.6	44	5	60	1	0.1	17.11	509	20.1	0.93	10.04	118.4	465
Italy	57.4	153	68	289	311	5.6	19.88	479	23.0	0.65	7.32	92.8	587
Netherlands	15.5	20	2	24	1	0.1	25.94	454	14.6	0.63	11.99	219.2	358
Norway	4.4	11	120	160	12	0.7	34.51	372	68.7	1.38	7.23	123.1	401
Portugal	9.9	38	27	88	269	5.3	10.16	426	58.4	0.40	4.98	59.2	832
Spain	39.6	308	143	492	985	19.5	14.35	487	37.2	0.59	5.95	55.6	570
Sweden	8.8	34	294	403	13	0.7	25.71	413	30.8	1.97	6.72	73.8	168
Switzerland	7.2	16	13	33	30	1.0	44.35	393	16.0	0.82	5.96	52.2	634
United Kingdom	58.4	172	23	204	18	1.1	19.60	409	20.1	0.70	9.97	100.8	211
CENTRAL AND EASTERN EUROPE	**342.8**	**3 474**	**8 676**	**13 782**	**I.D.**	**I.D.**	**2.38**	**462**	**12.2**	**0.48**	**8.39**	**17.0**	**191**
Albania	3.2	11	11	28	79	2.6	0.82	357	1.2	0.14	0.56	6.2	214
Belarus	10.4	94	63	199	1	I.D.	2.07	542	1.3	1.43	5.93	34.8	142
Bosnia and Herzegovina	3.4	19	23	52	64	I.D.	I.D.	289	2.0	0.01	1.36	7.0	92
Bulgaria	8.4	62	38	108	106	3.0	1.19	453	2.5	0.40	6.51	26.6	190
Croatia	4.5	25	12	55	6	I.D.	3.80	244	3.4	0.51	3.34	54.4	440
Czech Rep.	10.3	42	25	79	81[1]	3.1	4.74	578	5.0	0.74	11.59	74.0	381
Estonia	1.5	15	15	42	2	I.D.	3.08	470	36.2	0.68	13.38	13.2	273
Hungary	10.2	62	7	70	30	1.4	4.34	595	4.4	0.46	5.80	63.9	276
Latvia	2.5	25	16	64	I.D.	I.D.	2.30	437	37.5	2.27	3.71	29.7	77
Lithuania	3.7	35	15	65	1	I.D.	2.28	497	33.4	0.94	4.00	32.0	96
Macedonia	2.0	13	11	25	I.D.	I.D.	0.99	343	3.5	0.43	5.70	24.7	282
Moldova	4.4	26	1	17	5	I.D.	0.59	304	1.1	0.12	2.69	39.2	13
Poland	38.7	185	89	311	27	1.1	3.23	510	16.4	0.54	9.45	68.3	271
Romania	22.6	148	81	196	99	2.9	1.60	439	1.9	0.53	5.44	27.9	187
Russian Federation	147.9	2 203	8 131	12 025	214	I.D.	2.41	459	17.2	0.45	10.26	6.6	185
Slovakia	5.4	24	23	49	I.D.	I.D.	3.41	458	0.5	0.71	7.34	38.0	202
Slovenia	2.0	8	7	20	13	I.D.	9.24	539	5.7	0.99	7.14	60.4	480
Ukraine	51.3	417	70	277	52	I.D.	1.20	396	9.7	0.22	7.57	17.5	95
Yugoslavia	10.6	62	37	102	155	2.9	I.D.	632	0.7	0.18	4.46	34.2	203
NON-OECD	**4 658.7**	**35 949**	**24 108**	**50 831**	**I.D.**	**I.D.**	**1.09**	**284**	**11.3**	**0.48**	**2.19**	**20.4**	**212**
AFRICA	710.0	10 736	4 944	13 582	I.D.	I.D.	0.61	219	7.0	0.81	0.97	3.0	98
ME&CA	244.7	5 693	130	541	I.D.	I.D.	0.81	302	3.9	0.11	4.96	5.6	312
ASIA/PACIFIC	3 029.3	9 889	3 888	13 061	I.D.	I.D.	0.82	277	13.3	0.38	1.69	58.1	238
LA&C	391.1	6 447	6 591	10 324	I.D.	I.D.	3.59	318	7.6	0.88	2.15	8.9	189
EUROPE	283.6	3 185	8 555	13 323	I.D.	I.D.	2.00	447	12.1	0.46	8.24	12.3	170
OECD	**1 091.0**	**12 996**	**9 549**	**16 244**	**I.D.**	**I.D.**	**21.75**	**499**	**27.1**	**1.02**	**11.11**	**31.1**	**447**
ASIA/PACIFIC	193.0	4 886	535	1 414	I.D.	I.D.	31.39	346	60.2	0.81	9.96	8.2	770
NORTH AMERICA	392.1	5 964	7 600	10 642	I.D.	I.D.	21.28	611	18.8	1.55	15.65	31.7	299
EUROPE	506.0	2 147	1 414	4 188	I.D.	I.D.	18.44	471	21.0	0.70	8.02	81.3	439

[1] data for former Czechoslovakia

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Map 11:
COUNTRIES AND TERRITORIES IN THE *LIVING PLANET REPORT*

- AFRICA
- MIDDLE EAST AND CENTRAL ASIA
- ASIA/PACIFIC
- LATIN AMERICA AND THE CARIBBEAN
- NORTH AMERICA
- WESTERN EUROPE
- CENTRAL AND EASTERN EUROPE

WWF aims to conserve nature and ecological processes by:

■

preserving genetic, species, and ecosystem diversity

■

ensuring that the use of renewable natural resources is sustainable both now and in the longer term, for the benefit of all life on Earth

■

promoting actions to reduce to a minimum pollution and the wasteful exploitation and consumption of resources and energy.

WWF–World Wide Fund For Nature is the world's largest and most experienced independent conservation organization. It has 4.7 million regular supporters and a global network active in 96 countries.

WWF is known as the World Wildlife Fund in Canada and the United States of America.

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