



for a living planet



EUROPE 2007

Gross Domestic Product and Ecological Footprint



Global Footprint Network
Advancing the Science of Sustainability

Europe's Ecological Footprint

The European Union (EU) has demonstrated considerable dynamism over the past 40 years. It has grown stronger politically and economically and today, together, its 27 Member States make up the world's largest economy. But this economic growth and the increased affluence of its citizens have masked an increasing toll that Europe is taking on the planet's well-being, despite many successful environmental initiatives. The success of Europe's project to look beyond economic factors to gauge progress towards sustainable development is vital. Only then will the EU be able to maintain its competitiveness, but also the lifestyles of its current and future citizens in the face of environmental challenges – from the fertility of its soils and seas to climate change.

The Ecological Footprint measures humanity's demand on the biosphere in terms of the area of biologically productive land and sea required to provide the resources we use and to absorb our waste. The footprint of a country or region includes all the cropland, grazing land, forest, and fishing grounds required to produce the food, fibre, and timber it consumes and to absorb the wastes it emits. In 2003 the European Union's Ecological Footprint was 2.26 billion global hectares, 4.7 global hectares per person – a global hectare (gha) is a hectare with world-average ability to produce resources and absorb wastes. In contrast, Europe's total supply of productive area, or biocapacity, in the same year was 1.06 billion gha, or 2.2 gha per person. When Europe's footprint was first measured, in the

1960s, it was approximately commensurate with the available biocapacity. Since then it has more than doubled – increasing by 16 per cent in the last 10 years.

Europe maintains its ecological deficit – the difference between its footprint and its biocapacity – by importing goods and services from beyond its borders and exporting some of its wastes, including CO₂. The European footprint is the sum of these areas, wherever they may be. But the world is already running a deficit – the average biocapacity available per person is around 1.8 gha, while the average footprint is 2.2 gha. If all the world's citizens lived as Europeans, we would need more than two and a half planets to provide the necessary resources, absorb our wastes, and leave some capacity for wild species.

Figure 1: Ecological Footprint and biocapacity, EU-27 countries, 1993-2003

This includes all EU countries for which complete data are available*.

Figure 2: EU total Ecological Footprint, GDP, and population growth, 1971-2003

Indexed data showing Ecological Footprint, GDP, and population growth for the EU. Data is added as new Member States join the Union, i.e. in 1971 the data is for the original EU-6, while in 2003, it is for the EU-15. The diagram implies that some decoupling of GDP from the footprint has taken place. Nonetheless the footprint has more than doubled, and is growing faster than the population.

* Throughout, data is provided for all EU-27 Member States except Cyprus and Malta.

Fig 1: Ecological Footprint and biocapacity, EU-27 countries, 1993-2003 (global hectares per person)

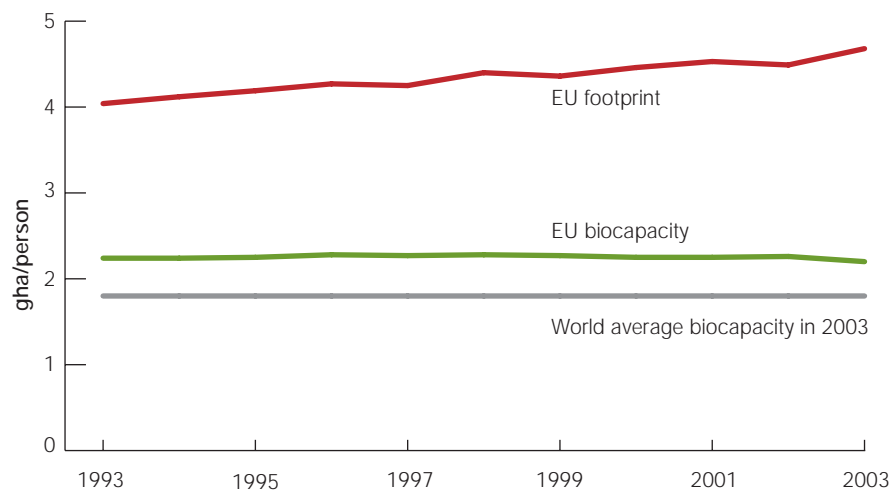
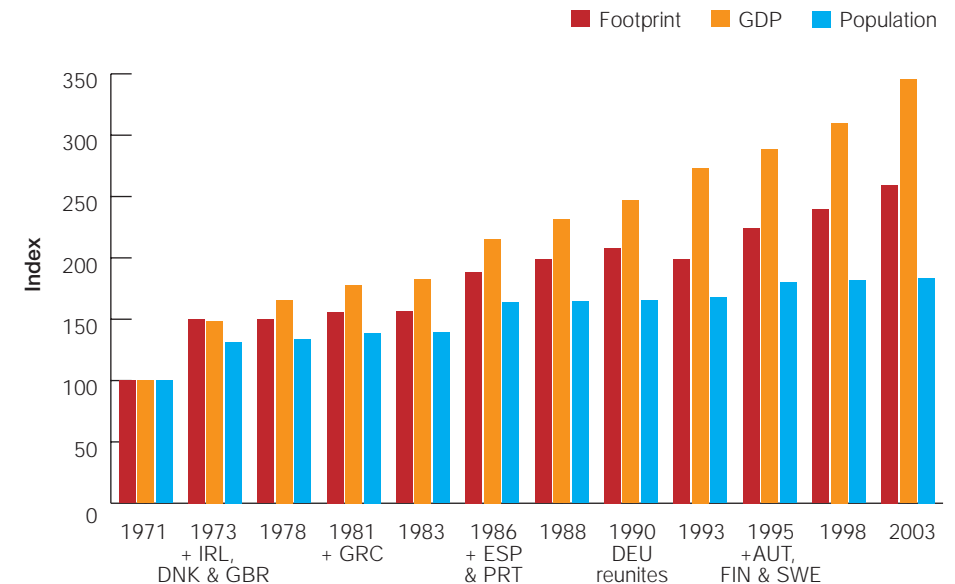


