LIVING PLANET REPORT 1998

Overconsumption is driving the rapid decline of the world's natural environments

CONTENTS

AUTHORS

Jonathan Loh[1]
Jørgen Randers[1]
Alex MacGillivray[2]
Val Kapos[3]
Brian Groombridge[3]
Martin Jenkins[3]

1. WWF INTERNATIONAL
AVENUE DU MONT-BLANC
CH-1196 GLAND
SWITZERLAND
Tel: +41 22 364 91 11
Fax: +41 22 364 53 58
E-mail: infobox@wwfnet.org
Website: www.panda.org

2. NEW ECONOMICS FOUNDATION
1st FLOOR VINE COURT
112-116 WHITECHAPEL ROAD
LONDON E1 1JE
UK
Tel: +44 171 377 56 96
Fax: +44 171 377 57 20
E-mail: info@neweconomics.org
Website: www.neweconomics.org

3. WORLD CONSERVATION MONITORING CENTRE
219 HUNTINGTON ROAD
CAMBRIDGE CB3 0DL
UK
Tel: +44 123 377 27 73 14
Fax: +44 1223 27 71 36
E-mail: info@wcmc.org.uk
Website: www.wcmc.org.uk

EXECUTIVE SUMMARY

WWF's mission is to conserve nature and ecological processes. The *Living Planet Report* seeks to present a quantitative picture of the state of the world's natural environment and the human pressures upon it. Specifically, it presents WWF's Living Planet Index (LPI), a measure of the change in the health of the world's natural ecosystems since 1970, focusing on the Earth's forest, freshwater, and marine biomes as these contain most of the world's biodiversity.

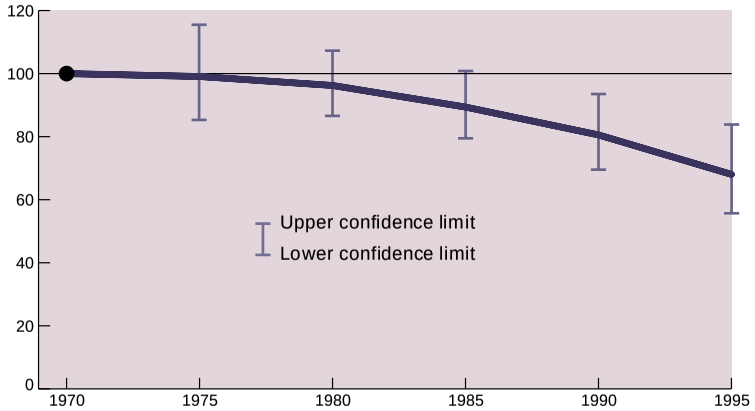
The report also analyses global consumption patterns to calculate Global Consumption Pressure – a measure of the burden placed on the natural environment by humanity. People put pressure on forest, freshwater, and marine ecosystems through the production and consumption of resources such as grain, fish, wood, and freshwater, and the emission of pollutants such as carbon dioxide (CO_2).

The LPI has declined by about 30 per cent relative to its reference point in 1970, which can be interpreted as meaning that the world has lost nearly a third of its natural wealth in that time. Global Consumption Pressure is growing rapidly – at about 5 per cent per year – and is likely to exceed globally sustainable levels, at least for fish consumption, meat consumption, and CO_2 emissions, if indeed they have not been exceeded already. Global Consumption Pressure is very unevenly distributed: on average, consumers in the industrialized world exert two-and-a-half times as much pressure on the natural environment as their counterparts in the developing world.

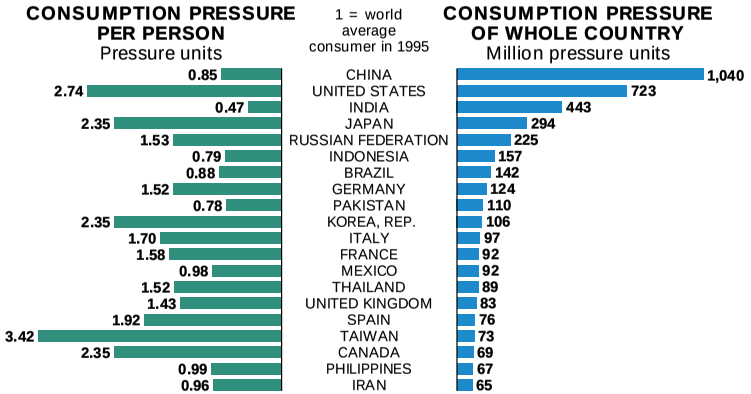
WWF is particularly worried about the significant loss of biodiversity implied by the decline in the LPI and the increasing environmental degradation implied by the growth in consumption pressure, and believes that it is important to try to reverse these negative trends. Recommendations on how governments, businesses, and consumers can respond to these trends, included in the sections on consumption in this report, are based on WWF policies and aim to slow down and eventually halt the degradation of the world's natural environments.

The *Living Planet Report* has drawn only on recent, consistent, and updateable datasets. WWF and its collaborators, the World Conservation Monitoring Centre and the New Economics Foundation, are committed to tracking environmental trends, and to improving the report's indices.

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



CONSUMPTION PRESSURE
A measure of the burden placed on the environment by people, 1995



THE LIVING PLANET INDEX

THE Living Planet Index (LPI) is a measure of the health of global ecosystems and biodiversity, based on data showing the average change over time in the state of forest, freshwater, and marine ecosystems. It is an attempt to quantify the extent and severity of biodiversity loss.

Change in the area of natural forest cover, calculated as total forest cover less plantations, is used as a measure of the state of forest ecosystems. The state of freshwater and marine ecosystems is indicated by changes in populations of selected freshwater and marine vertebrate species.

Figure 1 shows that the LPI fell by over 30 per cent between 1970 and 1995 and that the average rate of decline between 1990 and 1995 was about 3 per cent per year. This can be interpreted as meaning that 30 per cent of the Earth's natural wealth was lost during this period.

The forest index went down by about 10 per cent from 1970 to 1995. But forest area is not necessarily proportional to forest biodiversity, and the relatively slow decline of the index masks a loss of ecological quality, particularly in temperate forests.

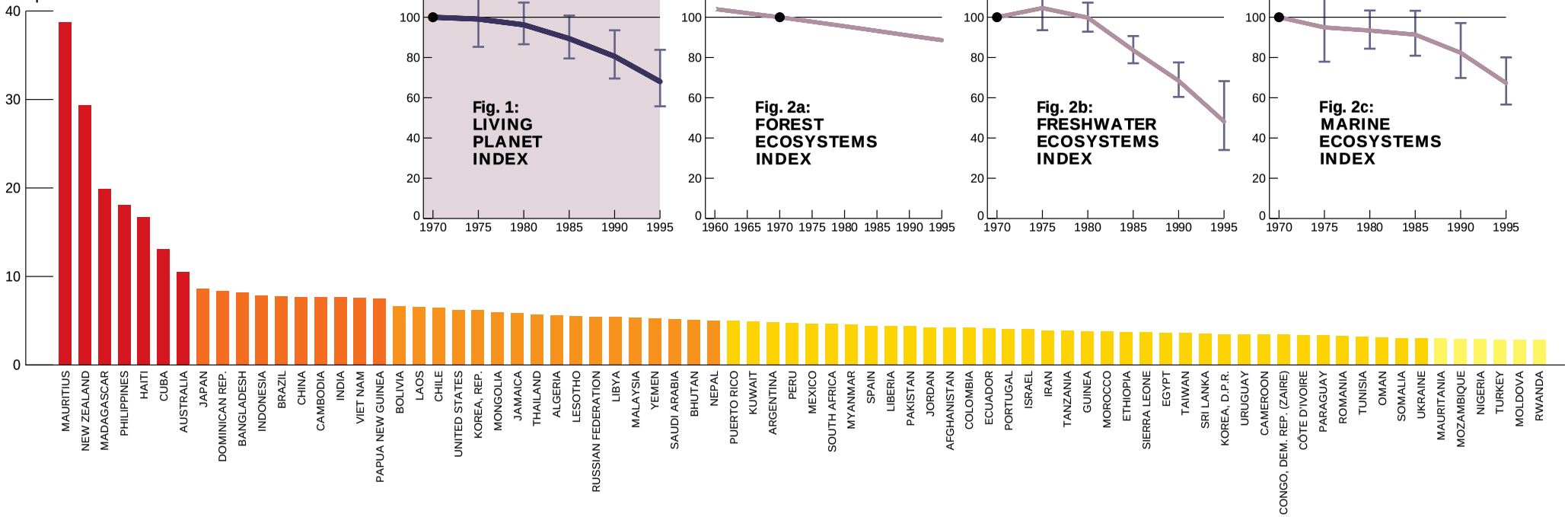
The freshwater ecosystems index dropped by 50 per cent over the same 25-year period. Between 1990 and 1995 the average rate of decline was almost 6 per cent per year.

The marine ecosystems index fell by about 30 per cent, with an average rate of decrease between 1990 and 1995 of nearly 4 per cent per year.

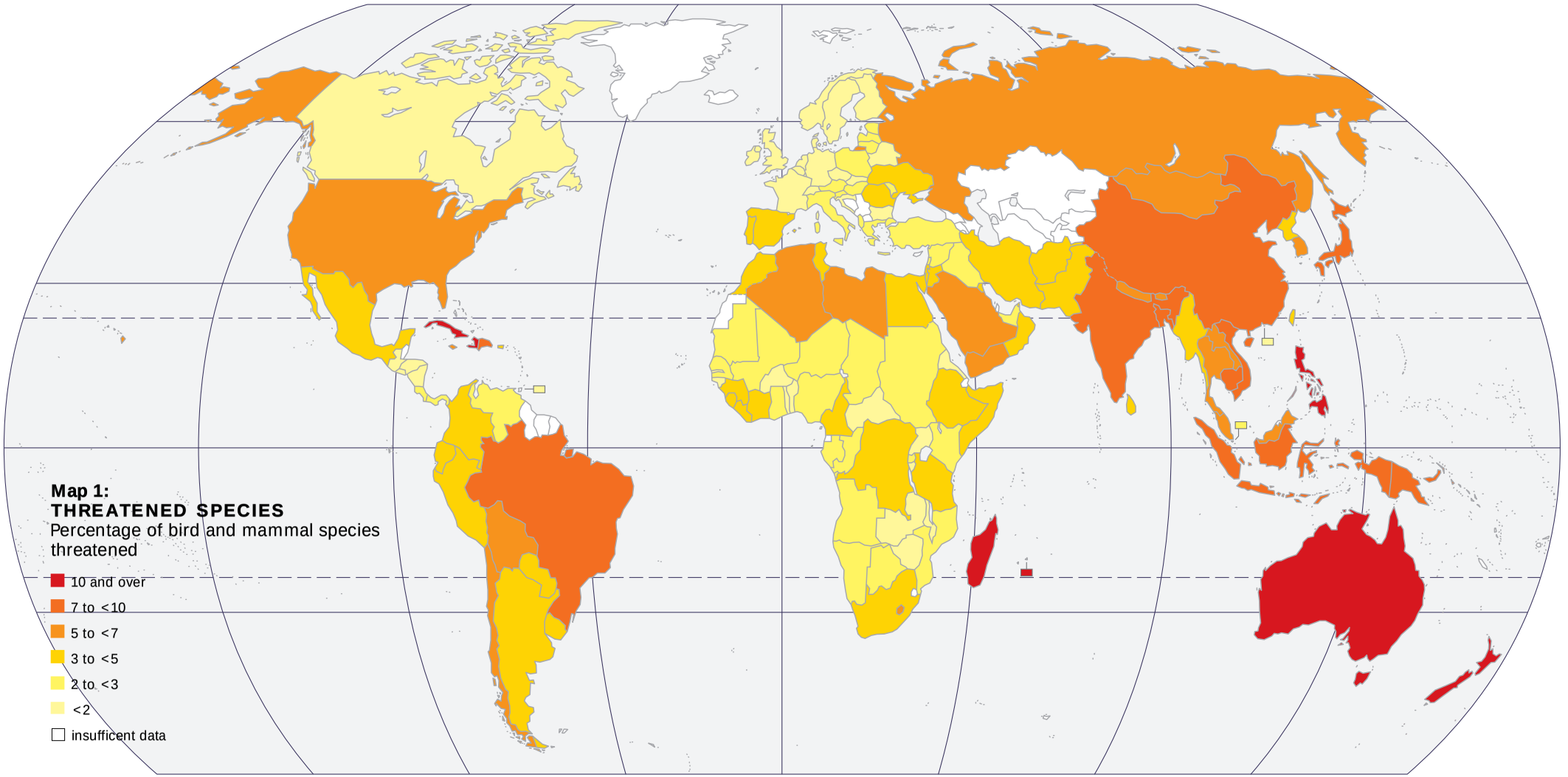
The freshwater and marine indices can be thought of as measuring the change in the population of a typical marine or freshwater species, starting with 100 individuals in 1970. The samples of species used in both indices include all those for which time-series population data could be found – 70 freshwater and 87 marine species. Fish and amphibian species are under-represented compared with birds, mammals, and reptiles, as are tropical species compared with temperate ones. (Further detail of the construction of the indices is discussed on pages 6-11.)

To supplement the LPI's perspective on the state of natural ecosystems at a global level, Map 1 and Figure 3 show a measure of the current state of biodiversity at a national level, based on the percentage of each country's bird and mammal species that are classified as vulnerable, endangered or critically endangered in the *1996 IUCN Red List of Threatened Animals*.

Fig. 3:
THREATENED SPECIES
Percentage of bird and mammal species threatened



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



KENYA
NAMIBIA
ANGOLA
LATVIA
GREECE
LITHUANIA
CHAD
POLAND
GHANA
HUNGARY
SINGAPORE
MALI
LEBANON
IRAQ
NIGER
GABON
VENEZUELA
SYRIA
COSTA RICA
BOTSWANA
SLOVENIA
UNITED ARAB EMIRATES
CONGO
ESTONIA
ITALY
PANAMA
SENEGAL
AUSTRIA
ALBANIA
SUDAN
FINLAND
FRANCE
GERMANY
UGANDA
BULGARIA
MALAWI
BELARUS
ZAMBIA
BURUNDI
CROATIA
ZIMBABWE
NORWAY
CANADA
SWEDEN
CZECH REP.
SLOVAKIA
GUINEA-BISSAU
BENIN
TOGO
HONDURAS
BELGIUM/LUXEMBOURG
BURKINA FASO
NETHERLANDS
CENTRAL AFRICAN REP.
NICARAGUA
GUATEMALA
SWITZERLAND
ERITREA
DENMARK
TRINIDAD AND TOBAGO
GAMBIA, THE
UNITED KINGDOM
IRELAND
EL SALVADOR
HONG KONG
ARMENIA
AZERBAIJAN
BOSNIA AND HERZEGOVINA
GEORGIA
KAZAKHSTAN
KYRGYZSTAN
MACEDONIA
TAJIKISTAN
TURKMENISTAN
UZBEKISTAN
YUGOSLAVIA

GLOBAL CONSUMPTION PRESSURE

CONSUMPTION Pressure is a measure of national and individual pressures on natural ecosystems, based on resource consumption and pollution data from 152 countries in 1995. It is an attempt to quantify the burden placed on the global environment by the inhabitants of these countries.

There are six components to Global Consumption Pressure: grain, marine fish, and wood consumption; freshwater withdrawals; carbon dioxide emissions, as a proxy for fossil fuel consumption; and cement consumption, as a proxy for land consumption. Importantly, consistent, recent, and updateable information is available for each of these components for most countries. The production and consumption of these resources are closely related to the degradation of the planet's natural ecosystems.

For each of the six components, a country's total consumption – calculated as its production of the resource in question plus imports minus exports – is divided by its population to provide the average consumption per person for that country. The results of these calculations are shown on pages 12-23. Figures 4 and 5 show total and per person Consumption Pressure, based on all six components combined, for selected countries and regions. Figure 6 shows Consumption Pressure per person for all 152 countries and Map 2 shows the geographical distribution of Global Consumption Pressure – the distribution of consumption pressure within countries is based only on the distribution of its population.

Each of the six components has been given equal weighting in calculating Consumption Pressure. It would, of course, be possible to obtain different results by applying different weightings to different components, but the method used here is the simplest. More details on the calculations are given on page 24.

Fig. 4:
CONSUMPTION PRESSURE
A measure of the burden placed on the environment by people, 1995

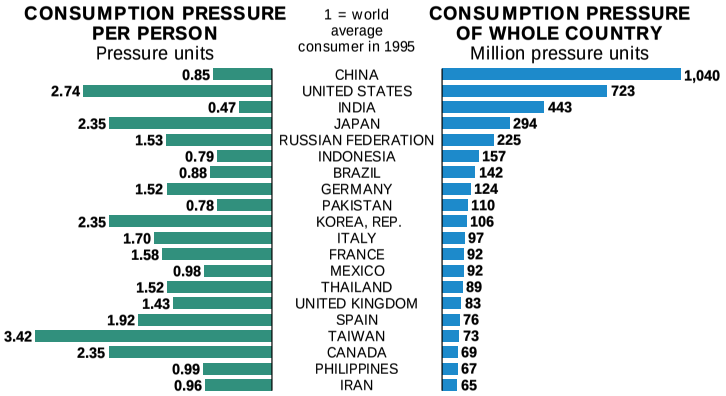


Fig. 5:
CONSUMPTION PRESSURE BY REGION
Pressure units per person per year, 1995
(1 = world average consumer in 1995)

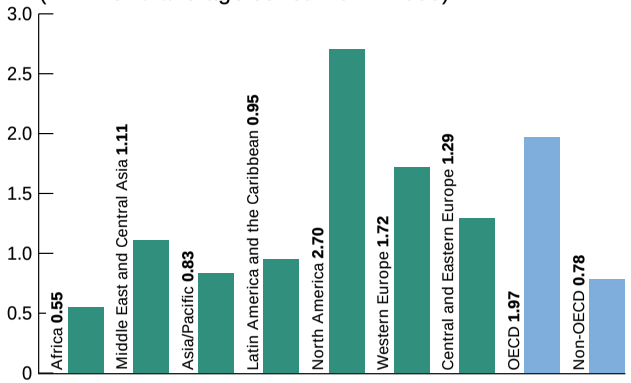
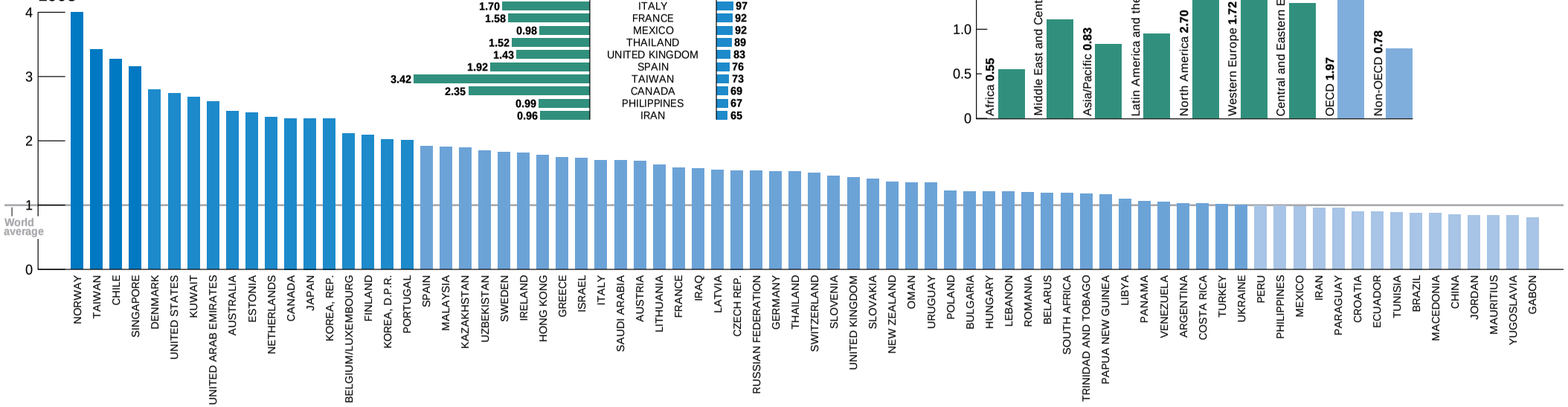
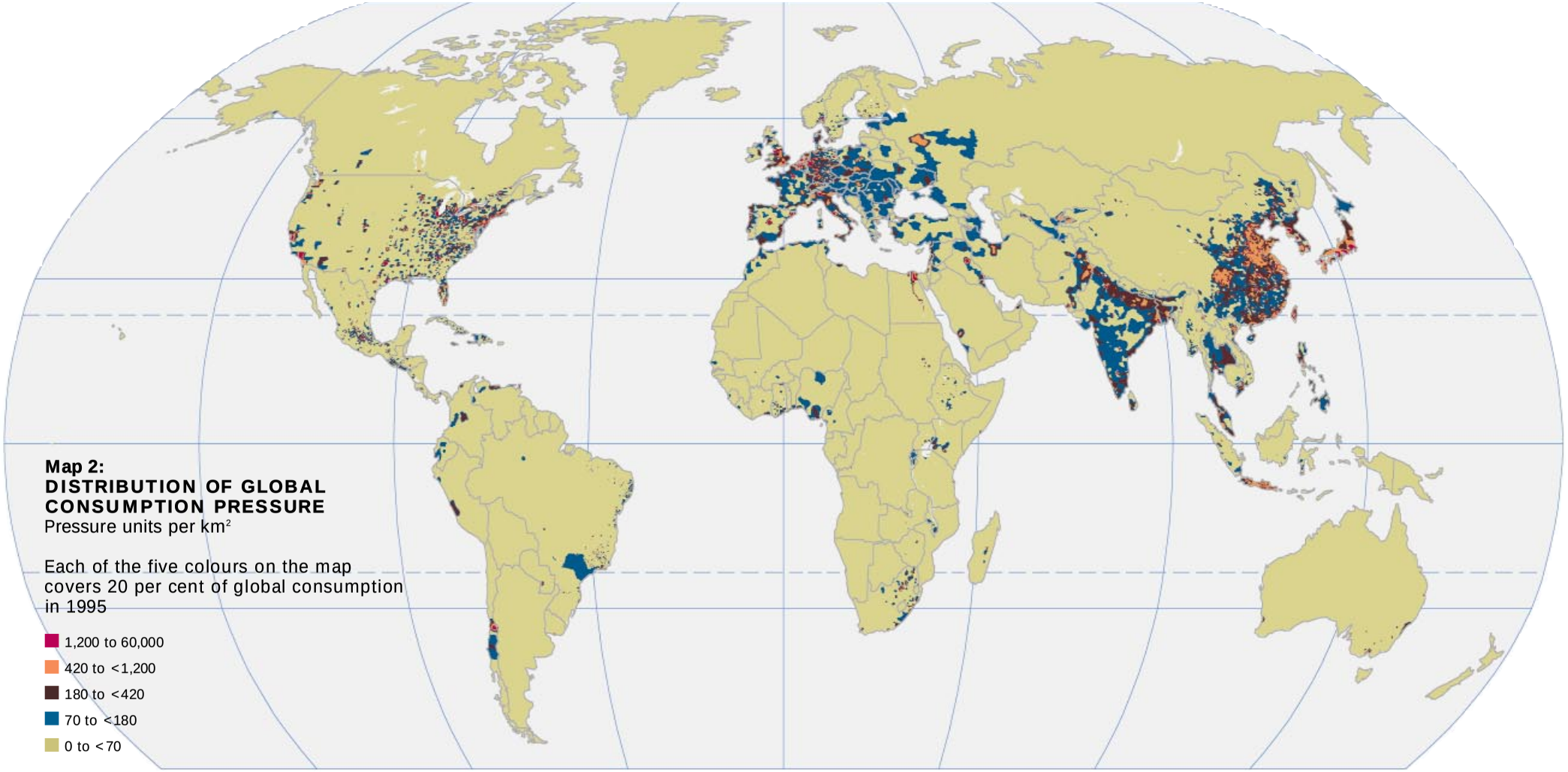
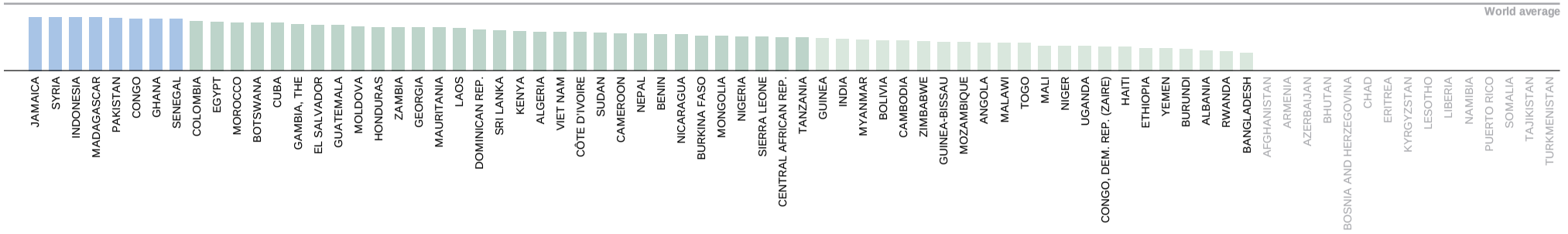