Fig 2: EU's total Ecological Footprint, GDP, and population growth, 1971-2003 (Index, 1971=100)



Measuring sustainability

Sustainable development, according to IUCN–The World Conservation Union, is a commitment to “improving the quality of human life while living within the carrying capacity of supporting ecosystems”.

What does this mean for Europe? Is Sweden ecologically sustainable when its average resident’s footprint is nearly three times larger than what is available per person worldwide, yet is around two-thirds of Sweden’s biocapacity? If, however, everyone in the world led the same lifestyle as the average Swedish citizen, it is unlikely that the Earth could sustain life as we know it for long. Nor would humanity be sustainable were all countries to run an ecological deficit as do all but three of the EU’s Member States. The average footprint of Europe’s citizens is more than twice Earth’s

available biocapacity per person, and about eight times that of such low-income countries as Mozambique or Pakistan.

Progress towards sustainable development can be assessed using the United Nations Development Programme’s (UNDP) Human Development Index (HDI) as an indicator of well-being, and the Ecological Footprint as a measure of demand on the biosphere. The HDI is a composite of life expectancy, literacy and education, and per capita GDP, with an HDI value of more than 0.8 considered “high human development”.

Meanwhile, a footprint lower than 1.8 gha per person means that humanity as a whole would be using less than Earth’s total – though some biocapacity would still be needed for those species with whom we share the planet.

Sustainable development requires that the world, on average, meets at least these two criteria, with countries moving into the green quadrant shown in Figure 3.

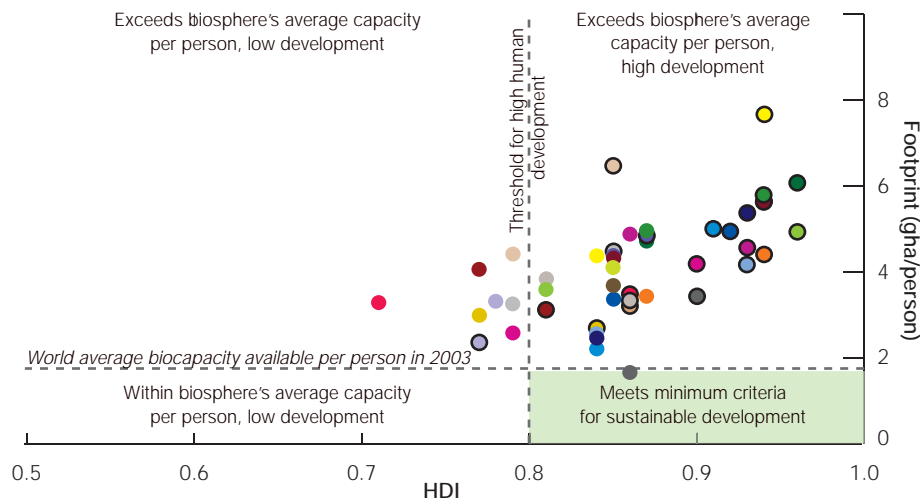
The paradox is that as countries develop according to accepted criteria, their footprints continue to grow even after they have achieved “high human development”. This implies a conflict between what is currently seen as development, and the internationally stated goal of sustainability.