Fig. 6:
CONSUMPTION PRESSURE BY COUNTRY
Pressure units per person per year, 1995




Map 2:
DISTRIBUTION OF GLOBAL CONSUMPTION PRESSURE
Pressure units per km²
Each of the five colours on the map covers 20 per cent of global consumption in 1995
1,200 to 60,000
420 to <1,200
180 to <420
70 to <180
0 to <70


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

FOREST ECOSYSTEMS

THE world's forest cover, not counting plantations, decreased by 13 per cent between 1960 and 1990, from 37 million km² to 32 million km². This is equivalent to an average annual loss of about 160,000km² – an area half the size of Norway – or 0.5 per cent per year. Figure 7 shows that most of this has occurred in tropical regions. For example, satellite images of the Brazilian Amazon show that forest cover has been lost at an average annual rate of about 19,000km² over the last 20 years: the total accumulated deforestation up to 1996 was equivalent to the loss of an area slightly larger than Spain out of an original forest area about the size of Western Europe. Although temperate and boreal forest area has remained more or less constant since the 1960s, the flat lines on the graph conceal a decline in quality, as much of it is secondary or semi-natural rather than old-growth forest.

In addition, Table 2 (page 36) shows that much current forest is fragmented into areas too small to support the full complement of species that would live in an undisturbed natural forest. Furthermore, plantations, which make up large tracts of current forest area, neither support the same levels of biodiversity nor perform the same ecological functions as old-growth forest.

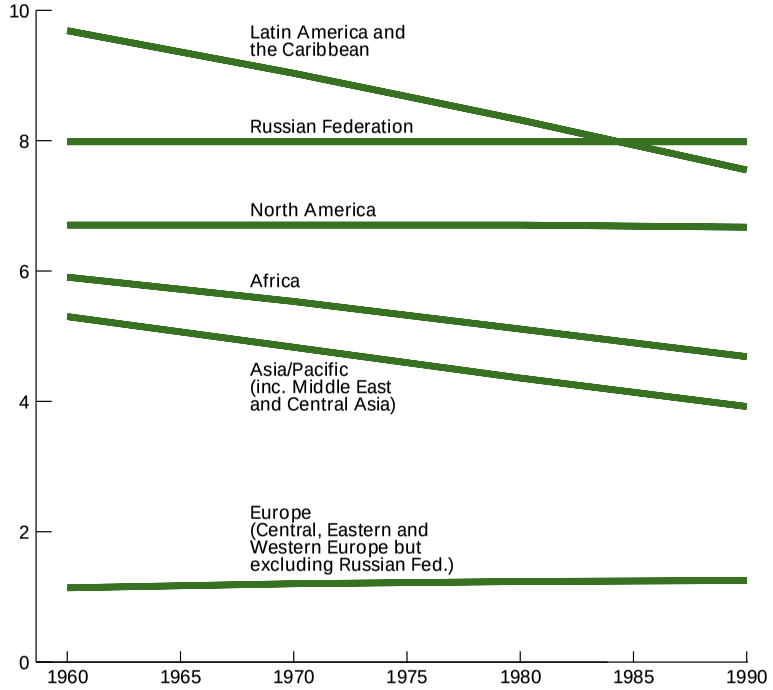
Original forest cover

Half of the world's original forest has gone. Original forest cover is an estimate of the likely area of forest under current climatic conditions without human interference. This would be close to the maximal area of forest some time after the last ice age, around 6,000-8,000 years ago. Since then forests have been cleared to make room for agriculture and other human activities.

It is apparent from Figure 9 and Map 3 that, historically, temperate forests have fared at least as badly as tropical forests which are currently disappearing fastest. The percentages of four forest types lost are: over 60 per cent of temperate broadleaf and mixed forest; around 30 per cent of needleleaf forest; about 45 per cent of tropical moist forest; and approximately 70 per cent of tropical dry forest.

The greatest reduction has been in Asia, where about 70 per cent of the original forest cover has gone. Today, largely intact tracts of undisturbed forest remain only in the Russian Federation, Canada, and the Amazon and Congo basins.

Fig. 7:
NATURAL FOREST COVER
Million square kilometres, 1960–1990



ORIGINAL AND CURRENT FOREST COVER:
Fig. 8: BY REGION
Million square kilometres

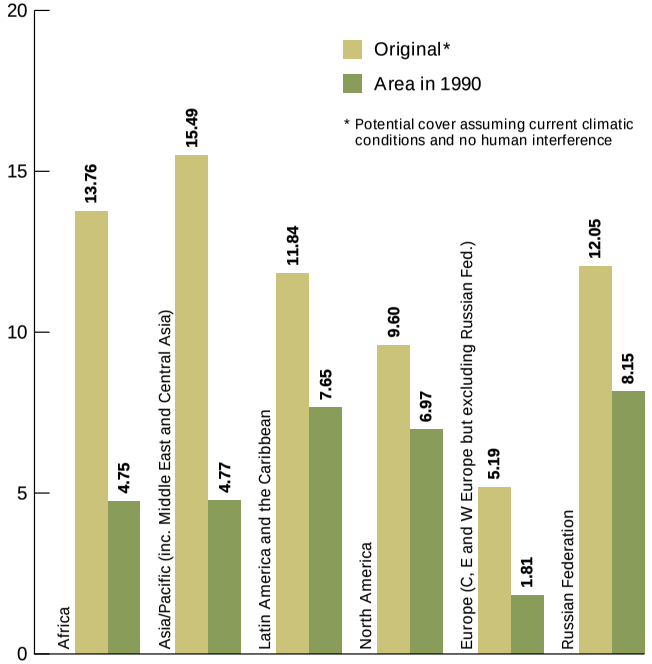
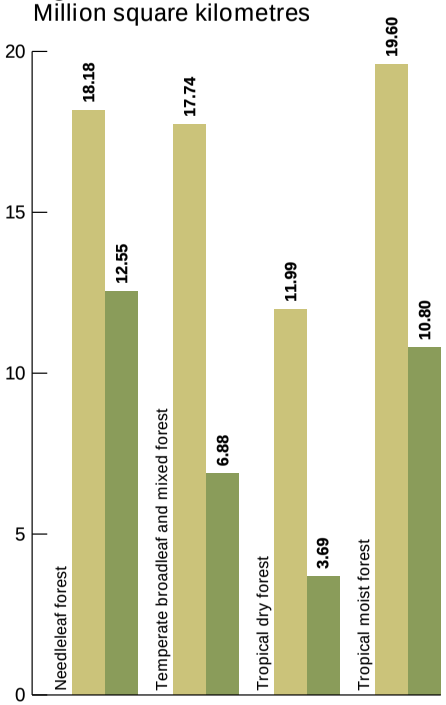
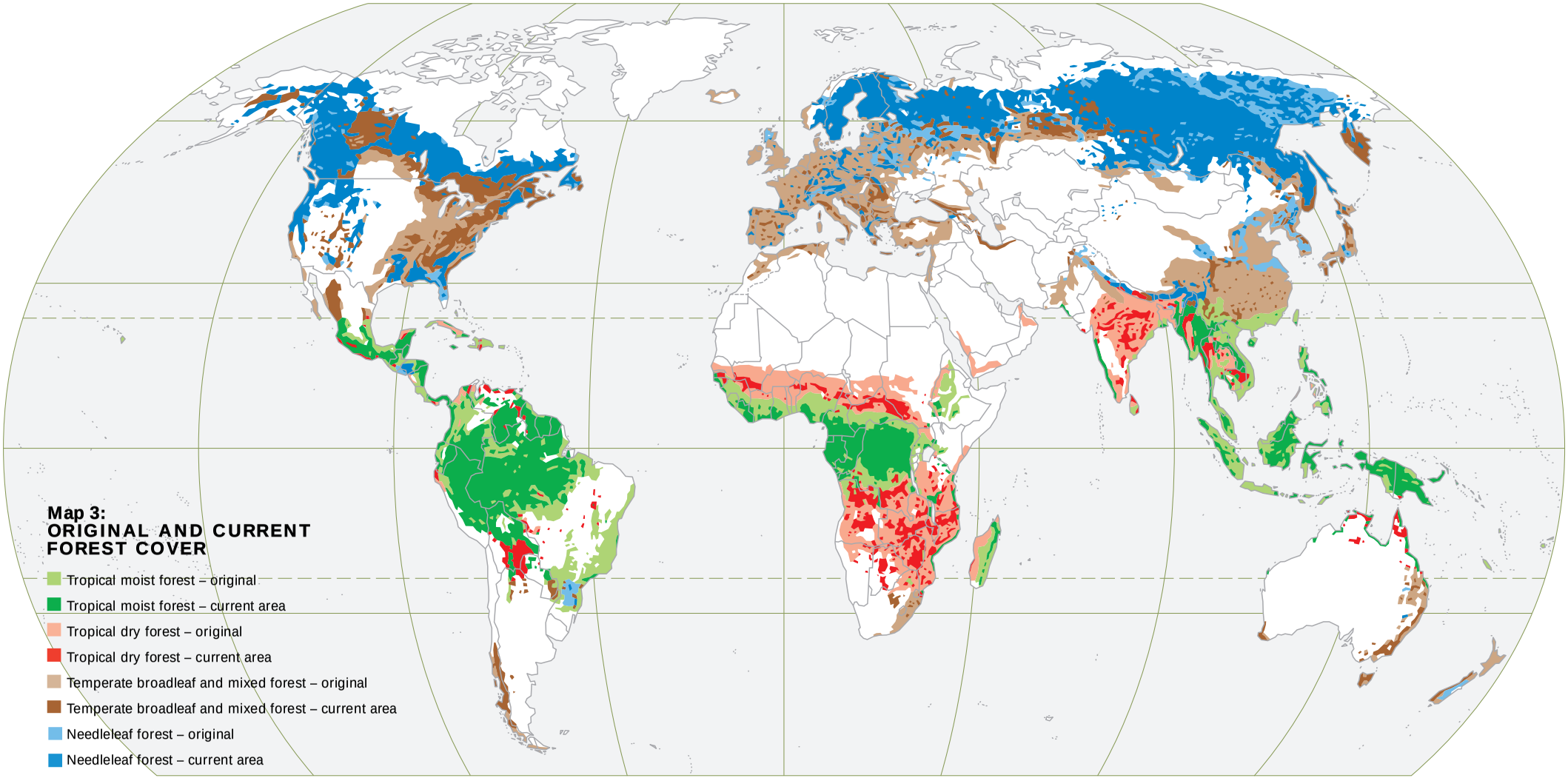


Fig. 9: BY TYPE
Million square kilometres




Map 3:
ORIGINAL AND CURRENT
FOREST COVER
Tropical moist forest – original
Tropical moist forest – current area
Tropical dry forest – original
Tropical dry forest – current area
Temperate broadleaf and mixed forest – original
Temperate broadleaf and mixed forest – current area
Needleleaf forest – original
Needleleaf forest – current area

FRESHWATER ECOSYSTEMS

UNLIKE changes in forest ecosystems, it is difficult to indicate biological trends in freshwater ecosystems such as lakes, rivers, and wetlands by measuring changes in area. Instead Figure 10 shows changes in populations of selected freshwater species as a measure of the health of these ecosystems. Data on trends in the populations of 227 freshwater fish, reptile, bird, and mammal species were analysed to estimate the percentage that were either declining, stable, or increasing during the 1970s, the 1980s, and the 1990s. The results show that, during this period, about 50-60 per cent were in decline, while 35-40 per cent remained stable, and only 5-10 per cent increased.

Clearly there are limitations to this analysis. The sample includes every vertebrate species for which information on population trends over the last three decades could be found. While this sample covers a wide taxonomic and geographic range of species, fish and amphibians are under-represented – amphibians are believed by biologists to be declining more rapidly than perhaps any other freshwater group – as are species from tropical countries.

Freshwater ecosystems index

For 70 out of the 227 species it was possible to estimate populations at two or more points in time. These time-series data were averaged to construct an index of the changes in freshwater ecosystems (Figure 2b). This index represents the changes from 1970 to 1995 in a hypothetical population that is typical of the sample as a whole. Map 4 shows the changes in populations of selected species from the freshwater index and their approximate location in the world. The 70 species are listed on page 25.

Freshwater lakes

Figure 11 compares two global surveys of 93 freshwater lakes to give a qualitative indication of the overall change in their ecological state between the 1960s and the 1980s or 1990s. The comparison focused particularly on threats and impacts from overfishing, coastal development, siltation, and pollution. Each lake was classified according to whether its condition had become better or worse, or was unchanged, and the percentage of the lakes in each category was compared for each region.

Fig. 10:
FRESHWATER SPECIES POPULATION TRENDS
Percentage of species worldwide, 1970–present

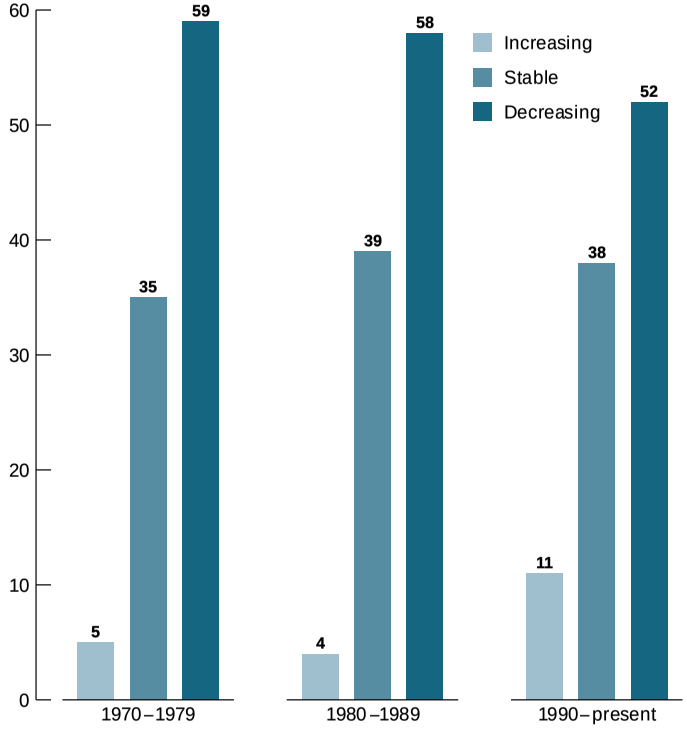


Fig. 2b:
FRESHWATER ECOSYSTEMS INDEX
1970–1995

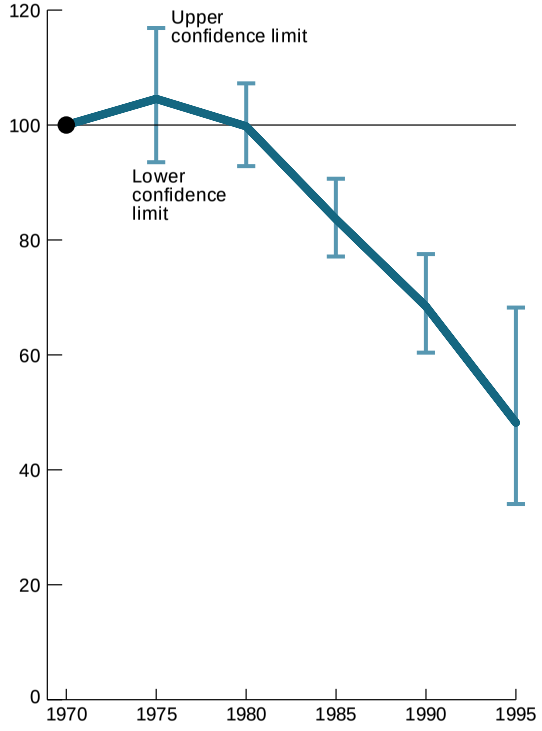
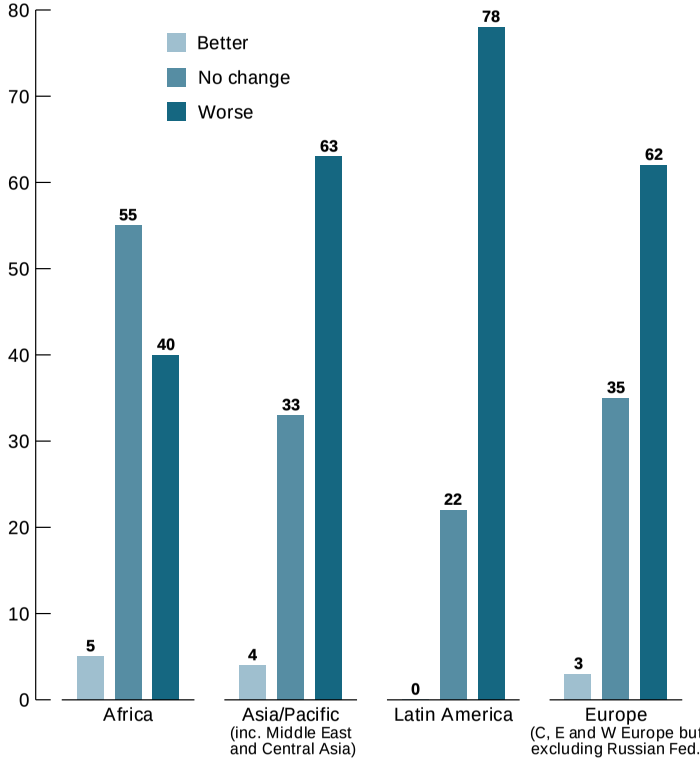
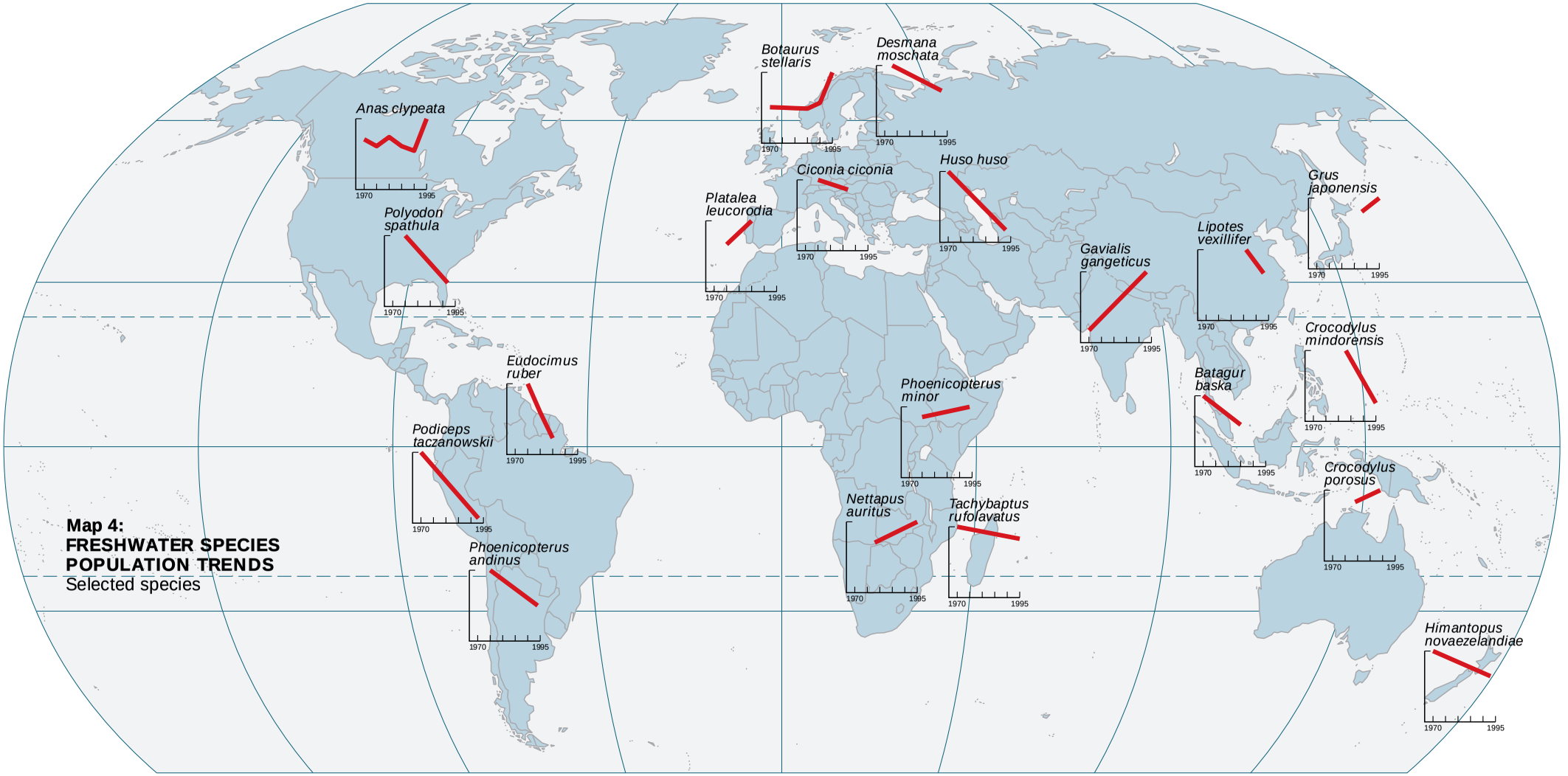


Fig. 11:
FRESHWATER LAKES: CHANGE IN CONDITION
Percentage of lakes, 1960s–present





Map 4:
FRESHWATER SPECIES POPULATION TRENDS
Selected species

Anas clypeata	**Northern shoveler**	***Gavialis gangeticus***	**Gharial**	***Platalea leucorodia***	**White spoonbill**
Batagur baska	**River terrapin**	***Grus japonensis***	**Red-crowned crane**	***Podiceps taczanowskii***	**Junín grebe**
Botaurus stellaris	**Eurasian bittern**	***Himantopus novaezelandiae***	**Black stilt**	***Polyodon spathula***	**Paddlefish**
Ciconia ciconia	**White stork**	***Huso huso***	**Beluga (sturgeon)**	***Tachybaptus rufolavatus***	**Alaotra grebe**
Crocodylus mindorensis	**Philippines crocodile**	***Lipotes vexillifer***	**Baiji (river dolphin)**		
Crocodylus porosus	**Estuarine crocodile**	***Nettapus auritus***	**African pygmy goose**		
Desmana moschata	**Russian desman**	***Phoenicopterus andinus***	**Andean flamingo**		
Eudocimus ruber	**Scarlet ibis**	***Phoenicopterus minor***	**Lesser flamingo**		

MARINE ECOSYSTEMS

FIGURE 12 shows the changes in populations of marine vertebrate species as a measure of the health of the oceans and coasts, in the same way that freshwater species were used as indicators of freshwater ecosystems. Data on the populations of 116 species were analysed to estimate the percentages that were either declining, stable, or increasing in each decade since 1970. The results show that, over this period, about 40 per cent of marine populations have declined, about 25 per cent have maintained stable populations, and 35 per cent have increased.