A sustainable society, Meadows, Randers and Meadows suggest in *Limits to Growth: The 30-Year Update*, is one that “has the time, resources and will to innovate, to preserve the fertility of its ecosystems and focuses on increasing the quality of life rather than on merely expanding consumption”.

Figure 3: **Human development and the Ecological Footprint**

This traces the development towards sustainability of EU Member States. It shows that as levels of development, as measured by the HDI, increase, so too do footprints. For example, in 1995 Slovenia was the only European nation that met the two criteria of an HDI score of more than 0.8 and a footprint lower than the biocapacity available per person globally. However, its footprint has now more than doubled, while its HDI has risen by less than 5 per cent. (The table provides details of the years tracked.)

Fig 3: Human development and the Ecological Footprint, earliest year and 2003



	Years	Footprint	HDI	Footprint	HDI
Austria	75/03	3.37	0.85	4.94	0.92
Belgium & Lux.	75/03	4.11	0.85	5.61	0.94
Bulgaria	80/03	4.06	0.77	3.11	0.81
Czech Rep.	95/03	4.36	0.85	4.91	0.87
Denmark	75/03	4.95	0.87	5.75	0.94
Estonia	90/03	4.42	0.79	6.47	0.85
Finland	75/03	4.37	0.84	7.64	0.94
France	75/03	3.68	0.85	5.63	0.94
Germany	80/03	4.88	0.86	4.55	0.93
Greece	75/03	2.20	0.84	5.00	0.91
Hungary	75/03	3.29	0.71	3.50	0.86
Ireland	75/03	3.50	0.86	4.95	0.96
Italy	75/03	2.57	0.84	4.15	0.93
Latvia	80/03	2.99	0.77	2.59	0.84
Lithuania	90/03	3.25	0.79	4.44	0.85
Netherlands	75/03	3.43	0.87	4.39	0.94
Poland	90/03	3.83	0.81	3.29	0.86
Portugal	75/03	2.57	0.79	4.19	0.90
Romania	90/03	3.31	0.78	2.35	0.77
Slovakia	id/03	id	id	3.23	0.86
Slovenia	95/03	1.68	0.86	3.42	0.90
Spain	75/03	2.47	0.84	5.36	0.93
Sweden	75/03	4.72	0.87	6.07	0.96
UK	75/03	4.32	0.85	5.59	0.94

Case studies

EU Member States have experienced rapid growth and political transition over the past 20 years. Some, such as Germany, have begun decoupling economic growth from resource use. Others, such as Greece and Spain, are still expanding in both economic and material terms. Another group, including Hungary and Romania, have the opportunity of “leapfrogging” from outdated technologies to modern, resource-efficient ones.

Yet the EU remains an overall ecological debtor. From a low of 2.4 gha per Romanian to a high of 7.6 gha per Finnish citizen, all but three of the EU Member States – Finland, Latvia, and Sweden – are ecological debtors, and all have Ecological Footprints above the world’s average biocapacity per person.

The upper graphs illustrate, for each year, a country’s total Ecological Footprint – the resources it used to meet the demands of its population. The Ecological Footprint is the product of population multiplied by consumption per person, and reflects the efficiency with which resources are turned into products.

Biocapacity – resource supply – varies each year depending on ecosystem management, agricultural practices such as fertilizer use and irrigation, ecosystem degradation, and weather.

These figures show the ratio of a country’s demand to its biocapacity in each year, and how these have changed over time. Comparing these with a country’s population growth highlights the true development of consumption over the past 30 years.

The lower graphs track, in absolute terms, the average Ecological Footprint per person and biocapacity per person in each country over a 30-year period. As populations grow, so the biocapacity per person diminishes unless measures are in force to decouple consumption from resource use.

GERMANY

Germany, after a rise in its Ecological Footprint of around 65 per cent between 1961 and 1971, has managed, by reducing the amount of coal it uses and becoming a world leader in renewable energy development, to stabilize its footprint and to increase its biocapacity, despite a 5 per cent increase in population. In this, Germany is leading the EU in terms of innovation and the decoupling of resource use and production. Nonetheless, its footprint is two and a half times its biocapacity and remains more than double the world average per person.