The sample includes every marine vertebrate species for which information on population trends over the last few decades could be found. Although this covers a wide geographic and taxonomic range, some bias remains because there is more information available on birds and mammals than fishes relative to their numbers in the world's oceans. Similarly, there is more information on temperate species than on tropical ones.

Marine ecosystems index

For 87 out of the 116 species it was possible to estimate population sizes at more than one point in time. As with the freshwater species populations, these data were averaged to produce the marine ecosystems index shown in Figure 2c. The index represents the change from 1970 to 1995 of a hypothetical population that is typical of the sample. Map 5 shows the changes in population of selected species from the marine ecosystems index. The list of 87 species can be seen on page 26.

Fig. 12:
MARINE SPECIES POPULATION TRENDS
Percentage of vertebrate species worldwide, 1970–present

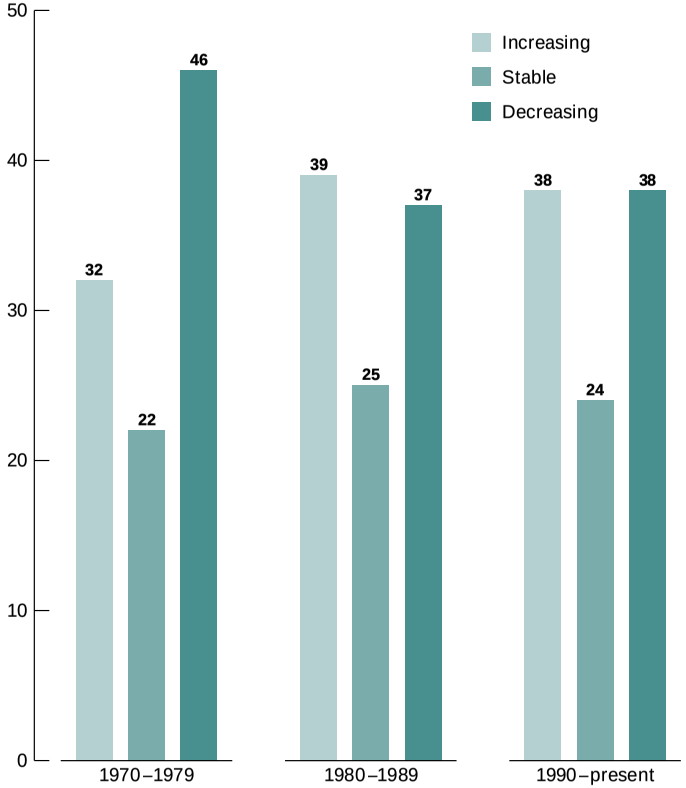
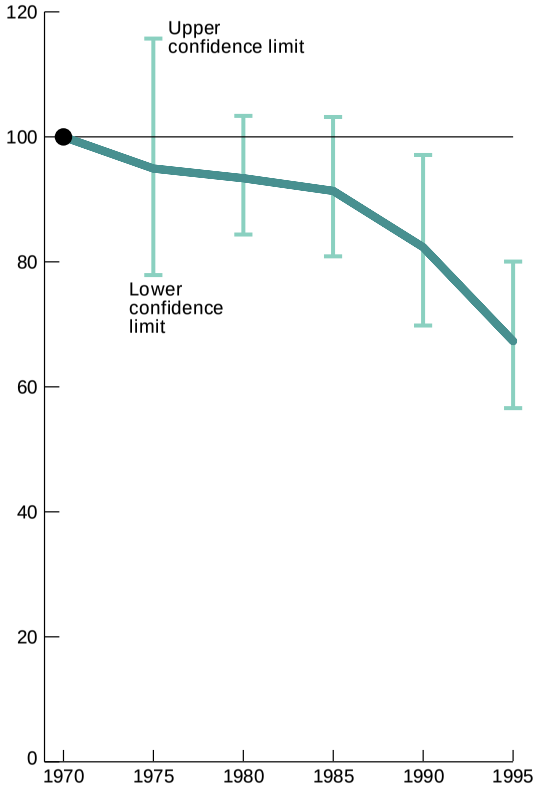
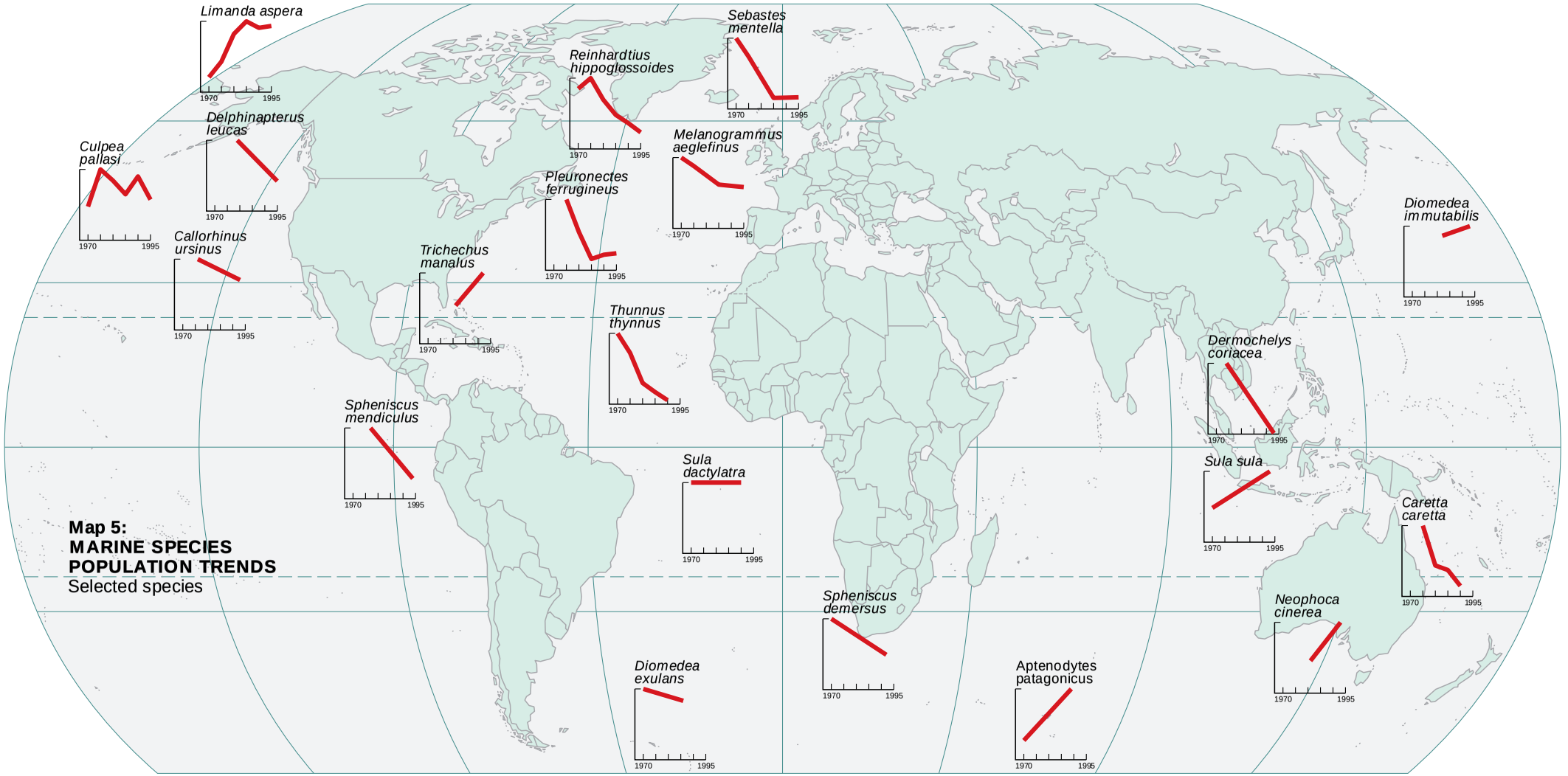


Fig. 2c:
MARINE ECOSYSTEMS INDEX
1970–1995





Map 5:
MARINE SPECIES
POPULATION TRENDS
Selected species

Aptenodytes patagonicus	**King penguin**	***Limanda aspera***	**Yellowfin sole**	***Sula dactylatra***	**Masked booby**
Callorhinus ursinus	**Northern fur seal**	***Melanogrammus aeglefinus***	**Haddock**	***Sula sula***	**Red-footed booby**
Caretta caretta	**Loggerhead turtle**	***Neophoca cinerea***	**Australian sea lion**	***Thunnus thynnus***	**Bluefin tuna**
Clupea pallasi	**Pacific herring**	***Pleuronectes ferrugineus***	**Yellowtail flounder**	***Trichechus manatus***	**Caribbean manatee**
Delphinapterus leucas	**Beluga whale**	***Reinhardtius hippoglossoides***	**Greenland halibut**		
Dermochelys coriacea	**Leatherback turtle**	***Sebastes mentella***	**Deepwater redfish**		
Diomedea exulans	**Wandering albatross**	***Spheniscus demersus***	**Jackass penguin**		
Diomedea immutabilis	**Laysan albatross**	***Spheniscus mendiculus***	**Galapagos penguin**		

GRAIN CONSUMPTION

GRAINS, such as wheat and rice, are the most important crops for feeding the world's population. About a third of the global grain harvest is fed to animals to produce meat and dairy products, and the world's livestock population is expanding at least as fast as the human population. As people become more affluent and move higher up the food chain, the growing demand for meat, dairy products, and eggs exerts further pressure to increase crop production. Clearing forests to create cropland or pasture is responsible for most of the deforestation in the tropics.

Figure 13 shows that world grain production has more than doubled since 1960. However, the increase per person has flattened since the 1980s. Production is no longer growing faster than the world's population as water resources are reaching their limits and croplands are lost to urban development and soil erosion. Assuming that global grain production can be maintained and distributed evenly, the current harvest of approximately 2 billion tonnes a year would supply about 330kg per person per year, sufficient to provide a healthy diet for the current world population, but not if everyone were to adopt the consumption patterns of the industrialized countries.

Figures 14 and 15 and Map 6 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 seed, processing losses, and waste grain.

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

- Protect soil from erosion and degradation caused by overgrazing and bad agricultural practices.
- 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. 13:
PRODUCTION BY MAJOR COUNTRY/REGION
Million tonnes per year, 1961–1995

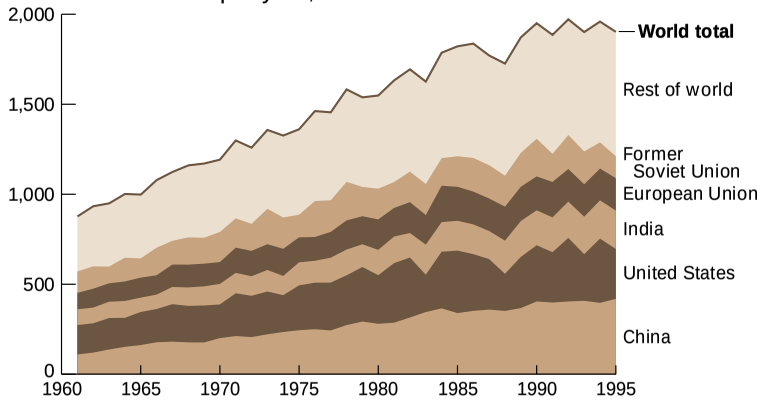


Fig. 14:
CONSUMPTION BY REGION
Kilograms per person per year, 1995 data

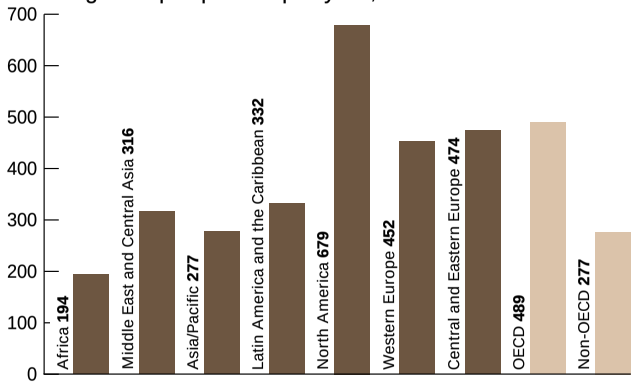
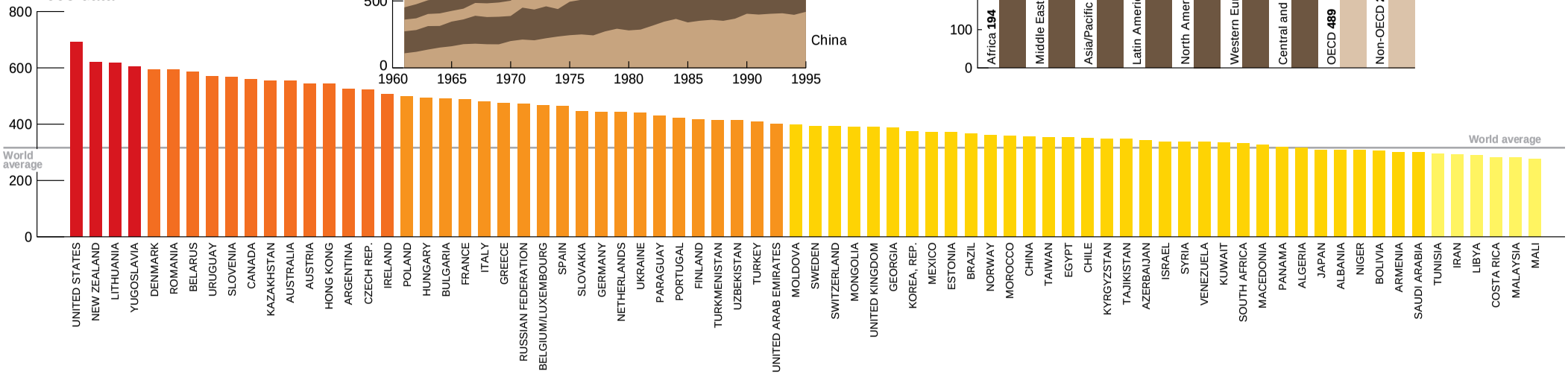
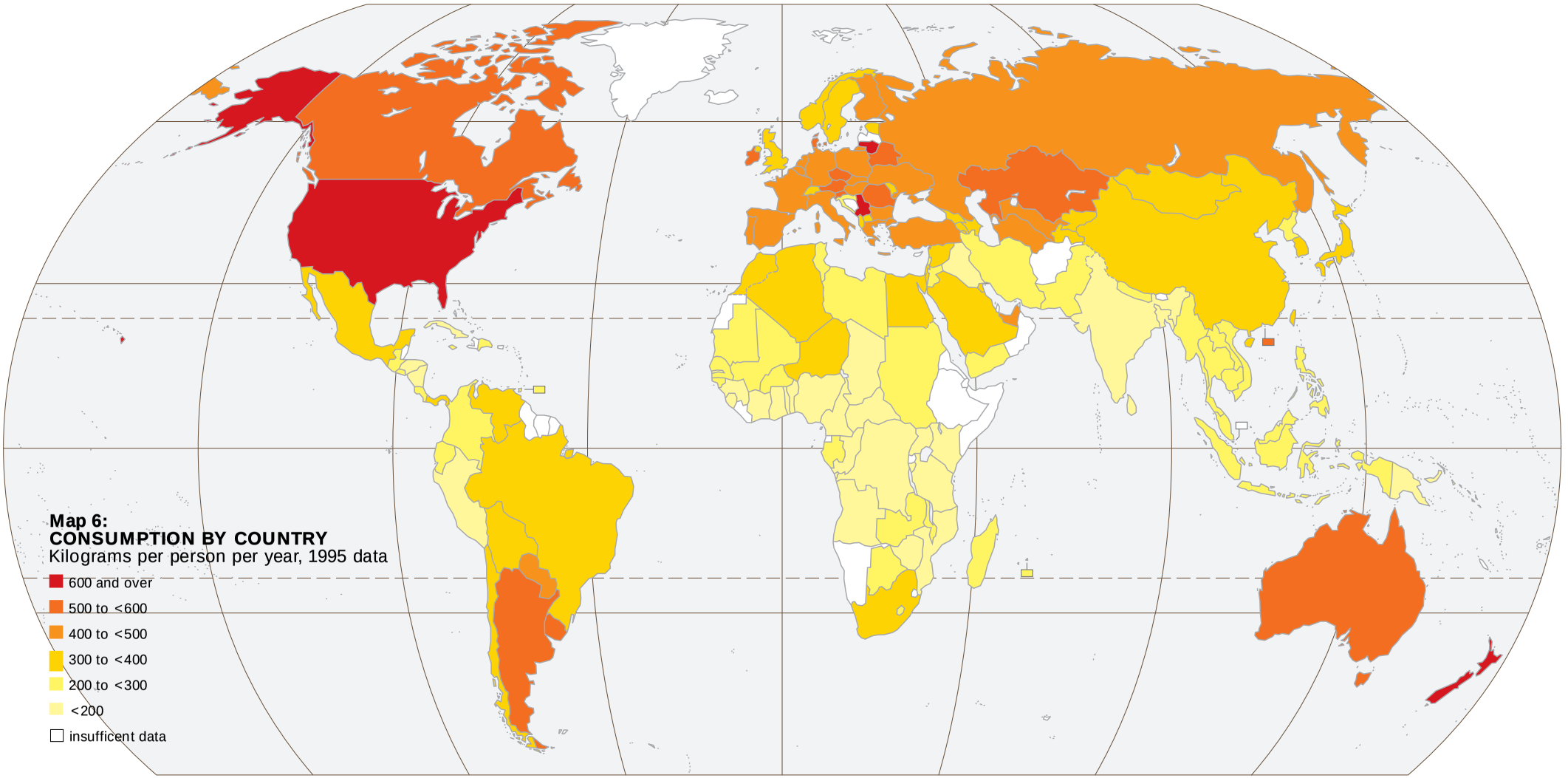
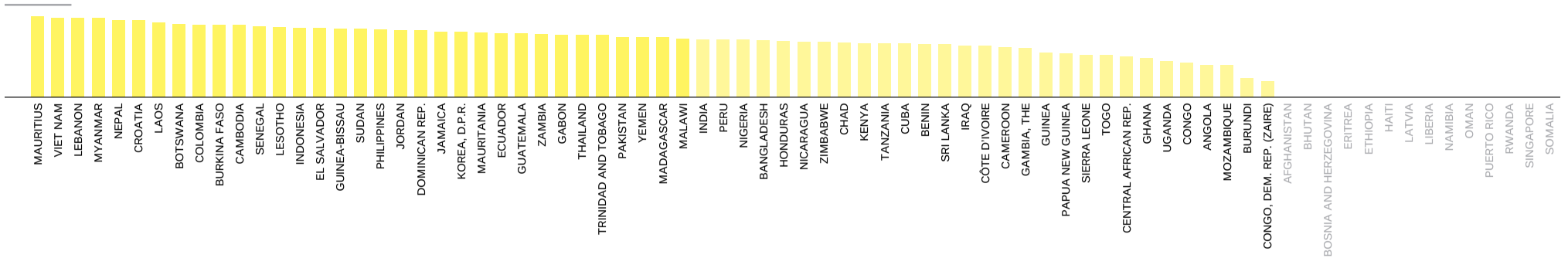


Fig. 15:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data




Map 6:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data
600 and over
500 to <600
400 to <500
300 to <400
200 to <300
<200
insufficent data


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

MARINE FISH CONSUMPTION

FISH is the primary source of protein for 950 million people and forms an important part of the diet of many more. About a third of global fish production is processed into fish meal or oil, most of which is fed to animals. Three-quarters of the fish eaten or otherwise consumed are marine fish, caught from the wild, rather than freshwater fish or farmed fish. Overfishing is causing many fish stocks to decline, especially in the North Atlantic.