Fig 4: Germany’s total Ecological Footprint, biocapacity, and population, 1971-2003

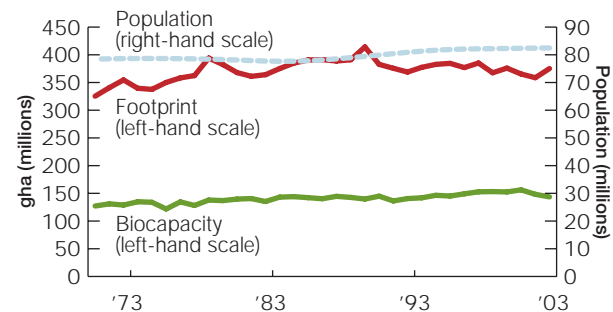
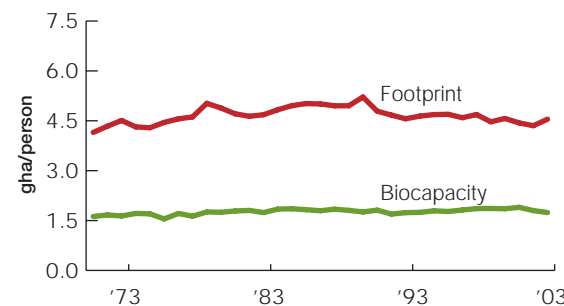


Fig 5: Germany’s Ecological Footprint and biocapacity per person, 1971-2003



FRANCE

In 1961, France was using, in net terms, slightly less than its full domestic biocapacity, but by 1971 it was already an ecological debtor. The deficit has continued to grow, and by 2003 France used nearly twice its own biocapacity, although this, too, has increased slightly. France’s experience parallels a general EU-27 trend: biocapacity is increasing with improved technology and more intensive agriculture, but is outpaced by the growth of consumption, with the largest component being energy, whether for industrial and domestic use or transport.

Fig 6: France’s total Ecological Footprint, biocapacity, and population, 1971-2003

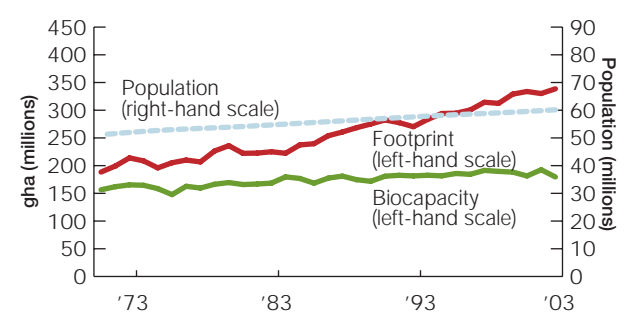
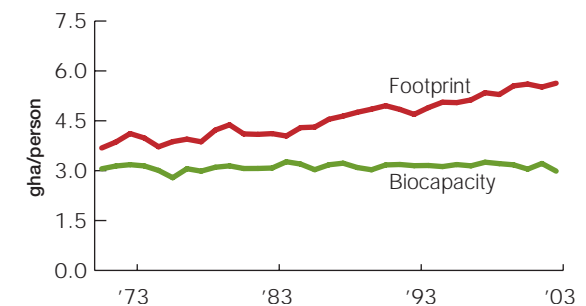


Fig 7: France’s Ecological Footprint and biocapacity per person, 1971-2003



SPAIN

Spain's remarkable economic growth since 1961 has been accompanied by a significant rise in its footprint and, because of its rising population, a diminution in the biocapacity available per person. Since 1971, both absolute and per person Ecological Footprints have grown by more than 160 per cent, although population increased by just over 20 per cent. In 2003, its biocapacity available per person was just below the global average, while its footprint was 15 per cent above the European and almost 150 per cent higher than the global average, despite Spain being a leader in renewable energy.