The average marine fish catch for 1990-1995 was 84 million tonnes per year, double what it was in 1960 (Figure 16). On top of this, at least 27 million tonnes per year of by-catch – unwanted fish – were caught and discarded, putting the minimum estimate of fish caught at more than 110 million tonnes a year.

The UN Food and Agriculture Organization estimated that, in 1994, 60 per cent of the world's fish resources were either fully exploited or in decline. The FAO also estimates that the maximum sustainable potential of the oceans is between 82 and 100 million tonnes a year, equivalent to about 14kg-17kg of fish per person per year for a world population of about 6 billion. Current levels of marine production will therefore lead to further declines in fish stocks.

The data used in Figures 17 and 18 and Map 7 include shellfish, finfish, and fish that is processed into oil or meal for animal feed, as well as fish consumed as food. Freshwater fish are not included, nor is by-catch as this is difficult to attribute to a consumer country.

WWF recommendations to reduce pressure on marine fisheries ■ Stop overfishing by limiting fishing effort and access to fisheries, and allowing depleted stocks to recover. ■ Eliminate destructive fishing practices and the wasteful discarding of by-catch by commercial fishing operations. ■ Develop social and economic incentives for the sustainable management of fisheries, such as independent certification under the auspices of the Marine Stewardship Council. ■ Remove government fishing subsidies and decommission excess fleet capacity. ■ Establish and maintain no-fishing zones to serve as insurance against unsustainable fishing elsewhere.

Fig. 18:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data

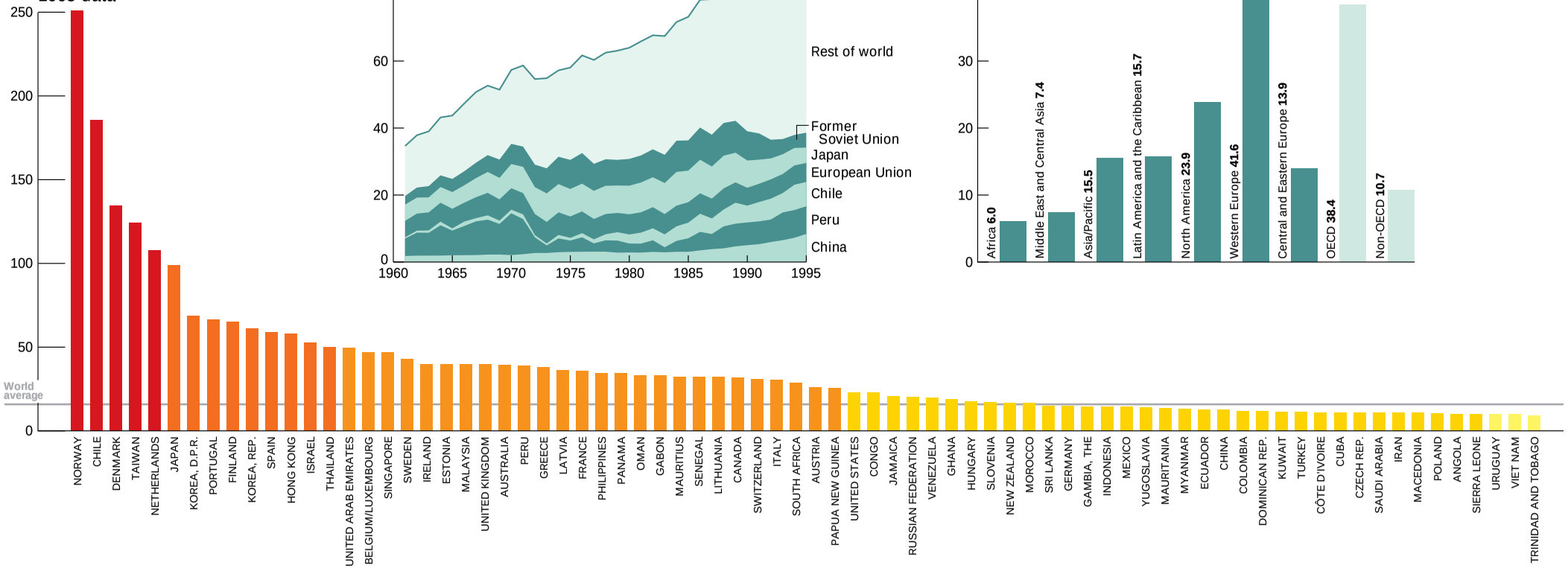
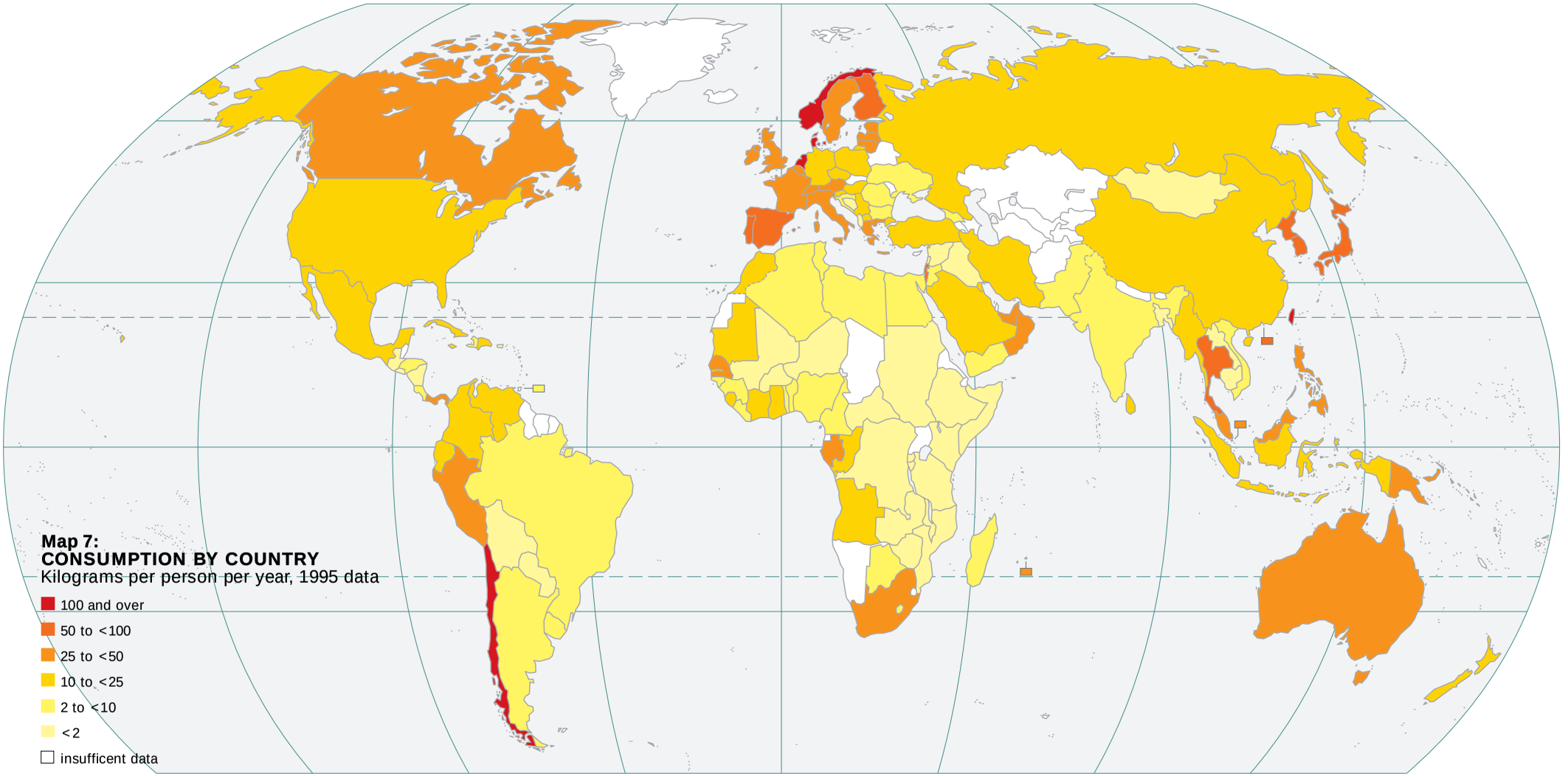
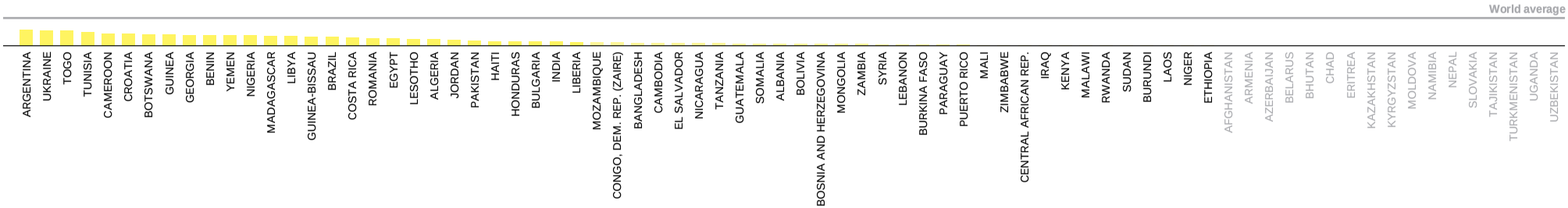


Fig. 16:
PRODUCTION BY MAJOR COUNTRY/REGION
Million tonnes per year, 1961–1995

Fig. 17:
CONSUMPTION BY REGION
Kilograms per person per year, 1995 data


Map 7:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data
100 and over
50 to <100
25 to <50
10 to <25
2 to <10
<2
insufficent data


World average
ARGENTINA
UKRAINE
TOGO
TUNISIA
CAMEROON
CROATIA
BOTSWANA
GUINEA
GEORGIA
BENIN
YEMEN
NIGERIA
MADAGASCAR
LIBYA
GUINEA-BISSAU
BRAZIL
COSTA RICA
ROMANIA
EGYPT
LESOTHO
ALGERIA
JORDAN
PAKISTAN
HAITI
HONDURAS
BULGARIA
INDIA
LIBERIA
MOZAMBIQUE
CONGO, DEM. REP. (ZAIRE)
BANGLADESH
CAMBODIA
EL SALVADOR
NICARAGUA
TANZANIA
GUATEMALA
SOMALIA
ALBANIA
BOLIVIA
BOSNIA AND HERZEGOVINA
MONGOLIA
ZAMBIA
SYRIA
LEBANON
BURKINA FASO
PARAGUAY
PUERTO RICO
MALI
ZIMBABWE
CENTRAL AFRICAN REP.
IRAQ
KENYA
MALAWI
RWANDA
SUDAN
BURUNDI
LAOS
NIGER
ETHIOPIA
AFGHANISTAN
ARMENIA
AZERBAIJAN
BELARUS
BHUTAN
CHAD
ERITREA
KAZAKHSTAN
KYRGYZSTAN
MOLDOVA
NAMIBIA
NEPAL
SLOVAKIA
TAJIKISTAN
TURKMENISTAN
UGANDA
UZBEKISTAN

WOOD CONSUMPTION

WOOD is a versatile material: as a fuel it is the most important source of energy for 2 billion people; as timber it can be made into plywood, veneers, and other sawnwood, or chipped to make wood-based panels; or it can be pulped to make paper. To produce wood, the world needs forests, but the world's forests are currently facing two critical problems: diminishing size and declining biological quality as a result of the conversion of natural forests into plantations. This is partly because of inadequate forest protection and unsustainable management and partly because of the wasteful consumption of wood and paper.

World wood production has increased by two-thirds since 1960 (Figure 19). In 1995, consumption of fuelwood, industrial roundwood, pulp, and paper globally was about 3.5 billion m^3, or 0.6m^3 per person per year. Even so, the world's forests, if managed well, could still provide more than enough wood. Global consumption, however, is characterized by extremes of consumption between countries, with 18 countries consuming more than twice the world average, and 49 consuming less than half the world average.

Figures 20 and 21 and Map 8 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. 19:
PRODUCTION BY MAJOR COUNTRY/REGION
Million cubic metres per year, 1961–1995

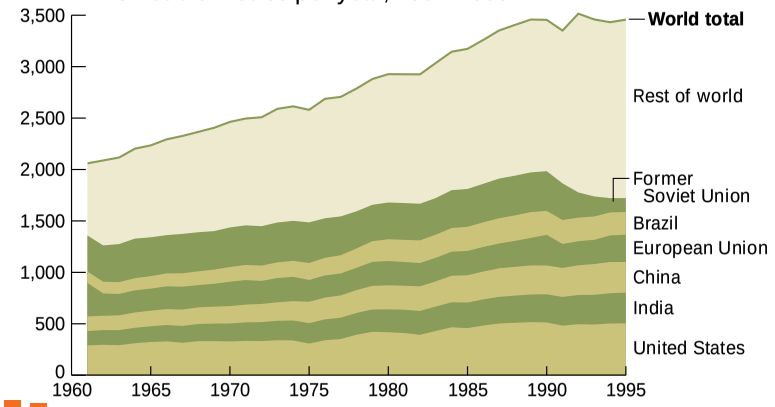


Fig. 20:
CONSUMPTION BY REGION
Cubic metres per person per year, 1995 data

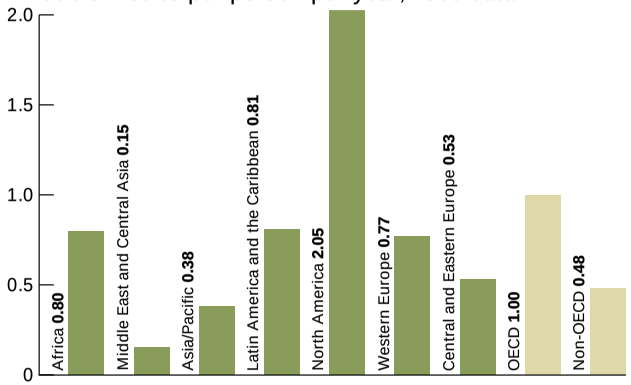
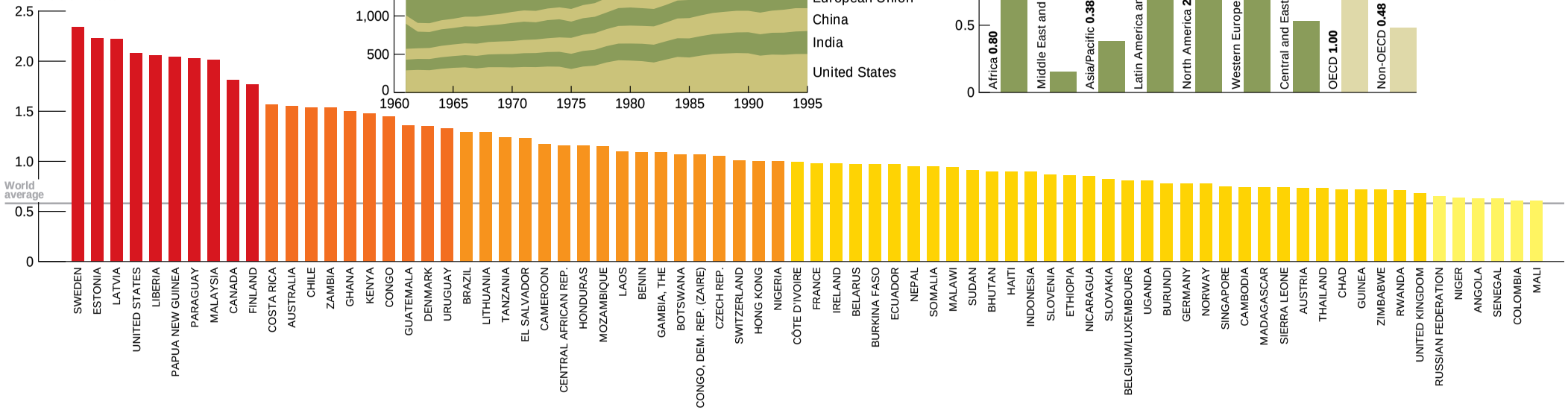
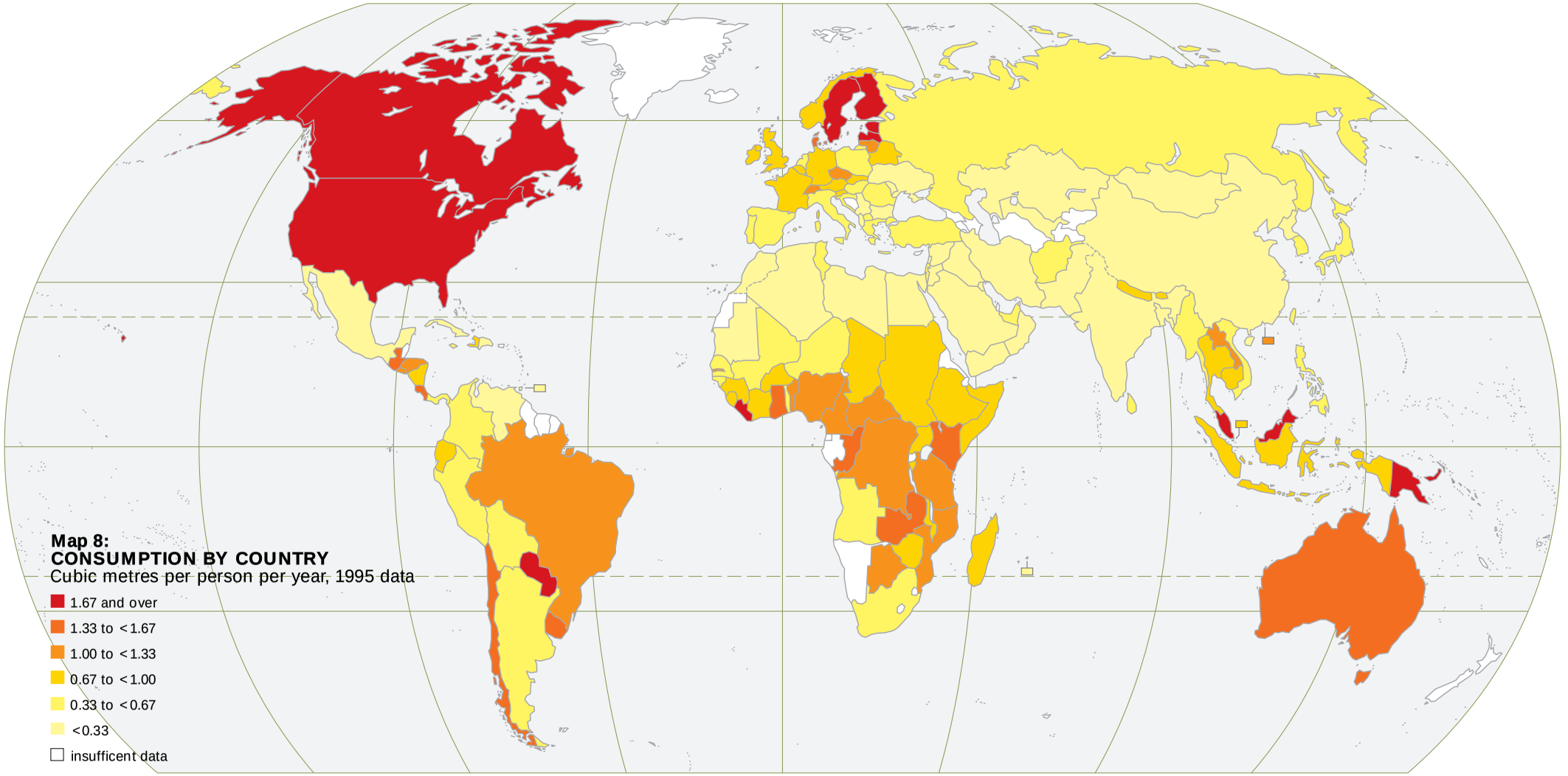
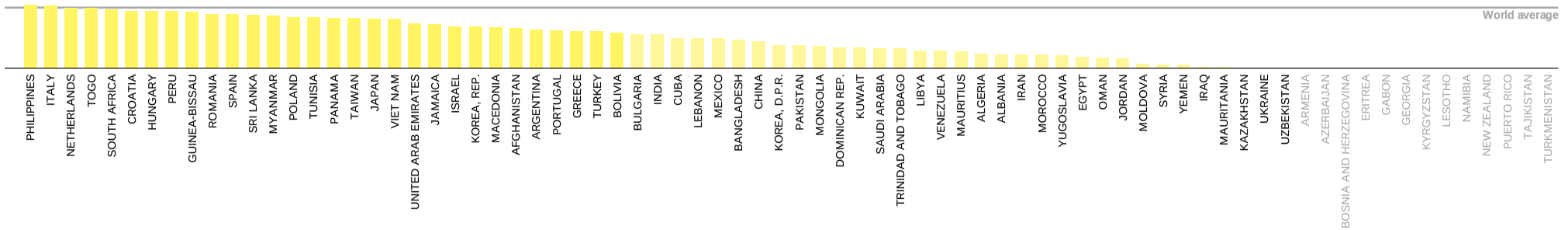


Fig. 21:
CONSUMPTION BY COUNTRY
Cubic metres per person per year, 1995 data




Map 8:
CONSUMPTION BY COUNTRY
Cubic metres per person per year, 1995 data
1.67 and over
1.33 to <1.67
1.00 to <1.33
0.67 to <1.00
0.33 to <0.67
<0.33
insufficent data


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

FRESHWATER WITHDRAWALS

FRESHWATER is essential to human health, agriculture, industry, and natural ecosystems, but is now running scarce in many regions of the world. Natural ecosystems, especially wetlands and natural forests, capture water and even out seasonal flows as well as recharging groundwater and improving water quality. Conserving natural ecosystems is vital to maintaining the supply of freshwater. Conversely, the overuse of freshwater has adverse impacts on natural ecosystems.

Global freshwater withdrawals have almost doubled since 1960 (Figure 22). It is estimated that humanity now uses more than half of all accessible freshwater runoff – the source of all water for irrigation, industrial, and municipal uses as well as instream uses such as the maintenance of freshwater fisheries and hydroelectric power generation.

Figures 23 and 24 and Map 9 show annual withdrawals of freshwater per person by country and region, combining agricultural, industrial, and municipal uses – but excluding instream uses. Of course, some parts of the world have abundant water resources while others are chronically short of freshwater, so high per person usage in a particular country is not necessarily an indicator of unsustainable consumption. Even in countries that have generally abundant water, however, high levels of consumption often lead to localized shortages.