Fig 8: Spain's total Ecological Footprint, biocapacity, and population, 1971-2003

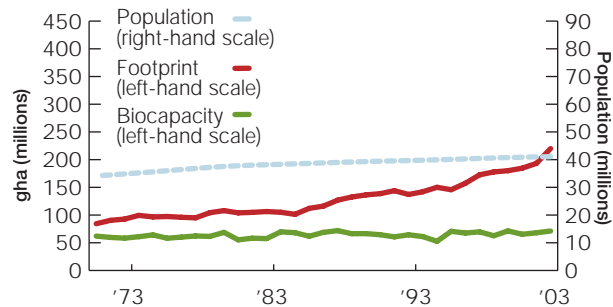
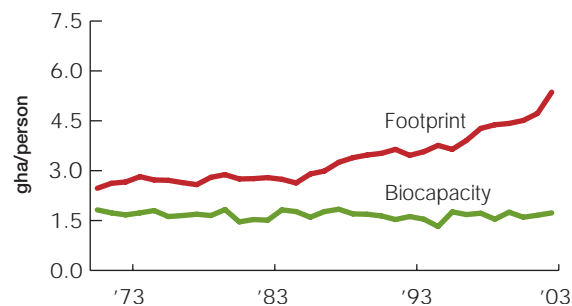


Fig 9: Spain's Ecological Footprint and biocapacity per person, 1971-2003



HUNGARY

Hungary's footprint per person rose from 2.4 gha in 1961 to a high of 4.2 gha in 1991, but has since fallen back to 3.5 gha, while its population diminished slightly. Over the same period, the country's biocapacity followed a similar pattern – rising from 2.1 gha in 1961 to 2.8 gha in 1991, then moving to just above the global average at 2 gha in 2003. With these changes largely due to economic shifts resulting from the close of the Soviet era, Hungary has the opportunity, strengthened by accession to the European Union, of decoupling economic growth from resource use, leapfrogging the environment/development paradox.

Fig 10: Hungary's total Ecological Footprint, biocapacity, and population, 1971-2003

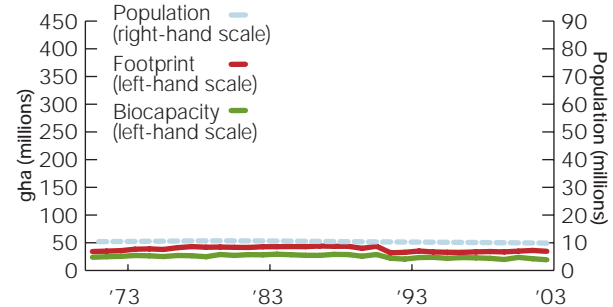
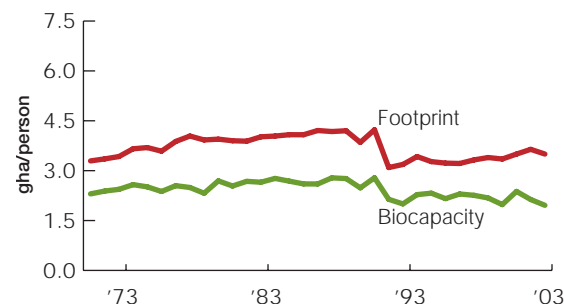


Fig 11: Hungary's Ecological Footprint and biocapacity per person, 1971-2003



ROMANIA

Romania has the lowest Ecological Footprint among the EU-27, at just 2.4 gha per person – marginally more than the global average. Yet it remains an ecological debtor, with biocapacity of 2.3 gha per person. Over the years, the discrepancy between footprint and biocapacity has varied – until 1970 the country enjoyed a biocapacity reserve, but then ran a deficit until 1994. In the years measured since then, all but two show a reserve of biocapacity over footprint. As these years also show rapid growth in GDP, it will be interesting to see whether these trends continue following accession to the European Union.

Fig 12: Romania's total Ecological Footprint, biocapacity, and population, 1971-2003

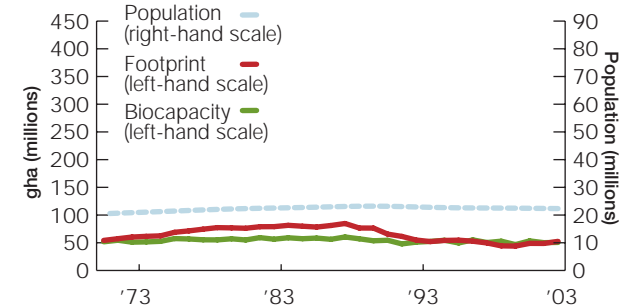
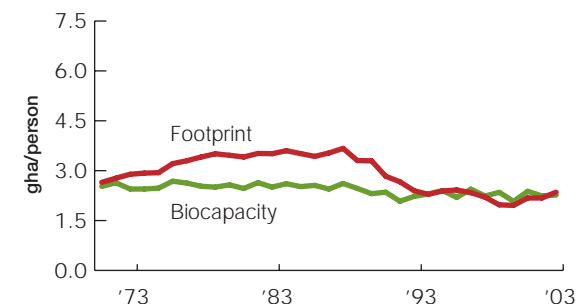


Fig 13: Romania's Ecological Footprint and biocapacity per person, 1971-2003



Europe's share

At a national level, all but three countries of the EU-27 currently run ecological deficits and the combined footprint of Member States is more than twice their biocapacity.