WWF recommendations to reduce pressure on freshwater ecosystems and meet basic human needs ■ Conserve and restore freshwater ecosystems to maintain their hydrological functions. ■ Manage water resources on a catchment area basis, taking into account land-use practices that may have an impact on the quality or quantity of surface or groundwater. ■ Establish protected wetland areas and designate important sites under the Convention on Wetlands. ■ Increase water-use efficiency, especially in the agricultural sector where water losses are highest. ■ Improve water quality through pollution prevention – particularly a reduction of synthetic chemicals entering freshwater bodies – and wastewater treatment.

Fig. 24:
WITHDRAWALS BY COUNTRY
Cubic metres per person per year, 1995 data

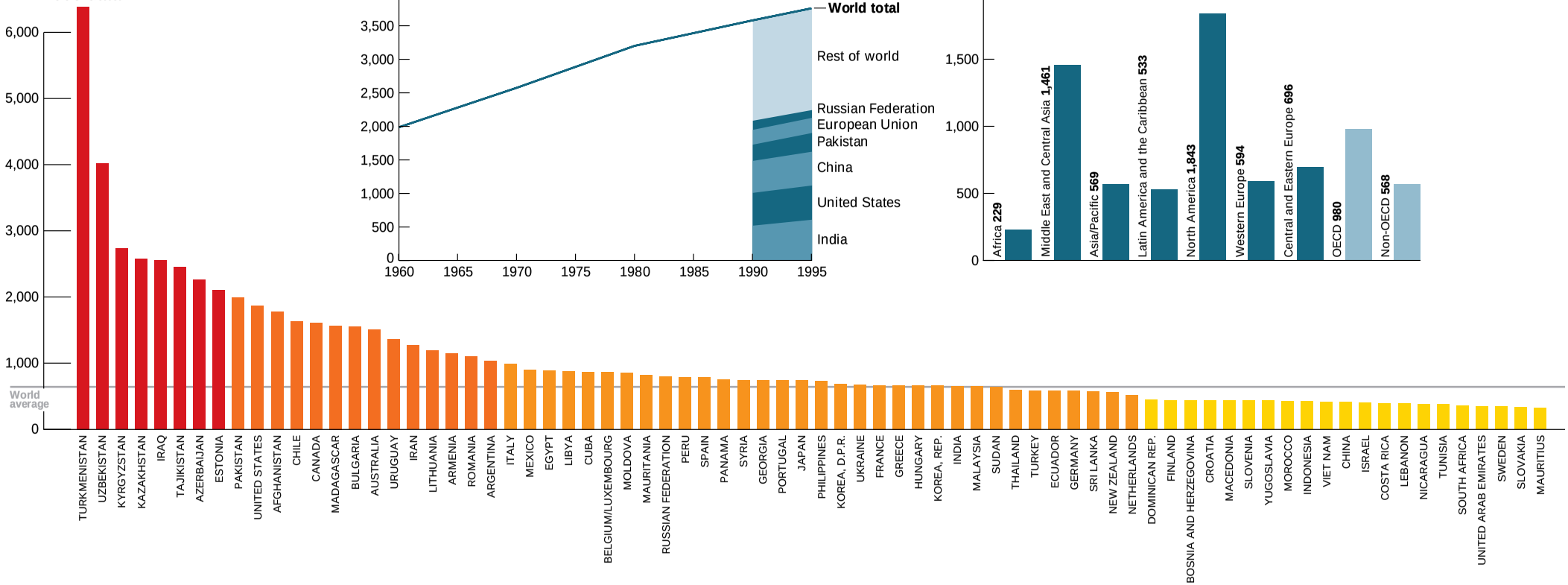
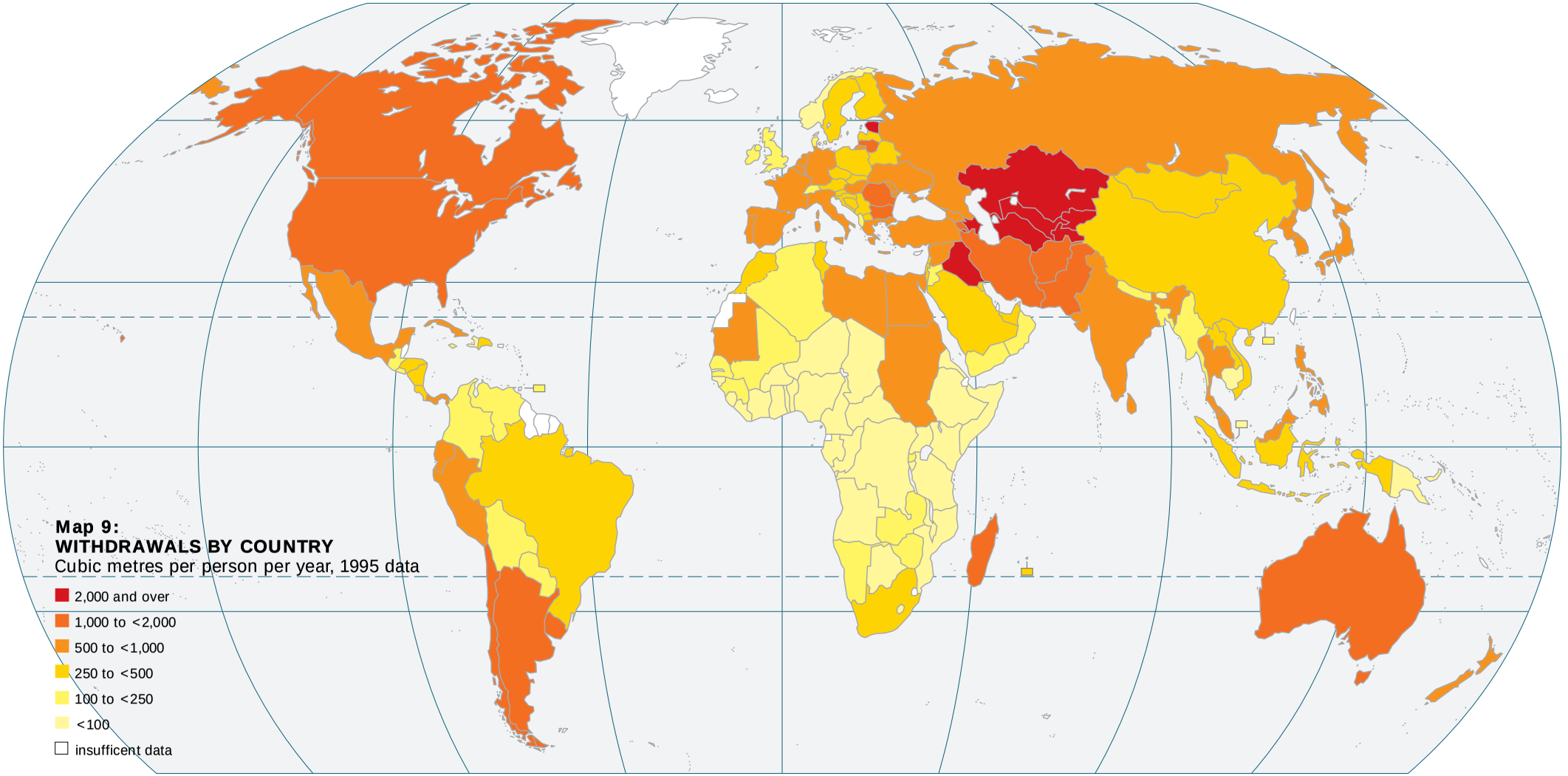
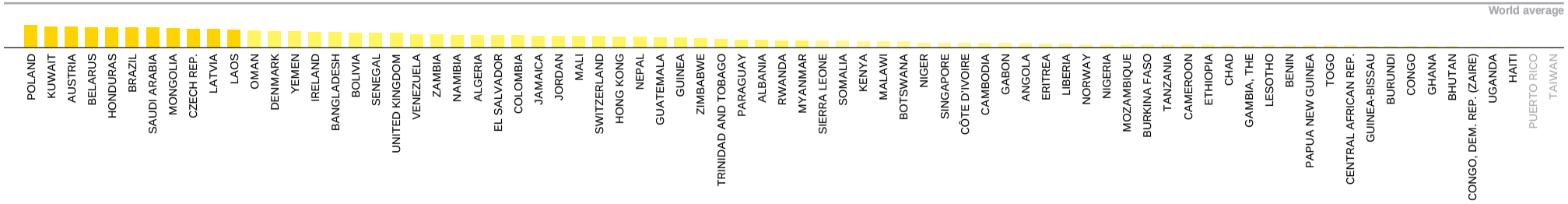


Fig. 22:
WITHDRAWALS BY MAJOR COUNTRY/REGION
Billion cubic metres per year, 1960–1995

Fig. 23:
WITHDRAWALS BY REGION
Cubic metres per person per year, 1995 data


Map 9:
WITHDRAWALS BY COUNTRY
Cubic metres per person per year, 1995 data
2,000 and over
1,000 to <2,000
500 to <1,000
250 to <500
100 to <250
<100
insufficent data


World average
POLAND
KUWAIT
AUSTRIA
BELARUS
HONDURAS
BRAZIL
SAUDI ARABIA
MONGOLIA
CZECH REP.
LATVIA
LAOS
OMAN
DENMARK
YEMEN
IRELAND
BANGLADESH
BOLIVIA
SENEGAL
UNITED KINGDOM
VENEZUELA
ZAMBIA
NAMIBIA
ALGERIA
EL SALVADOR
COLOMBIA
JAMAICA
JORDAN
MALI
SWITZERLAND
HONG KONG
NEPAL
GUATEMALA
GUINEA
ZIMBABWE
TRINIDAD AND TOBAGO
PARAGUAY
ALBANIA
RWANDA
MYANMAR
SIERRA LEONE
SOMALIA
KENYA
MALAWI
BOTSWANA
NIGER
SINGAPORE
CÔTE D'IVOIRE
CAMBODIA
GABON
ANGOLA
ERITREA
LIBERIA
NORWAY
NIGERIA
MOZAMBIQUE
BURKINA FASO
TANZANIA
CAMEROON
ETHIOPIA
CHAD
GAMBIA, THE
LESOTHO
BENIN
PAPUA NEW GUINEA
TOGO
CENTRAL AFRICAN REP.
GUINEA-BISSAU
BURUNDI
CONGO
GHANA
BHUTAN
CONGO, DEM. REP. (ZAIRE)
UGANDA
HAITI
PUERTO RICO
TAIWAN

CARBON DIOXIDE EMISSIONS

THE emission of carbon dioxide (CO_2) to the atmosphere from fossil fuel combustion is a principal cause of global climate change and also a reasonably good indicator of other air pollution – particularly nitrogen oxides and sulphur dioxide emissions. 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 1995, from less than 10 billion tonnes per year to more than 23 billion tonnes per year (Figure 25). This does not include the emissions from deforestation which add between 2 billion and 10 billion tonnes per year.

The concentration of CO_2 in the atmosphere is climbing to a dangerous level. To stabilize the atmospheric concentration, the scientific community believes that global CO_2 emissions would have to be cut by about 60 per cent, to a level that is within the capacity of the oceans and terrestrial ecosystems, especially forests, to remove CO_2 from the atmosphere.

On average, each person in the world burns enough fossil fuels to emit about 4 tonnes of CO_2 per year (Figure 27). Yet, as Figure 26 and Map 10 show, per person CO_2 emissions in North America are around 20 tonnes per year, double the European average and eight 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 reafforestation of deforested areas in an ecologically and socially appropriate manner.

Fig. 27:
EMISSIONS BY COUNTRY
Tonnes per person per year, 1995 data

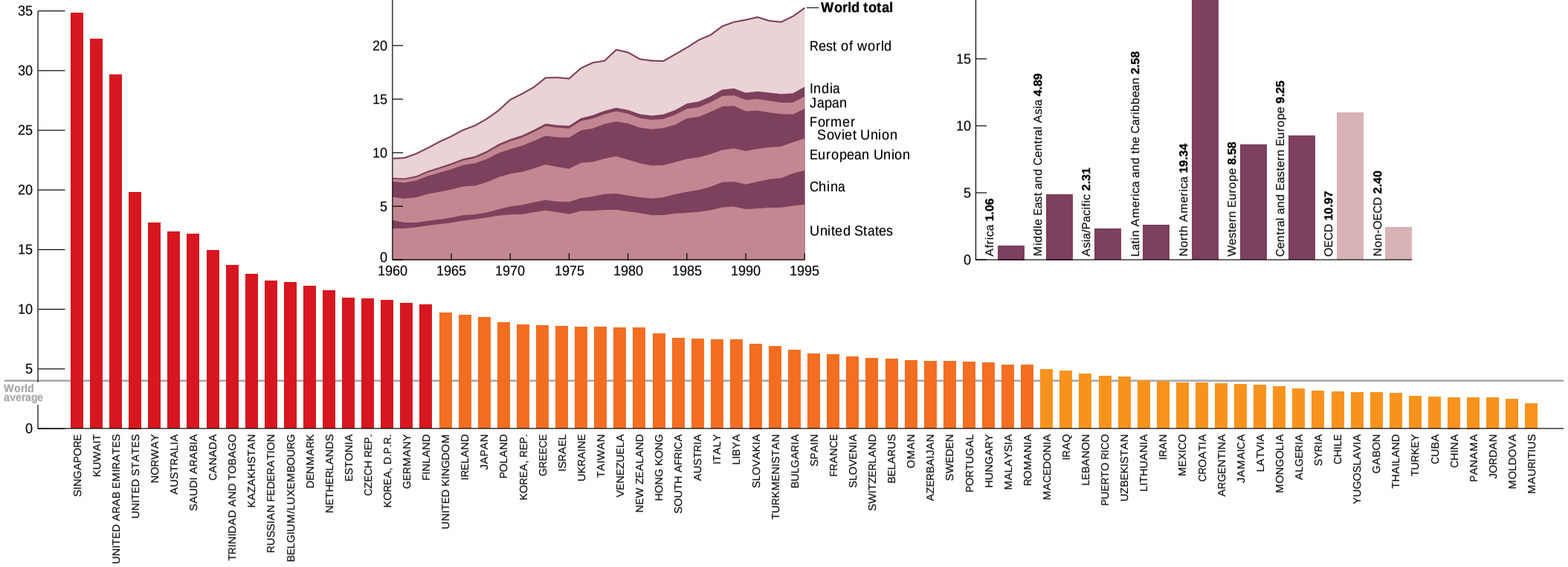
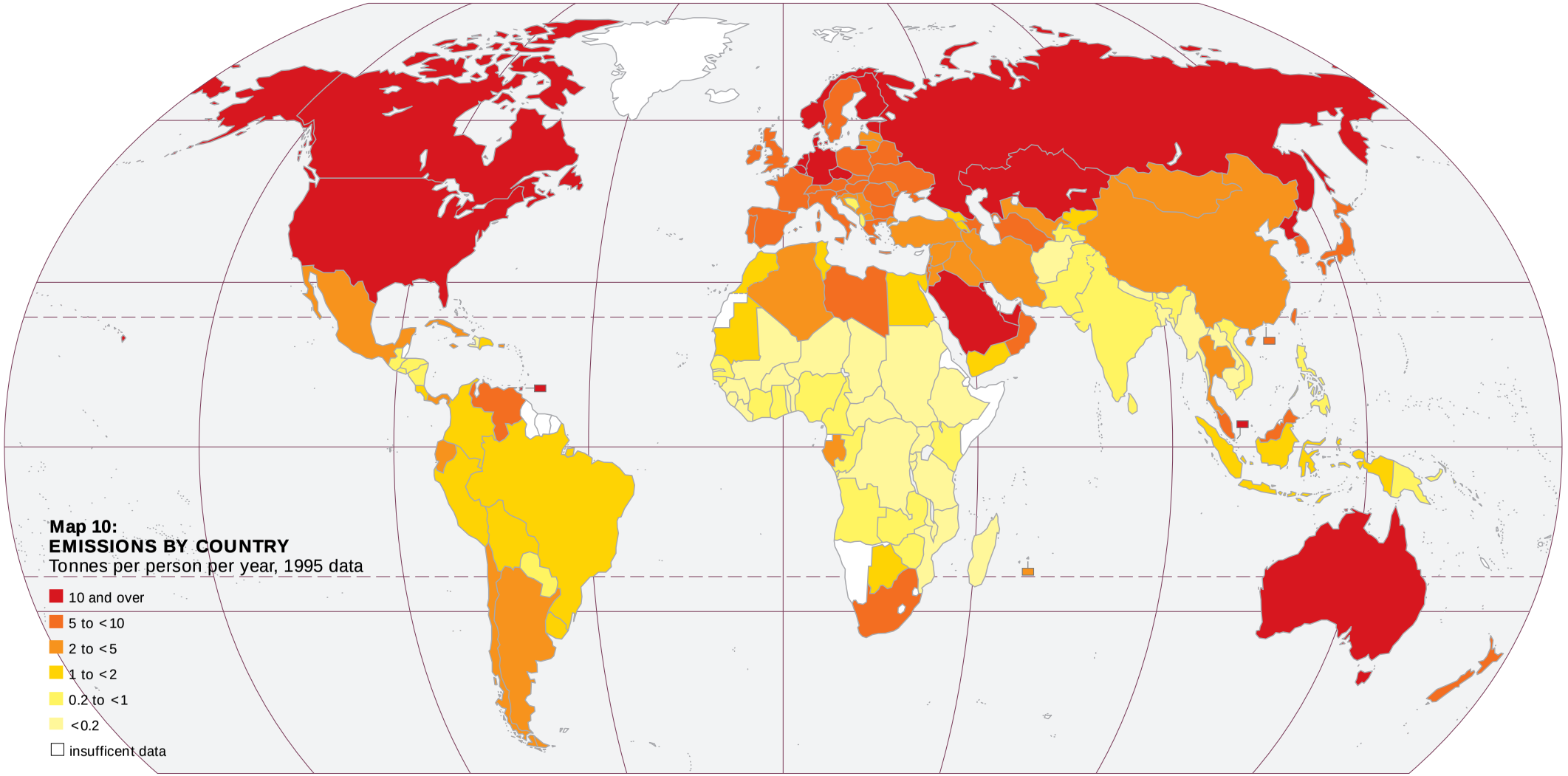
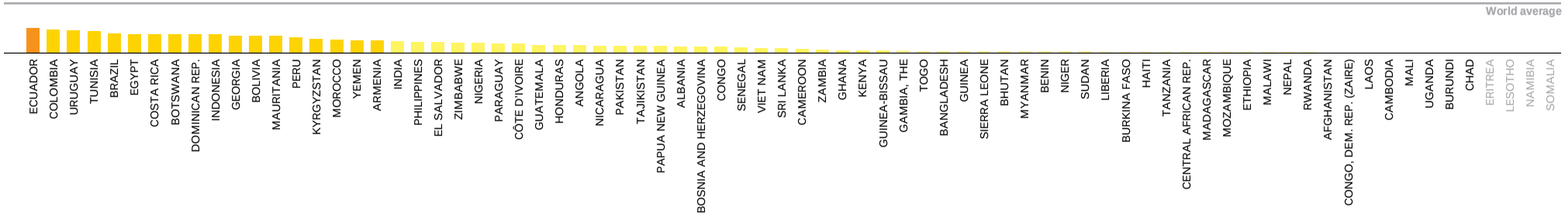


Fig. 25:
EMISSIONS BY MAJOR COUNTRY/REGION
Billion tonnes per year, 1960–1995

Fig. 26:
EMISSIONS BY REGION
Tonnes per person per year, 1995 data


Map 10:
EMISSIONS BY COUNTRY
Tonnes per person per year, 1995 data
10 and over
5 to <10
2 to <5
1 to <2
0.2 to <1
<0.2
insufficent data


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

CEMENT CONSUMPTION

A SIGNIFICANT cause of biodiversity loss which is not covered by the other components of Global Consumption Pressure is the loss of natural habitat, forest, and farmland to urban expansion, infrastructure development, and mining. Most countries do not produce data on the amount of land that is lost each year in these ways, so cement consumption has been used as a very approximate measure of construction and road building, and of aggregates extraction.

World cement consumption has increased more than fourfold since 1960 (Figure 28). The raw materials used for construction are not likely to become scarce at current rates of extraction and urban areas still only make up a small proportion of the world's land area, so it is not realistic to suggest a sustainable limit. But urban encroachment is a serious problem both in industrialized countries and the developing world, where the physical size of cities is predicted to double between 1980 and 2000.

Figures 29 and 30 and Map 11 show that world average cement consumption was about 250kg per person per year in 1995, with almost 50 countries above that average. National data on cement production have been used where data on consumption are not available.

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 cities and car-free zones 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 MAJOR COUNTRY/REGION
Million tonnes per year, 1960–1995

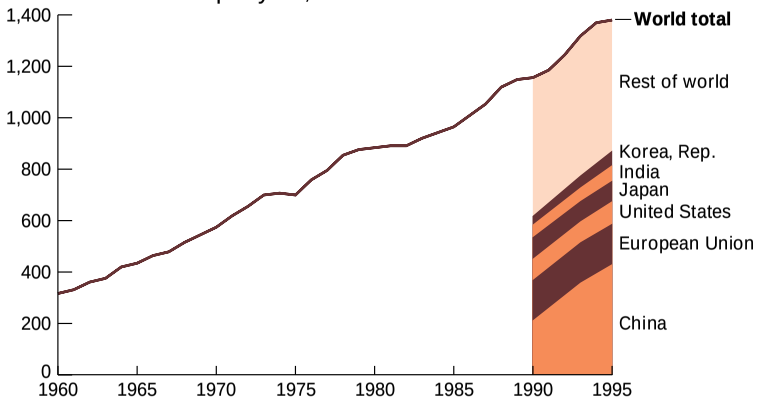


Fig. 29:
CONSUMPTION BY REGION
Kilograms per person per year, 1995 data

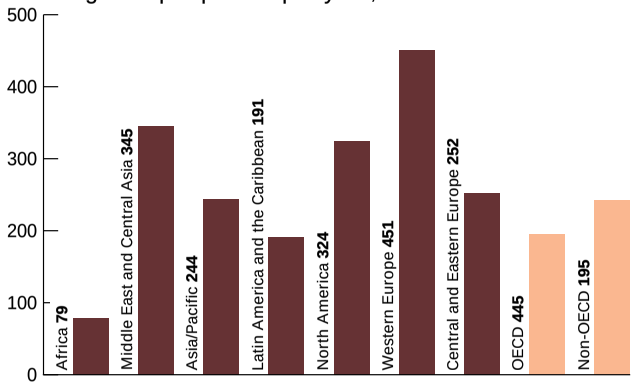
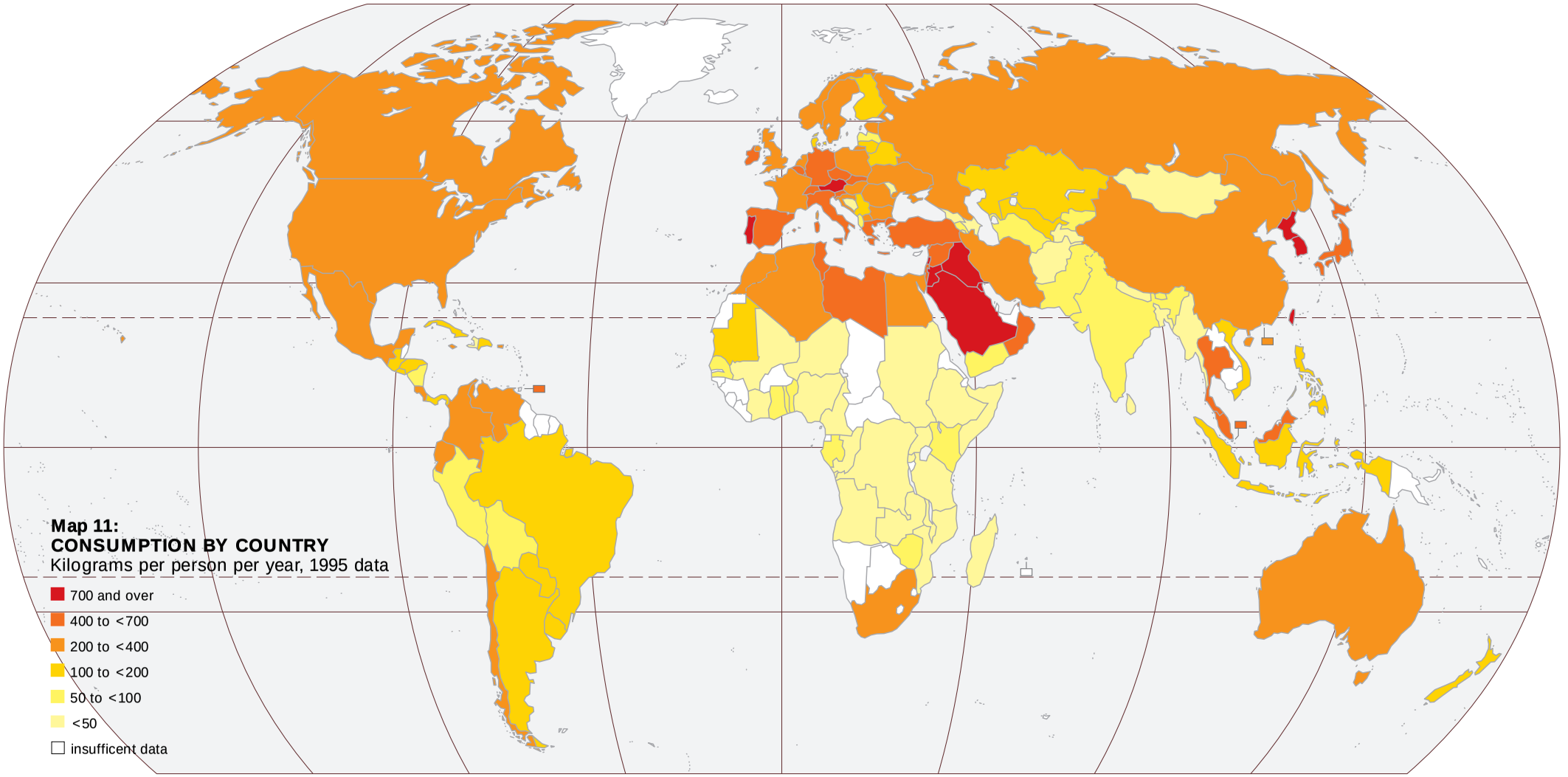
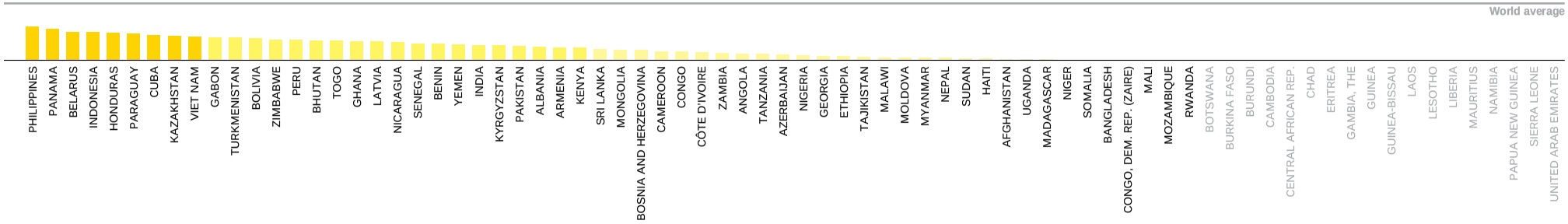


Fig. 30:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data


Map 11:
CONSUMPTION BY COUNTRY
Kilograms per person per year, 1995 data
700 and over
400 to <700
200 to <400
100 to <200
50 to <100
<50
insufficent data


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

TECHNICAL NOTES

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 1960 to 1990 (see below). The loss of forests over the period averaged about 160,000km^2 per year. This relates largely to tropical forests, the loss of temperate forests having been comparatively small.

The freshwater and marine indices are based on the changes in populations of samples of freshwater and marine vertebrate species worldwide since 1970 (see pages 25-26). The samples include all freshwater and marine vertebrate species for which population statistics from more than one point in time could be found, a total of 70 and 87 species respectively.

There are of course limitations to the accuracy of 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 fishes and reptiles are under-represented and amphibians altogether absent, reflecting the level of knowledge of these groups.

A recent estimate by Costanza et al. (1997) put the current economic value of natural ecosystems and ecological services provided by the biosphere at about US$33 trillion per year, almost double the global GNP of US$18 trillion per year. The LPI estimates the average rate of degradation of the Earth's ecosystems over the period 1990-1995 to be about 3 per cent per year, which equates to an economic loss of about US$1 trillion per year. Costanza et al. also estimated the current economic value of ecological services provided by tropical forests to be about US$2,000 per hectare per year, by freshwater ecosystems to be about US$5 trillion per year and by marine ecosystems to be about US$21 trillion per year. The average annual declines from 1990 to 1995 in the forest, freshwater, and marine indices therefore equate to economic losses of about US$32 billion per year for forests, US$291 billion per year for freshwater ecosystems, and US$775 billion per year for marine ecosystems.

Figure 3 and Map 1. The number of threatened bird and mammal species refers to the number that are globally vulnerable, endangered or critically endangered (IUCN 1996), and not necessarily the number of bird and mammal species that are threatened within each country: a species may be highly threatened in one country but in a lower risk category globally. Only birds and mammals were used as the assessment of the status of all bird and mammal species has been completed, whereas the assessment of other taxonomic groups is incomplete.

Page 4 GLOBAL CONSUMPTION PRESSURE

Consumption pressure is a measure of the impact that humans exert on natural ecosystems through the consumption of natural resources and pollution of the environment. The calculations were made using six measures of resource consumption and pollution in 152 countries: grain and meat consumption; marine fish consumption; wood and paper consumption; freshwater withdrawals; carbon dioxide (CO_2) emissions, as a proxy for fossil fuel consumption; and cement consumption, as a proxy for land consumption. Countries with populations of less than 1 million in 1995 were not included in the analysis: 64 countries, with a combined population of about 13 million people, were therefore excluded. Luxembourg has been aggregated with Belgium. Regional information is based on data for regional subsets of the 152 countries, while global information includes all countries of the world. (For details of the regions, see inside back cover.)

All consumption, production, and population data relate to 1995. The sources used to calculate each of the six components are given on pages 26-27. National population statistics are from the United Nations Population Division (*Annual Populations (1994 Rev.)*, Median estimate), and grid-referenced population statistics used to create **Map 2** come from the National Center for Geographic Information and Analysis at the University of California, Santa Barbara (Tobler et al. 1995).

For grain, marine fish, and wood, total national consumption is calculated as follows:

Consumption =
(production + imports – exports) +
(imports of derived products –
corresponding exports)

The principal products derived from these three resources include meat, fish meal, and pulp and paper. Freshwater withdrawals and CO_2 emissions data are taken directly from national datasets. Cement consumption was assumed to be equal to production in all countries except for the largest 15 consumers, for which national consumption data are available.

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

The aggregated Global Consumption Pressure is a measure based on the six components combined. For each component, a country's per person average was divided by the global per person average, giving a relative score. The relative scores for all six components were then averaged to give the Consumption Pressure per person for that country. Total Consumption Pressure was then calculated by multiplying a country's per person Consumption Pressure by its population. For countries where there was insufficient data to calculate one of the components, Global Consumption Pressure was based on only five components. For countries where there were insufficient data on more than one component, Global Consumption Pressure was not calculated.

Page 6 FOREST ECOSYSTEMS

Statistics on deforestation rates and forest loss in the Brazilian Amazon come from the Brazilian National Space Agency (INPE 1998).

Figure 7 and Tables 2 and 3. For Africa, Asia, and Latin America, data for 1990 are World Conservation Monitoring Centre (WCMC) figures for total forest area for each region minus the United Nations Food and Agriculture Organization (FAO) plantation figures. Deforestation rates for 1980-1990 are those in the FAO *Forest Resources Assessment 1990*. 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* which has figures for change in forest extent for 29 European countries, including those of 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), applied to WCMC figures for forest area. In both cases figures for plantation area have been deducted from the 1990 WCMC figure for total forest area to give an estimate of natural forest. It may be assumed that the plantation areas are underestimates. 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 has been no change in forest area in Russia from 1980-1990: FAO (1995) notes that this is the safest assumption, as data from different sources conflict.

Plantation areas in the tropics and temperate regions in Argentina, Australia, Canada, Chile, China, Japan, Morocco, New Zealand, the Republic of Korea, South Africa, United States, Uruguay, and the former USSR were obtained from FAO.

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 total and the remainder attributed to Russia.

Table 2. Forest fragmentation was evaluated using geographic information systems (GIS) analyses of large regional sections from the global current forest cover dataset, without dividing forest cover into different types. Neither national boundaries nor rivers less than 0.5km wide were considered to disrupt patches of forest. Europe's forests were the most fragmented with about 26 per cent of the total, including plantations, in blocks of less than 500km^2. Around 14 per cent of Asia's forests were fragmented into areas smaller than 500km^2, whereas in Russia and North America the figure was less than 10 per cent.

Figures 8 and 9 and Map 3. 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 datasets which, between them, cover the globe. 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. The forest cover in the map is defined as closed forest, which in general refers to canopy cover of more than 30 per cent. The global total matches very well with FAO's estimate of global forest cover in 1990. The classification of forests has been simplified to four forest types: tropical moist forest, tropical dry forest, temperate broadleaf and mixed forest, and needleleaf forest.

The fact that the greatest loss of forest has been in Asia is perhaps unsurprising as most of the world's population is Asian and agriculture has been practised in Asia for longer than anywhere else. Although it is possible to see a significant reduction in the area of all types of forest, the figures underestimate the true magnitude of impacts on forest biodiversity as much of the current forest cover has regrown or been planted and is therefore generally of lower biological quality.

Page 8 FRESHWATER ECOSYSTEMS

Figure 10. For 227 freshwater species it was possible to locate qualitative information on population trends and estimate with considerable confidence 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 and gallinules, skimmers and dippers, stilts, and storks; 72 reptiles – crocodilians and turtles; and 44 fishes – grayling, lampreys, paddlefish, and sturgeons.

The total number of species in each category for each time period was 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 1997.

Figure 2b and Map 4. Quantitative population data from more than one point in time were available for 70 out of the 227 species. These data points were used to calculate the freshwater ecosystems index, which represents the changes from 1970 to 1995 in a hypothetical population that is typical of the sample. **Map 4** shows the approximate locations of a selection of the species used to construct the index. The 70 species are:

MAMMALS
Insectivores
Desmana moschata

River dolphins
Lipotes vexillifer
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 americana
Aythya marila
Aythya nyroca
Aythya valisineria
Cygnus olor
Marmaronetta angustirostris
Mergus albellus
Mergus merganser
Netta rufina
Nettapus auritus
Tadorna ferruginea

Flamingos
Phoenicopterus andinus
Phoenicopterus chilensis
Phoenicopterus jamesi
Phoenicopterus minor
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
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

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 11. The base line information is taken from *Project Aqua*, a project designed to document information on more than 600 water bodies judged worthy of conservation (Luther

and Rzóska 1971). Some of the *Project Aqua* data appear to have been collected in 1970, but the published information relates essentially to the 1960s. A substantial number of lakes treated in *Project Aqua* are also treated in later information sources, such as the *Directory of Asian Wetlands* (Scott 1989) and the *Lakes Database* (ILEC web site), and in these cases it is often possible to make an assessment at a later time point and so determine the extent of change. Entries for 93 lakes were compared and each given a simple score according to whether their condition appears to have declined (or impacts increased), stayed the same, or improved. Three categories of information were used in the scoring: present usage; threats from possible or proposed developments; and other information. No change will sometimes mean no new information. The results are based on uneven sampling and non-standard reporting, but may be taken as a valid indication of the general direction of change over recent decades. However, not all remedial measures taken within the past 10 years or so, or their beneficial effects, will have been reported in the information sources used.

Page 10 MARINE ECOSYSTEMS

Figure 12. It was possible to locate qualitative information on population trends for 116 marine vertebrate species and estimate with considerable confidence 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 status for each time period is an indication of any changes in the general status of global marine ecosystems from the 1970s through to 1997. The species in the sample consist of 36 mammals – marine otters, sirenians, 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 33 fishes – cods, flatfish, herrings, sole, seaperch and redfish, tuna and mackerel, and other marine fish.

Figure 2c and Map 5. Quantitative population data from more than one point in time were available for 87 out of the 116 species. These data points were used to calculate the marine 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 5**. The 87 species are:

MAMMALS
Sea otter
Enhydra lutris

Fur seals
Arctocephalus australis
Arctocephalus forsteri
Arctocephalus galapagoensis
Arctocephalus philippii
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
Eschrichtius robustus
Balaena mysticetus
Balaenoptera borealis
Balaenoptera edeni
Balaenoptera musculus
Balaenoptera physalus
Megaptera novaeangliae

Toothed whales
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
Morus bassanus
Morus capensis
Papasula abbotti
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
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
Clupea harengus
Clupea pallasi
Sprattus sprattus

Seaperch and redfish
Sebastes alutus
Sebastes mentella
Sebastolobus alascanus

Tunas and mackerel
Thunnus albacares
Thunnus obesus
Thunnus thynnus
Scomber scombrus

Other marine fish
Anoplopoma fimbria
Mallotus villosus
Pleurogrammus monopterygius
Urophycis tenuis

Page 12 GRAIN CONSUMPTION

Figures 13 to 15 and Map 6. All data came from the FAOSTAT database of national grain and meat production and trade. Grain-equivalent consumption was calculated as the consumption of grain, plus its indirect consumption in the form of meat, plus seed, processed, and waste grain. In calculating a country's consumption, all imports and exports of grain, meat, and poultry were taken into account.

Apart from the inherent inefficiency of converting vegetable matter into meat, animals are also more demanding of water and energy than crops (see table). 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.

Food, energy, and water requirements of crops and livestock

Food	grain requirement: kg grain input per kg meat output (FAO)	energy requirement: Joule input per Joule output (Lünzer 1992)	water requirement: litres per kg meat (Pimentel 1997)
wheat	0	0.1-0.4	900
maize	0		1 400
rice	0	0.1-0.4	1 910
milk		0.8-8	
eggs		0.5-10	
poultry (battery-farmed)	2.0-2.5	7	3 500
pork	3.0-4.0		
beef (industrial production)	3.0-7.0	35	100 000

Page 14 MARINE FISH CONSUMPTION

Figure 16. Annual data on fish production 1961-1983 come from FAOSTAT and include all marine fish, crustaceans, molluscs and cephalopods, capture and culture fisheries; 1984-1995 data come from FAO recent trends in global fishery production (www.fao.org) which includes all of the above except those produced by mariculture.

Figures 17 and 18 and Map 7. The statistics on fish consumption came from the FAOSTAT database on nutrition and FAO Fisheries Department (FAO 1997, Grainger and Garcia 1996). Consumption includes marine fish, crustaceans, cephalopods and other molluscs, and non-food fish meal and fish oil. All imports and exports of both food fish and non-food fish were taken into account. Freshwater fish were not included, nor was by-catch as this is difficult to attribute to a consumer country. Farmed (mariculture) fish are included in this dataset. The difference in total world fish consumption and total world fish production in 1995 is explained by the inclusion of farmed fish in the consumption data and also the inclusion of data from Taiwan, which are not included in the production data.

Page 16 WOOD CONSUMPTION

Figure 19. Figures on wood production came from the FAOSTAT forestry database. The data include fuelwood and industrial roundwood.

The world's forests, managed sustainably, could still provide enough wood to meet current needs. On the basis of the world's current forest cover and the potential sustainable yields of eight different forest types, allowing for 10 per cent protected areas in each, total annual yield could be as high as 4 billion cubic metres (m^3), or 0.7m^3 per person per year. The eight forest types are based on the four types used to classify forest ecosystems, incorporating differences between tropical forest productivity in the Americas and the rest of the world, plus plantations.

Figures 20 and 21 and Map 7. Calculations were made from the FAOSTAT database of national production, imports, and exports of wood and wood products. 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 were not converted as the wood waste generated in their production is usually used elsewhere in the industry for fibre, pulp, or energy.

National consumption of wrme is estimated as the volume of production of wood raw material, plus the volume of net trade in all wood raw material and products.

Page 20 FRESHWATER WITHDRAWALS

According to Postel et al. (1996), humanity now uses 54 per cent of freshwater runoff that is geographically and temporally accessible.

Figures 22 to 24 and Map 9. Annual withdrawals of freshwater per person by country and region came from unpublished data on freshwater resources and availability from a study led by the Russian State Hydrological Institute (Shiklomanov et al.), undertaken for the United Nations (WMO et al. 1997). Some studies prefer to measure each country's withdrawals of freshwater as a fraction of its annual renewable resource. However, this masks the fact that in many countries freshwater may not be accessible throughout the country or available throughout the year. The Sahel region, for example, faces severe water shortages although it uses less than 10 per cent of its annual renewable freshwater resource.

Page 22 CARBON DIOXIDE EMISSIONS

Figures 25 to 27 and Map 10. The data include emissions from the combustion of fossil fuels (coal, oil, and natural gas), gas flaring, cement manufacture, and bunker fuels, from Marland and Boden (1998). Gas flaring is the burning of unwanted natural gas at oil well-heads. The manufacture of cement releases CO_2 from the breakdown of calcium carbonate. Bunker fuels are used in international marine and aviation transport. Conventional emissions inventories omit bunker fuels from national accounts because of the problem of attributing them to any one country. However, as bunker fuels are responsible for 2-3 per cent of global emissions, and perhaps as much as 10 per cent of global warming, they have been included and attributed to the country in which the fuel is loaded on to the aircraft or ship. Singapore has high per person emissions in part because it is an international transport hub.

Page 24 CEMENT CONSUMPTION

Figures 28 to 30 and Map 11. National data on cement production were used where data on consumption are not available. Production is an adequate substitute for consumption as most cement is consumed within the producing country and ground deliveries of cement generally do not exceed 150km. Marland and Boden (1998) give figures on CO_2 emissions from cement manufacture, which have been converted into cement production at a rate of 2 tonnes of cement per tonne of CO_2. Data on consumption are available for the top 15 consuming countries from the Centre for Concrete Information (1997).

NATIONAL AND REGIONAL CONSUMPTION units per person per year, 1995

Country	POPULATION (millions)	GRAIN Total (kg grain-equivalent)	GRAIN Meat (kg grain-equivalent)	GRAIN Food grain (kg)	GRAIN Seed, waste, and processing (kg)	FISH Marine (kg)	WOOD Total (m^3 wrme)	WOOD Fuelwood and charcoal (m^3)	WOOD Timber, pulp, and paper (m^3 wrme)	FRESHWATER Withdrawals (m^3)	CO_2 Emissions (t)	CEMENT (kg)	CONSUMPTION PRESSURE (average consumer equivalents)
World average	**N.A**	**316**	**125**	**152**	**40**	**15.9**	**0.58**	**0.32**	**0.26**	**644**	**4.01**	**242**	**1.00**
AFRICA													
Algeria	27.94	316	52	236	28	3.6	0.14	0.08	0.06	180	3.32	222	0.58
Angola	11.07	111	42	63	6	10.2	0.63	0.54	0.09	57	0.65	27	0.41
Benin	5.41	182	41	102	39	6.1	1.09	1.03	0.06	28	0.13	70	0.54
Botswana	1.49	251	94	133	24	6.5	1.07	1.00	0.07	81	1.51	I.D	0.71
Burkina Faso	10.32	247	3	208	37	0.6	0.97	0.93	0.04	40	0.09	I.D	0.52
Burundi	6.39	64	14	34	16	0.1	0.78	0.76	0.02	20	0.04	I.D	0.32
Cameroon	13.23	171	44	109	17	6.9	1.17	0.93	0.23	38	0.32	39	0.55
Central African Rep.	3.32	140	85	48	8	0.2	1.16	0.98	0.18	26	0.08	I.D	0.50
Chad	6.36	187	37	127	23	I.D	0.72	0.61	0.11	34	0.02	I.D	I.D
Congo	2.59	118	54	59	5	23.0	1.45	0.91	0.54	20	0.50	39	0.77
Congo, Dem. Rep. (Zaire)	43.90	54	13	36	6	1.8	1.07	1.00	0.08	10	0.06	2	0.36
Côte d'Ivoire	14.25	176	30	121	25	11.1	0.99	0.81	0.18	66	0.75	35	0.57
Egypt	62.93	352	60	251	41	4.3	0.11	0.04	0.07	881	1.54	255	0.73
Eritrea	3.53	I.D	21	I.D	I.D	I.D	I.D	I.D	I.D	57	I.D	I.D	I.D
Ethiopia	55.05	I.D	27	I.D	I.D	0.0	0.86	0.83	0.03	36	0.07	17	0.33
Gabon	1.32	212	116	80	16	33.0	I.D	I.D	I.D	59	3.00	99	0.80
Gambia, The	1.12	169	20	132	17	14.6	1.09	0.99	0.10	32	0.19	I.D	0.69
Ghana	17.45	133	22	88	24	18.8	1.50	1.44	0.06	17	0.24	80	0.77
Guinea	6.70	151	16	110	24	6.4	0.72	0.62	0.10	140	0.17	I.D	0.48
Guinea-Bissau	1.07	234	55	161	18	5.2	0.54	0.39	0.15	21	0.23	I.D	0.42
Kenya	28.26	185	52	124	10	0.2	1.48	1.41	0.07	87	0.24	53	0.59
Lesotho	2.05	240	53	172	15	3.9	I.D	I.D	I.D	30	I.D	I.D	I.D
Liberia	3.04	I.D	13	I.D	I.D	2.0	2.06	1.74	0.33	55	0.12	I.D	I.D
Libya	5.41	289	67	193	29	5.6	0.17	0.10	0.07	879	7.43	426	1.09
Madagascar	14.76	204	68	114	22	5.7	0.74	0.71	0.03	1 567	0.08	4	0.79
Malawi	11.13	201	13	160	28	0.2	0.94	0.89	0.05	87	0.07	13	0.41
Mali	10.80	277	56	194	27	0.4	0.61	0.57	0.04	162	0.05	2	0.37
Mauritania	2.27	220	50	160	9	13.6	0.01	0.00	0.00	814	1.38	165	0.64
Mauritius	1.12	276	107	158	11	32.4	0.16	0.01	0.15	322	2.11	I.D	0.84
Morocco	27.03	358	50	262	46	16.6	0.13	0.05	0.08	427	1.09	241	0.72
Mozambique	16.00	109	20	83	7	1.9	1.15	1.08	0.07	41	0.08	1	0.42
Namibia	1.54	I.D	65	124	I.D	I.D	I.D	I.D	I.D	181	I.D	I.D	I.D
Niger	9.15	307	34	220	53	0.1	0.64	0.60	0.04	69	0.13	3	0.37
Nigeria	111.72	196	27	125	43	5.8	1.00	0.92	0.08	42	0.83	23	0.51
Rwanda	7.95	I.D	8	I.D	I.D	0.2	0.71	0.68	0.04	102	0.07	1	0.29
Senegal	8.31	242	55	163	24	32.3	0.63	0.54	0.09	205	0.46	71	0.77
Sierra Leone	4.51	144	15	115	14	10.0	0.74	0.71	0.03	99	0.17	I.D	0.51

0 = negligible I.D = insufficient data N.A = not applicable Totals may not add up due to rounding

Country *units per person per year*	POPULATION (millions)	GRAIN Total (kg grain-equivalent)	Meat (kg grain-equivalent)	Food grain (kg)	Seed, waste, and processing (kg)	FISH Marine (kg)	WOOD Total (m^3 wrme)	Fuelwood and charcoal (m^3)	Timber, pulp, and paper (m^3 wrme)	FRESHWATER Withdrawals (m^3)	CO_2 Emissions (t)	CEMENT (kg)	CONSUMPTION PRESSURE (average consumer equivalents)
AFRICA cont.													
Somalia	9.25	I.D	32	I.D	I.D	1.2	0.95	0.94	0.01	99	I.D	3	I.D
South Africa	41.47	333	124	187	23	28.6	0.56	0.17	0.39	359	7.56	219	1.19
Sudan	28.10	233	56	158	18	0.2	0.91	0.82	0.09	633	0.13	9	0.56
Tanzania	29.69	185	40	111	33	1.4	1.24	1.17	0.07	40	0.09	27	0.50
Togo	4.14	144	28	91	25	8.6	0.58	0.52	0.06	28	0.18	85	0.41
Tunisia	8.90	296	56	202	38	7.9	0.49	0.38	0.12	381	1.79	484	0.89
Uganda	21.30	123	35	59	29	I.D	0.81	0.70	0.11	9	0.05	6	0.37
Zambia	9.46	216	29	159	27	0.9	1.54	1.42	0.12	186	0.27	32	0.65
Zimbabwe	11.26	188	24	146	17	0.3	0.72	0.56	0.16	136	0.87	89	0.44
Regional average	N.A	194	42	130	25	6.0	0.80	0.71	0.09	229	1.06	79	0.55
MIDDLE EAST AND CENTRAL ASIA													
Afghanistan	20.14	I.D	31	I.D	I.D	I.D	0.38	0.30	0.08	1 773	0.06	6	I.D
Armenia	3.60	301	56	147	99	I.D	I.D	I.D	I.D	1 142	1.01	56	I.D
Azerbaijan	7.56	343	40	181	122	I.D	I.D	I.D	I.D	2 257	5.64	26	I.D
Georgia	5.46	388	87	180	121	6.2	I.D	I.D	I.D	743	1.42	18	0.64
Iran	67.28	293	58	211	24	10.7	0.13	0.04	0.09	1 272	3.95	243	0.96
Iraq	20.45	177	21	132	23	0.2	0.01	0.01	0.00	2 556	4.84	881	1.57
Israel	5.63	337	173	145	19	52.5	0.40	0.00	0.39	405	8.56	623	1.73
Jordan	5.44	230	64	151	15	3.2	0.09	0.00	0.09	167	2.59	736	0.84
Kazakhstan	17.11	555	188	220	148	I.D	0.00	0.00	0.00	2 580	12.95	105	1.89
Kuwait	1.55	334	191	128	16	11.5	0.20	0.04	0.16	305	32.63	1 295	2.68
Kyrgyzstan	4.75	349	130	131	88	I.D	I.D	I.D	I.D	2 730	1.15	63	I.D
Lebanon	3.01	271	124	137	10	0.7	0.29	0.17	0.12	391	4.61	998	1.21
Oman	2.16	I.D	87	I.D	I.D	33.1	0.10	0.00	0.10	242	5.69	648	1.35
Saudi Arabia	17.88	301	111	168	22	10.9	0.19	0.01	0.18	285	16.30	896	1.70
Syria	14.66	337	38	232	68	0.8	0.03	0.00	0.03	744	3.16	410	0.80
Tajikistan	6.10	349	34	188	127	I.D	I.D	I.D	I.D	2 450	0.61	16	I.D
Turkey	61.95	408	56	233	120	11.2	0.35	0.14	0.21	585	2.70	460	1.01
Turkmenistan	4.10	414	101	187	126	I.D	I.D	I.D	I.D	6 388	6.92	98	I.D
United Arab Emirates	2.38	402	249	125	27	49.7	0.43	0.01	0.41	345	29.67	I.D	2.61
Uzbekistan	22.84	413	99	188	126	I.D	0.00	0.00	0.00	4 021	4.33	153	1.85
Yemen	14.50	205	34	164	6	6.0	0.03	0.02	0.01	234	1.03	69	0.33
Regional average	N.A	316	71	182	66	7.4	0.15	0.06	0.09	1 461	4.89	345	1.11
ASIA/PACIFIC													
Australia	18.09	554	369	105	80	39.3	1.55	0.16	1.39	1 510	16.50	332	2.46
Bangladesh	120.43	194	10	170	14	1.7	0.27	0.26	0.01	220	0.17	2	0.26
Bhutan	1.64	I.D	21	I.D	I.D	I.D	0.90	0.87	0.03	14	0.15	85	I.D
Cambodia	10.25	247	42	177	28	1.7	0.74	0.65	0.08	64	0.05	I.D	0.45
China	1 221.46	357	145	182	30	12.5	0.26	0.17	0.09	413	2.62	352	0.85
Hong Kong	5.87	545	418	118	9	58.2	1.00	0.05	0.95	158	7.97	327	1.78
India	935.74	197	17	161	19	2.3	0.32	0.29	0.03	649	0.97	65	0.47
Indonesia	197.59	238	31	189	18	14.6	0.90	0.76	0.14	420	1.51	122	0.79

Country *units per person per year*	POPULATION (millions)	GRAIN Total (kg grain-equivalent)	Meat (kg grain-equivalent)	Food grain (kg)	Seed, waste, and processing (kg)	FISH Marine (kg)	WOOD Total (m^3 wrme)	Fuelwood and charcoal (m^3)	Timber, pulp, and paper (m^3 wrme)	FRESHWATER Withdrawals (m^3)	CO_2 Emissions (t)	CEMENT (kg)	CONSUMPTION PRESSURE (average consumer equivalents)
ASIA/PACIFIC cont.													
Japan	125.10	309	153	129	28	99.0	0.47	0.01	0.46	735	9.31	636	2.35
Korea, D.P.R.	23.92	224	35	159	31	68.7	0.22	0.18	0.04	686	10.75	712	2.02
Korea, Rep.	45.00	374	142	168	65	61.2	0.40	0.11	0.29	657	8.69	1 256	2.35
Laos	4.88	255	39	181	35	0.1	1.10	0.92	0.18	258	0.06	I.D	0.63
Malaysia	20.14	282	144	126	11	39.8	2.01	0.48	1.53	648	5.34	530	1.90
Mongolia	2.41	390	239	118	33	0.9	0.21	0.16	0.05	273	3.51	45	0.52
Myanmar	46.53	271	26	221	24	13.1	0.50	0.44	0.06	101	0.15	11	0.46
Nepal	21.92	263	34	199	30	I.D	0.95	0.92	0.03	150	0.07	10	0.55
New Zealand	3.58	621	480	97	44	16.7	I.D	I.D	I.D	557	8.43	196	1.36
Pakistan	140.50	206	44	149	13	2.7	0.22	0.20	0.02	1 985	0.61	61	0.78
Papua New Guinea	4.30	149	70	76	3	25.4	2.04	1.29	0.76	28	0.59	I.D	1.16
Philippines	67.58	231	85	137	9	34.6	0.61	0.54	0.07	726	0.93	145	0.99
Singapore	2.85	I.D	256	I.D	I.D	46.7	0.75	0.02	0.73	67	34.84	668	3.16
Sri Lanka	18.35	180	16	153	11	15.1	0.51	0.49	0.02	567	0.39	49	0.60
Taiwan	21.30	353	235	101	17	124.3	0.48	0.00	0.48	I.D	8.53	1 258	3.42
Thailand	58.79	212	61	121	30	50.0	0.73	0.62	0.11	596	2.98	572	1.52
Viet Nam	74.55	272	65	181	26	9.8	0.47	0.41	0.06	414	0.43	101	0.58
Regional average	N.A	277	85	168	24	15.5	0.38	0.28	0.11	569	2.31	244	0.83
LATIN AMERICA AND THE CARIBBEAN													
Argentina	34.59	526	346	130	51	9.0	0.37	0.15	0.22	1 035	3.77	185	1.03
Bolivia	7.41	306	157	124	24	0.9	0.34	0.17	0.17	210	1.41	95	0.45
Brazil	161.79	366	220	104	42	5.0	1.29	0.84	0.45	290	1.58	173	0.88
Chile	14.26	351	201	136	14	185.5	1.54	0.70	0.84	1 627	3.09	211	3.27
Colombia	35.10	248	138	101	10	11.8	0.61	0.51	0.11	172	1.93	275	0.74
Costa Rica	3.42	283	157	114	12	4.6	1.57	0.98	0.59	394	1.53	289	1.02
Cuba	11.04	184	73	100	11	11.0	0.29	0.23	0.06	868	2.65	109	0.71
Dominican Rep.	7.82	228	127	89	12	11.8	0.20	0.13	0.07	445	1.51	186	0.61
Ecuador	11.46	218	114	92	12	12.8	0.97	0.45	0.52	583	2.05	201	0.90
El Salvador	5.77	236	62	161	14	1.5	1.23	1.15	0.07	173	0.90	152	0.68
Guatemala	10.62	217	53	150	14	1.2	1.36	1.25	0.10	141	0.68	147	0.68
Haiti	7.18	I.D	33	I.D	I.D	2.6	0.90	0.86	0.04	7	0.09	7	0.36
Honduras	5.65	193	50	127	16	2.6	1.16	1.04	0.12	293	0.68	116	0.65
Jamaica	2.45	224	114	97	12	20.7	0.42	0.22	0.20	169	3.74	214	0.80
Mexico	93.67	373	153	177	43	14.4	0.29	0.17	0.12	899	3.84	224	0.98
Nicaragua	4.43	188	43	130	15	1.5	0.85	0.83	0.03	381	0.61	79	0.54
Panama	2.63	319	180	123	16	34.3	0.48	0.36	0.12	751	2.62	133	1.06
Paraguay	4.96	430	315	76	39	0.6	2.03	1.31	0.72	109	0.77	115	0.96
Peru	23.78	197	81	105	10	38.7	0.55	0.45	0.10	787	1.29	88	0.99
Puerto Rico	3.67	I.D	70	I.D	I.D	0.5	I.D	I.D	I.D	I.D	4.38	385	I.D
Trinidad and Tobago	1.31	212	80	115	17	9.2	0.19	0.02	0.18	115	13.71	460	1.18
Uruguay	3.19	570	406	110	54	9.9	1.33	0.96	0.38	1 358	1.81	189	1.35
Venezuela	21.84	337	178	126	33	19.6	0.17	0.04	0.13	188	8.46	316	1.05
Regional average	N.A	332	180	121	32	15.7	0.81	0.54	0.27	533	2.58	191	0.95

Country *units per person per year*	POPULATION (millions)	GRAIN Total (kg grain-equivalent)	Meat (kg grain-equivalent)	Food grain (kg)	Seed, waste, and processing (kg)	FISH Marine (kg)	WOOD Total (m^3 wrme)	Fuelwood and charcoal (m^3)	Timber, pulp, and paper (m^3 wrme)	FRESHWATER Withdrawals (m^3)	CO_2 Emissions (t)	CEMENT (kg)	CONSUMPTION PRESSURE (average consumer equivalents)
NORTH AMERICA													
Canada	29.46	560	349	95	116	31.7	1.81	0.18	1.63	1 604	14.95	234	2.35
United States	263.25	692	431	115	147	23.1	2.08	0.36	1.72	1 870	19.83	334	2.74
Regional average	N.A	679	423	113	144	23.9	2.05	0.34	1.71	1 843	19.34	324	2.70
WESTERN EUROPE													
Austria	7.97	545	387	95	63	26.1	0.73	0.42	0.31	304	7.52	753	1.68
Belgium/Luxembourg	10.52	467	317	100	49	46.8	0.81	0.06	0.74	858	12.26	593	2.11
Denmark	5.18	593	372	104	117	134.5	1.35	0.11	1.25	234	11.96	193	2.80
Finland	5.11	418	238	82	98	65.1	1.77	0.81	0.96	439	10.38	196	2.09
France	57.98	489	333	113	43	35.8	0.98	0.17	0.81	665	6.21	345	1.58
Germany	81.59	443	294	88	61	14.7	0.78	0.05	0.73	580	10.53	466	1.52
Greece	10.45	476	275	148	53	37.9	0.35	0.13	0.23	665	8.63	670	1.74
Ireland	3.55	507	278	132	98	39.9	0.98	0.02	0.96	225	9.50	563	1.81
Italy	57.19	480	296	159	25	30.4	0.60	0.10	0.50	986	7.44	568	1.70
Netherlands	15.50	443	317	69	56	107.6	0.58	0.02	0.56	519	11.59	323	2.37
Norway	4.34	362	212	116	34	251.0	0.78	0.20	0.58	46	17.26	323	4.00
Portugal	9.82	423	260	127	36	66.4	0.36	0.06	0.30	739	5.60	814	2.01
Spain	39.62	465	320	103	42	59.0	0.52	0.07	0.45	782	6.26	644	1.92
Sweden	8.78	393	235	99	59	42.8	2.34	0.44	1.90	341	5.62	240	1.82
Switzerland	7.20	393	266	101	27	31.1	1.01	0.12	0.90	160	5.92	556	1.50
United Kingdom	58.26	389	240	94	55	39.6	0.68	0.01	0.67	205	9.71	223	1.43
Regional average	N.A	452	294	109	49	41.6	0.77	0.10	0.67	594	8.58	451	1.72
CENTRAL AND EASTERN EUROPE													
Albania	3.44	307	108	119	80	0.9	0.13	0.10	0.03	103	0.54	58	0.30
Belarus	10.14	585	250	200	135	I.D	0.97	0.08	0.89	294	5.85	122	1.19
Bosnia and Herzegovina	3.46	I.D	70	I.D	I.D	0.9	I.D	I.D	0.01	432	0.53	43	I.D
Bulgaria	8.77	492	189	163	140	2.4	0.32	0.10	0.22	1 548	6.57	240	1.21
Croatia	4.50	262	119	95	47	6.8	0.55	0.20	0.35	432	3.81	379	0.90
Czech Rep.	10.30	523	318	120	85	11.0	1.05	0.07	0.98	266	10.89	469	1.54
Estonia	1.53	372	182	114	76	39.8	2.23	0.36	1.87	2 105	10.94	273	2.44
Hungary	10.12	493	264	120	110	17.5	0.55	0.18	0.36	660	5.53	297	1.21
Latvia	2.56	I.D	192	I.D	I.D	36.4	2.22	0.35	1.87	263	3.65	80	1.55
Lithuania	3.70	619	214	242	163	32.2	1.29	0.27	1.02	1 194	4.01	176	1.63
Macedonia	2.16	328	128	137	63	10.7	0.39	0.30	0.09	432	4.97	231	0.87
Moldova	4.43	397	95	181	121	I.D	0.04	0.00	0.04	854	2.44	11	0.66
Poland	38.39	499	244	155	100	10.6	0.49	0.07	0.42	322	8.87	362	1.22
Romania	22.84	593	198	202	193	4.4	0.52	0.12	0.40	1 102	5.31	263	1.20
Russian Federation	147.00	471	204	159	107	20.2	0.65	0.20	0.46	792	12.38	240	1.53
Slovakia	5.35	445	213	121	111	I.D	0.82	0.08	0.74	337	7.11	468	1.41
Slovenia	1.95	567	349	143	75	17.1	0.87	0.09	0.78	432	6.02	515	1.45
Ukraine	51.38	440	168	162	109	8.7	0.00	0.00	0.00	674	8.54	214	1.00
Yugoslavia	10.85	604	342	146	116	14.0	0.12	0.00	0.11	432	3.05	157	0.84
Regional average	N.A	474	209	157	111	13.9	0.53	0.13	0.40	696	9.25	252	1.29

NATIONAL AND REGIONAL CONSUMPTION units per year, 1995

Country	POPULATION (millions)	GRAIN Total (million t grain-equivalent)	GRAIN Meat (million t grain-equivalent)	GRAIN Food grain (million t)	GRAIN Seed, waste, and processing (million t)	FISH Marine (million t)	WOOD Total (million m³ wrme)	WOOD Fuelwood and charcoal (million m³)	WOOD Timber, pulp, and paper (million m³ wrme)	FRESHWATER Withdrawals (billion m³)	CO_2 Emissions (million t)	CEMENT (million t)	TOTAL CONSUMPTION PRESSURE (million average consumer equivalents)
World total	**5 737.73**	1 815.73	716.10	874.03	230.64	91.22	3 317.10	1 852.01	1 465.14	3 694.21	23 015.83	1 386.38	**5 737.73**
AFRICA													
Algeria	27.94	8.83	1.46	6.58	0.79	0.10	3.89	2.13	1.77	5.02	92.74	6.21	16.27
Angola	11.07	1.23	0.47	0.69	0.07	0.11	7.02	6.01	1.01	0.63	7.17	0.30	4.53
Benin	5.41	0.98	0.22	0.55	0.21	0.03	5.90	5.58	0.32	0.15	0.69	0.38	2.90
Botswana	1.49	0.37	0.14	0.20	0.04	0.01	1.58	1.49	0.10	0.12	2.24	I.D	1.05
Burkina Faso	10.32	2.55	0.03	2.14	0.38	0.01	10.04	9.58	0.46	0.41	0.96	I.D	5.34
Burundi	6.39	0.41	0.09	0.22	0.10	0.00	4.97	4.86	0.11	0.13	0.23	I.D	2.04
Cameroon	13.23	2.26	0.59	1.44	0.23	0.09	15.46	12.37	3.08	0.50	4.19	0.52	7.27
Central African Rep.	3.32	0.47	0.28	0.16	0.03	0.00	3.83	3.25	0.58	0.09	0.28	I.D	1.67
Chad	6.36	1.19	0.23	0.81	0.15	I.D	4.55	3.88	0.67	0.22	0.15	I.D	I.D
Congo	2.59	0.30	0.14	0.15	0.01	0.06	3.75	2.35	1.40	0.05	1.30	0.10	2.00
Congo, Dem. Rep. (Zaire)	43.90	2.39	0.57	1.56	0.25	0.08	47.18	43.85	3.33	0.42	2.58	0.10	15.98
Côte d'Ivoire	14.25	2.51	0.42	1.73	0.36	0.16	14.14	11.54	2.60	0.94	10.63	0.50	8.09
Egypt	62.93	22.18	3.78	15.81	2.58	0.27	6.81	2.63	4.18	55.43	96.86	16.02	45.88
Eritrea	3.53	I.D	0.07	I.D	I.D	I.D	I.D	I.D	I.D	0.20	I.D	I.D	I.D
Ethiopia	55.05	I.D	1.46	I.D	I.D	0.00	47.35	45.61	1.74	2.00	3.73	0.96	17.99
Gabon	1.32	0.28	0.15	0.11	0.02	0.04	I.D	I.D	I.D	0.08	3.96	0.13	1.05
Gambia, The	1.12	0.19	0.02	0.15	0.02	0.02	1.22	1.11	0.12	0.04	0.22	I.D	0.77
Ghana	17.45	2.32	0.38	1.53	0.41	0.33	26.18	25.19	0.99	0.30	4.21	1.40	13.43
Guinea	6.70	1.01	0.11	0.74	0.16	0.04	4.80	4.15	0.65	0.94	1.12	I.D	3.19
Guinea-Bissau	1.07	0.25	0.06	0.17	0.02	0.01	0.58	0.42	0.16	0.02	0.25	I.D	0.45
Kenya	28.26	5.24	1.47	3.49	0.27	0.01	41.76	39.77	1.99	2.45	6.86	1.50	16.81
Lesotho	2.05	0.49	0.11	0.35	0.03	0.01	I.D	I.D	I.D	0.06	I.D	I.D	I.D
Liberia	3.04	I.D	0.04	I.D	I.D	0.01	6.27	5.28	0.99	0.17	0.37	I.D	I.D
Libya	5.41	1.56	0.36	1.04	0.15	0.03	0.89	0.54	0.36	4.75	40.18	2.30	5.88
Madagascar	14.76	3.01	1.01	1.68	0.33	0.08	10.90	10.46	0.44	23.14	1.18	0.06	11.69
Malawi	11.13	2.24	0.14	1.79	0.31	0.00	10.49	9.94	0.55	0.97	0.76	0.14	4.61
Mali	10.80	2.99	0.60	2.09	0.30	0.00	6.54	6.12	0.42	1.75	0.52	0.02	3.99
Mauritania	2.27	0.50	0.11	0.36	0.02	0.03	0.02	0.01	0.01	1.85	3.14	0.38	1.46
Mauritius	1.12	0.31	0.12	0.18	0.01	0.04	0.18	0.01	0.17	0.36	2.35	I.D	0.94
Morocco	27.03	9.67	1.34	7.08	1.25	0.45	3.50	1.45	2.05	11.54	29.56	6.51	19.52
Mozambique	16.00	1.75	0.32	1.32	0.11	0.03	18.44	17.32	1.12	0.66	1.21	0.02	6.80
Namibia	1.54	I.D	0.10	0.19	I.D	I.D	I.D	I.D	I.D	0.28	I.D	I.D	I.D
Niger	9.15	2.81	0.31	2.01	0.48	0.00	5.87	5.50	0.36	0.63	1.17	0.03	3.41
Nigeria	111.72	21.90	3.05	13.99	4.85	0.65	111.22	102.78	8.45	4.65	93.09	2.60	57.23
Rwanda	7.95	I.D	0.06	I.D	I.D	0.00	5.67	5.39	0.28	0.81	0.52	0.01	2.27
Senegal	8.31	2.01	0.46	1.35	0.20	0.27	5.27	4.50	0.77	1.70	3.85	0.59	6.40
Sierra Leone	4.51	0.65	0.07	0.52	0.06	0.05	3.33	3.20	0.13	0.45	0.76	I.D	2.31

I.D = insufficient data 0 = negligible

Country *units per year*	POPULATION (millions)	GRAIN Total (million t grain-equivalent)	Meat (million t grain-equivalent)	Food grain (million t)	Seed, waste, and processing (million t)	FISH Marine (million t)	WOOD Total (million m^3 wrme)	Fuelwood and charcoal (million m^3)	Timber, pulp, and paper (million m^3 wrme)	FRESHWATER Withdrawals (billion m^3)	CO_2 Emissions (million t)	CEMENT (million t)	TOTAL CONSUMPTION PRESSURE (million average consumer equivalents)
AFRICA cont.													
Somalia	9.25	I.D	0.30	I.D	I.D	0.01	8.79	8.69	0.11	0.91	I.D	0.03	I.D
South Africa	41.47	13.82	5.13	7.74	0.95	1.19	23.13	7.04	16.09	14.89	313.27	9.08	49.52
Sudan	28.10	6.54	1.59	4.43	0.52	0.01	25.45	23.06	2.39	17.80	3.64	0.25	15.78
Tanzania	29.69	5.49	1.20	3.30	0.99	0.04	36.75	34.59	2.16	1.19	2.60	0.80	14.90
Togo	4.14	0.60	0.11	0.38	0.11	0.04	2.41	2.16	0.25	0.12	0.74	0.35	1.68
Tunisia	8.90	2.63	0.50	1.79	0.34	0.07	4.40	3.36	1.05	3.39	15.91	4.31	7.90
Uganda	21.30	2.61	0.75	1.25	0.61	I.D	17.24	14.94	2.30	0.20	1.05	0.13	7.84
Zambia	9.46	2.04	0.28	1.51	0.26	0.01	14.59	13.44	1.16	1.76	2.52	0.30	6.14
Zimbabwe	11.26	2.11	0.27	1.65	0.20	0.00	8.08	6.27	1.81	1.53	9.74	1.00	4.97
Regional total	724.05	140.70	30.49	94.27	18.16	4.37	580.47	511.81	68.65	165.68	768.52	57.03	401.46
MIDDLE EAST AND CENTRAL ASIA													
Afghanistan	20.14	I.D	0.62	I.D	I.D	I.D	7.68	5.99	1.69	35.70	1.25	0.11	I.D
Armenia	3.60	1.08	0.20	0.53	0.36	I.D	I.D	I.D	I.D	4.11	3.65	0.20	I.D
Azerbaijan	7.56	2.59	0.30	1.37	0.92	I.D	I.D	I.D	I.D	17.06	42.61	0.20	I.D
Georgia	5.46	2.12	0.47	0.98	0.66	0.03	I.D	I.D	I.D	4.05	7.75	0.10	3.49
Iran	67.28	19.68	3.89	14.20	1.59	0.72	8.50	2.56	5.94	85.61	265.66	16.32	64.85
Iraq	20.45	3.61	0.44	2.71	0.47	0.00	0.16	0.11	0.05	52.26	99.07	18.02	32.07
Israel	5.63	1.90	0.97	0.82	0.11	0.30	2.24	0.01	2.22	2.28	48.21	3.50	9.75
Jordan	5.44	1.25	0.35	0.82	0.08	0.02	0.51	0.01	0.50	0.91	14.08	4.01	4.57
Kazakhstan	17.11	9.50	3.21	3.76	2.53	I.D	0.01	0.00	0.00	44.14	221.64	1.80	32.26
Kuwait	1.55	0.52	0.29	0.20	0.02	0.02	0.31	0.06	0.25	0.47	50.48	2.00	4.15
Kyrgyzstan	4.75	1.66	0.62	0.62	0.42	I.D	I.D	I.D	I.D	12.95	5.47	0.30	I.D
Lebanon	3.01	0.82	0.37	0.41	0.03	0.00	0.86	0.51	0.35	1.18	13.86	3.00	3.65
Oman	2.16	I.D	0.19	I.D	I.D	0.07	0.22	0.00	0.22	0.52	12.30	1.40	2.91
Saudi Arabia	17.88	5.38	1.99	3.00	0.40	0.20	3.39	0.09	3.30	5.09	291.53	16.02	30.35
Syria	14.66	4.95	0.55	3.40	1.00	0.01	0.49	0.02	0.47	10.91	46.37	6.01	11.77
Tajikistan	6.10	2.13	0.21	1.15	0.77	I.D	I.D	I.D	I.D	14.95	3.74	0.10	I.D
Turkey	61.95	25.29	3.44	14.43	7.41	0.70	21.68	8.54	13.14	36.24	167.42	28.50	62.86
Turkmenistan	4.10	1.70	0.41	0.77	0.52	I.D	I.D	I.D	I.D	26.19	28.35	0.40	I.D
United Arab Emirates	2.38	0.96	0.59	0.30	0.06	0.12	1.02	0.03	0.99	0.82	70.52	I.D	6.21
Uzbekistan	22.84	9.42	2.25	4.29	2.88	I.D	0.00	0.00	0.00	91.84	98.95	3.50	42.32
Yemen	14.50	2.97	0.50	2.38	0.09	0.09	0.48	0.32	0.16	3.40	14.89	1.00	4.80
Regional total	308.54	97.51	21.88	56.13	20.31	2.27	47.55	18.27	29.28	450.68	1 507.82	106.52	341.69
ASIA/PACIFIC													
Australia	18.09	10.02	6.68	1.89	1.45	0.71	28.05	2.88	25.17	27.31	298.43	6.01	44.43
Bangladesh	120.43	23.35	1.20	20.52	1.64	0.20	32.28	31.31	0.97	26.47	20.98	0.28	31.66
Bhutan	1.64	I.D	0.03	I.D	I.D	I.D	1.47	1.42	0.05	0.02	0.24	0.14	I.D
Cambodia	10.25	2.53	0.43	1.82	0.29	0.02	7.55	6.68	0.87	0.66	0.50	I.D	4.66
China	1 221.46	435.76	176.81	221.88	37.07	15.23	316.47	204.24	112.23	504.32	3 197.94	430.00	1 040.37
Hong Kong	5.87	3.20	2.45	0.69	0.05	0.34	5.89	0.31	5.58	0.93	46.76	1.92	10.47
India	935.74	184.07	15.67	150.93	17.47	2.16	300.58	274.24	26.34	607.23	911.42	60.60	443.05
Indonesia	197.59	47.05	6.18	37.36	3.51	2.89	177.41	150.32	27.09	83.06	298.70	24.10	156.78

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ASIA/PACIFIC cont.													
Japan	125.10	38.69	19.10	16.13	3.46	12.38	58.60	0.66	57.94	91.95	1 164.17	79.60	294.17
Korea, D.P.R.	23.92	5.37	0.83	3.79	0.75	1.64	5.19	4.32	0.87	16.41	257.17	17.02	48.22
Korea, Rep.	45.00	16.85	6.39	7.55	2.91	2.76	17.85	4.85	13.01	29.56	390.84	56.50	105.76
Laos	4.88	1.24	0.19	0.88	0.17	0.00	5.37	4.51	0.86	1.26	0.31	I.D	3.06
Malaysia	20.14	5.68	2.90	2.55	0.23	0.80	40.56	9.71	30.85	13.06	107.47	10.68	38.29
Mongolia	2.41	0.94	0.57	0.29	0.08	0.00	0.51	0.38	0.13	0.66	8.46	0.11	1.26
Myanmar	46.53	12.60	1.21	10.27	1.12	0.61	23.04	20.39	2.65	4.69	7.06	0.52	21.55
Nepal	21.92	5.75	0.74	4.36	0.65	I.D	20.83	20.20	0.63	3.28	1.53	0.22	12.12
New Zealand	3.58	2.22	1.72	0.35	0.16	0.06	I.D	I.D	I.D	1.99	30.14	0.70	4.86
Pakistan	140.50	28.94	6.19	20.98	1.77	0.38	30.72	28.12	2.60	278.84	85.88	8.60	109.81
Papua New Guinea	4.30	0.64	0.30	0.33	0.01	0.11	8.79	5.53	3.25	0.12	2.56	I.D	4.98
Philippines	67.58	15.64	5.76	9.25	0.62	2.34	41.24	36.32	4.92	49.04	63.15	9.81	66.72
Singapore	2.85	I.D	0.73	I.D	I.D	0.13	2.15	0.06	2.09	0.19	99.22	1.90	9.00
Sri Lanka	18.35	3.30	0.30	2.81	0.20	0.28	9.30	8.94	0.37	10.41	7.19	0.90	10.94
Taiwan	21.30	7.51	5.01	2.14	0.36	2.65	10.21	0.01	10.20	I.D	181.69	26.81	72.84
Thailand	58.79	12.46	3.58	7.09	1.79	2.94	43.11	36.58	6.53	35.04	175.17	33.60	89.34
Viet Nam	74.55	20.25	4.83	13.51	1.90	0.73	35.23	30.49	4.74	30.85	31.73	7.51	42.97
Regional total	3 192.75	884.04	269.81	537.35	77.64	49.37	1 222.40	882.47	339.93	1 817.34	7 388.72	777.53	2 649.26
LATIN AMERICA AND THE CARIBBEAN													
Argentina	34.59	18.20	11.96	4.49	1.75	0.31	12.65	5.18	7.47	35.81	130.56	6.41	35.62
Bolivia	7.41	2.27	1.17	0.92	0.18	0.01	2.52	1.27	1.25	1.56	10.48	0.70	3.32
Brazil	161.79	59.24	35.62	16.79	6.83	0.80	208.14	135.61	72.53	46.86	255.20	28.00	141.68
Chile	14.26	5.01	2.86	1.94	0.20	2.65	21.97	9.98	11.99	23.20	44.14	3.00	46.62
Colombia	35.10	8.70	4.83	3.53	0.33	0.41	21.58	17.79	3.79	6.03	67.57	9.64	26.15
Costa Rica	3.42	0.97	0.54	0.39	0.04	0.02	5.39	3.36	2.02	1.35	5.24	0.99	3.48
Cuba	11.04	2.03	0.81	1.11	0.12	0.12	3.24	2.54	0.70	9.59	29.26	1.20	7.81
Dominican Rep.	7.82	1.78	0.99	0.70	0.09	0.09	1.55	0.98	0.56	3.48	11.78	1.45	4.75
Ecuador	11.46	2.49	1.31	1.05	0.14	0.15	11.13	5.19	5.94	6.68	23.44	2.30	10.35
El Salvador	5.77	1.36	0.36	0.93	0.08	0.01	7.09	6.66	0.43	1.00	5.19	0.88	3.93
Guatemala	10.62	2.31	0.56	1.59	0.15	0.01	14.43	13.33	1.10	1.50	7.19	1.56	7.27
Haiti	7.18	I.D	0.24	I.D	I.D	0.02	6.48	6.18	0.30	0.05	0.66	0.05	2.56
Honduras	5.65	1.09	0.28	0.72	0.09	0.01	6.55	5.87	0.68	1.66	3.86	0.66	3.66
Jamaica	2.45	0.55	0.28	0.24	0.03	0.05	1.02	0.53	0.49	0.41	9.15	0.52	1.96
Mexico	93.67	34.91	14.38	16.54	3.99	1.35	27.63	16.31	11.32	84.21	359.58	21.00	91.68
Nicaragua	4.43	0.83	0.19	0.58	0.07	0.01	3.78	3.66	0.11	1.69	2.70	0.35	2.39
Panama	2.63	0.84	0.47	0.32	0.04	0.09	1.27	0.95	0.32	1.98	6.90	0.35	2.79
Paraguay	4.96	2.13	1.56	0.38	0.19	0.00	10.07	6.52	3.55	0.54	3.81	0.57	4.75
Peru	23.78	4.68	1.93	2.51	0.24	0.92	13.03	10.68	2.34	18.73	30.58	2.10	23.43
Puerto Rico	3.67	I.D	0.26	I.D	I.D	0.00	I.D	I.D	I.D	I.D	16.08	1.42	I.D
Trinidad and Tobago	1.31	0.28	0.10	0.15	0.02	0.01	0.25	0.02	0.23	0.15	17.91	0.60	1.54
Uruguay	3.19	1.82	1.29	0.35	0.17	0.03	4.25	3.05	1.20	4.33	5.77	0.60	4.29
Venezuela	21.84	7.36	3.89	2.75	0.72	0.43	3.73	0.90	2.83	4.10	184.78	6.91	22.95
Regional total	478.06	158.83	85.89	57.96	15.47	7.50	387.76	256.58	131.18	254.89	1 231.83	91.27	454.22

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NORTH AMERICA													
Canada	29.46	16.50	10.30	2.79	3.41	0.93	53.35	5.21	48.14	47.25	440.58	6.90	69.14
United States	263.25	182.29	113.47	30.15	38.66	6.07	548.09	94.95	453.14	492.26	5219.47	87.90	722.58
Regional total	292.71	198.79	123.77	32.95	42.08	7.00	601.44	100.16	501.28	539.51	5660.05	94.80	791.72
WESTERN EUROPE													
Austria	7.97	4.34	3.09	0.76	0.50	0.21	5.85	3.35	2.50	2.42	59.95	6.00	13.41
Belgium/Luxembourg	10.52	4.91	3.34	1.06	0.52	0.49	8.51	0.68	7.83	9.03	128.97	6.24	22.20
Denmark	5.18	3.07	1.93	0.54	0.61	0.70	7.00	0.55	6.45	1.21	61.97	1.00	14.52
Finland	5.11	2.13	1.21	0.42	0.50	0.33	9.03	4.14	4.89	2.24	52.99	1.00	10.69
France	57.98	28.36	19.32	6.56	2.48	2.08	57.10	10.00	47.10	38.57	360.10	20.00	91.90
Germany	81.59	36.16	23.98	7.19	4.99	1.20	63.46	4.25	59.21	47.30	859.20	38.00	124.11
Greece	10.45	4.98	2.87	1.55	0.56	0.40	3.71	1.33	2.38	6.95	90.24	7.00	18.22
Ireland	3.55	1.80	0.99	0.47	0.35	0.14	3.47	0.07	3.40	0.80	33.74	2.00	6.43
Italy	57.19	27.47	16.95	9.08	1.44	1.74	34.30	5.65	28.65	56.36	425.30	32.50	97.24
Netherlands	15.50	6.87	4.92	1.07	0.87	1.67	9.01	0.25	8.76	8.04	179.71	5.00	36.70
Norway	4.34	1.57	0.92	0.50	0.15	1.09	3.39	0.86	2.52	0.20	74.86	1.40	17.34
Portugal	9.82	4.16	2.56	1.24	0.35	0.65	3.57	0.60	2.97	7.26	55.04	8.00	19.74
Spain	39.62	18.42	12.68	4.07	1.66	2.34	20.62	2.66	17.95	30.97	248.15	25.50	76.06
Sweden	8.78	3.45	2.06	0.87	0.52	0.38	20.53	3.88	16.65	2.99	49.36	2.10	15.95
Switzerland	7.20	2.83	1.92	0.72	0.19	0.22	7.28	0.83	6.45	1.15	42.67	4.01	10.77
United Kingdom	58.26	22.66	13.97	5.49	3.20	2.31	39.73	0.45	39.27	11.93	565.95	13.00	83.16
Regional total	383.06	173.19	112.70	41.59	18.89	15.94	296.55	39.57	256.99	227.43	3 288.20	172.75	658.43
CENTRAL AND EASTERN EUROPE													
Albania	3.44	1.06	0.37	0.41	0.27	0.00	0.44	0.35	0.09	0.36	1.85	0.20	1.02
Belarus	10.14	5.94	2.54	2.03	1.37	I.D	9.86	0.81	9.05	2.98	59.35	1.24	12.07
Bosnia and Herzegovina	3.46	I.D	0.24	I.D	I.D	0.00	I.D	I.D	0.04	1.49	1.84	0.15	I.D
Bulgaria	8.77	4.31	1.66	1.43	1.23	0.02	2.77	0.86	1.91	13.58	57.60	2.10	10.65
Croatia	4.05	1.18	0.54	0.43	0.21	0.03	2.45	0.90	1.55	1.94	17.14	1.70	4.04
Czech Rep.	10.30	5.39	3.27	1.24	0.88	0.11	10.82	0.69	10.13	2.74	112.13	4.83	15.85
Estonia	1.53	0.57	0.28	0.17	0.12	0.06	3.42	0.55	2.86	3.22	16.74	0.42	3.74
Hungary	10.12	4.99	2.67	1.22	1.11	0.18	5.52	1.85	3.67	6.68	55.92	3.00	12.20
Latvia	2.56	I.D	0.49	I.D	I.D	0.09	5.67	0.90	4.77	0.67	9.32	0.20	3.97
Lithuania	3.70	2.29	0.79	0.89	0.60	0.12	4.77	1.00	3.77	4.42	14.82	0.65	6.04
Macedonia	2.16	0.71	0.28	0.30	0.14	0.02	0.84	0.64	0.20	0.93	10.76	0.50	1.89
Moldova	4.43	1.76	0.42	0.80	0.54	I.D	0.17	I.D	0.17	3.79	10.82	0.05	2.93
Poland	38.39	19.16	9.37	5.96	3.83	0.41	18.75	2.51	16.24	12.35	340.52	13.90	46.71
Romania	22.84	13.54	4.51	4.61	4.41	0.10	11.87	2.77	9.10	25.17	121.18	6.01	27.31
Russian Federation	147.00	69.16	29.96	23.44	15.76	2.97	96.27	28.71	67.56	116.42	1 819.33	35.30	225.44
Slovakia	5.35	2.38	1.14	0.65	0.59	I.D	4.37	0.41	3.96	1.81	38.06	2.50	7.55
Slovenia	1.95	1.10	0.68	0.28	0.15	0.03	1.70	0.18	1.52	0.84	11.72	1.00	2.81
Ukraine	22.59	22.59	8.34	8.34	5.61	0.45	0.03	I.D	0.03	34.62	438.53	11.01	51.37
Yugoslavia	10.85	6.55	3.71	1.58	1.26	0.15	1.25	0.02	1.23	4.69	33.06	1.70	9.17
Regional total	342.85	162.68	71.56	53.78	38.08	4.76	180.94	43.15	137.83	238.70	3 170.70	86.48	440.94

LIVING PLANET INDEX additional data

Table 1: WWF LIVING PLANET INDEX: 1960-1995

Year	1960	1965	1970	1975	1980	1985	1990	1995
Living Planet Index			100	99	96	89	81	68
Forest Index	104	102	100	98	96	93	91	89
Freshwater Index			100	105	100	84	68	48
Marine Index			100	95	93	91	82	67

Table 2: ORIGINAL AND CURRENT FOREST COVER: showing fragmentation and plantation areas in million km^2

	Africa	Middle East and Central Asia	Asia/Pacific	Asia/Pacific inc. Middle East and Central Asia	Latin America and the Caribbean	North America	Europe	Russian Federation	WORLD TOTAL
Original Forest Cover	13.761	I.D	I.D	15.487	11.839	9.604	5.186	12.049	67.925
Forest Cover, 1990	4.745	0.168	4.603	4.771	7.653	6.967	1.815	8.150	34.102
Fragments 50 to <500km^2	0.419	0.038	0.478	0.516	0.180	0.169	0.270	0.379	1.933
Fragments <50km^2	0.462	0.041	0.105	0.146	0.136	0.275	0.204	0.153	1.376
Plantation area	0.059	0.004	0.847	0.850	0.104	0.294	0.563	0.167	2.036

NOTE:
Current forest cover includes fragments and plantation areas.
Figures for fragments include some plantation areas.
Figures for plantation areas include some fragments of less than 500km^2 and less than 50km^2.
Figures for Europe include Central, Eastern, and Western Europe but exclude the Russian Federation.

Table 3: NATURAL FOREST COVER: regional 1960-1990 and world 1960-1995 area in million km^2

Year	1960	1965	1970	1975	1980	1985	1990	1995
Africa	5.906	5.720	5.533	5.321	5.110	4.898	4.686	
Asia/Pacific	5.301	5.066	4.830	4.594	4.358	4.140	3.921	
Latin America and the Caribbean	9.688	9.361	9.034	8.676	8.318	7.934	7.550	
North America	6.705	6.705	6.705	6.705	6.705	6.689	6.673	
Europe	1.139	1.171	1.202	1.219	1.236	1.244	1.252	
Russian Federation	7.983	7.983	7.983	7.983	7.983	7.983	7.983	
Total	**36.723**	**36.005**	**35.287**	**34.498**	**33.709**	**32.887**	**32.066**	**31.260**

NOTE:
Natural forest cover excludes plantations.

LIVING PLANET INDEX additional data

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BA BOSNIA AND HERZEGOVINA
BL BELGIUM/LUXEMBOURG
CH SWITZERLAND
CR CROATIA
CZ CZECH REPUBLIC
HU HUNGARY
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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 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.

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WWF

WWF INTERNATIONAL, AVENUE DU MONT-BLANC
CH-1196 GLAND, SWITZERLAND
Tel: +41 22 364 91 11 Fax: +41 22 364 53 58
E-mail: infobox@wwfnet.org
Website: www.panda.org

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