Nations and regions with ecological deficits can maintain their resource consumption in two ways – and usually do so by combining both. They can use their own ecological assets faster than these are regenerated each year – for example, depleting existing forest stocks rather than just harvesting the amount grown each year. Or they can import resources from

elsewhere and export the wastes they generate, including CO₂.

Ecological creditors – just Finland, Latvia, and Sweden among the EU-27 – may be endowed with ecological reserves, but this does not necessarily mean that all their assets are well managed and are not subject to over-harvesting or degradation. Things change – just 40 years ago, much of Europe, too, was an ecological creditor.

But with a continuing global deficit, debtor and creditor countries alike will come to

realize the significance of ecological assets both for economic competitiveness and national security, and the economic value of curbing their footprints, thereby husbanding their biocapacity.

As national and regional ecological deficits continue to increase, the predominant geopolitical line may shift away from the current economic division between the developed and developing, and fall between those with ecological reserves and those with deficits.

Figure 14: **Ecological debtor and creditor countries, 2003**

Figure 15: **EU-27's share, 1971-2003**

The EU-27 is home to 7.7 per cent of the global population, and contains 9.5 per cent of the world's biocapacity. Yet, in 2003 the European Union accounted for just over 16 per cent of the global Ecological Footprint. Although Europe's shares have diminished since 1971, largely as a result of increases in global population, it remains ecologically dependent upon countries with ecological reserves. With the world already in ecological deficit, this is unlikely to be sustainable in the long term, and highlights the urgency of decoupling attitudes, lifestyles, and production from current levels of resource consumption.

Fig 14: Ecological debtor and creditor countries, 2003

National Ecological Footprint relative to nationally available biocapacity.

Ecodebt

- Footprint more than 50% larger than biocapacity
- Footprint 0–50% larger than biocapacity

Ecocredit

- Biocapacity 0–50% larger than footprint
- Biocapacity more than 50% larger than footprint
- Insufficient data (inset, not part of the EU)

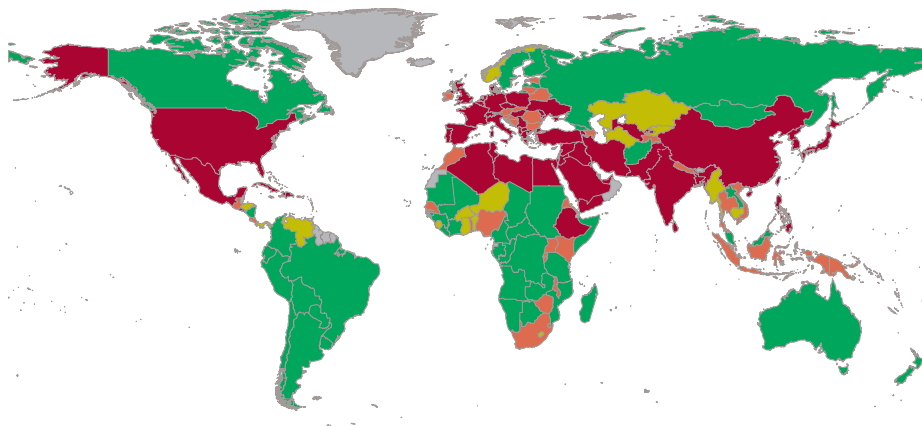
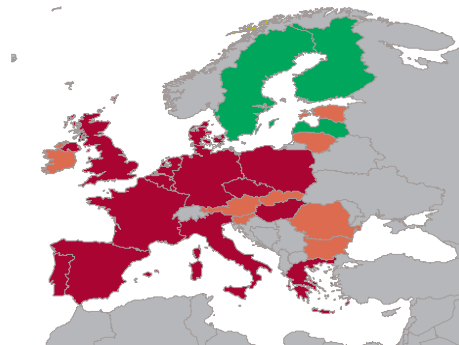
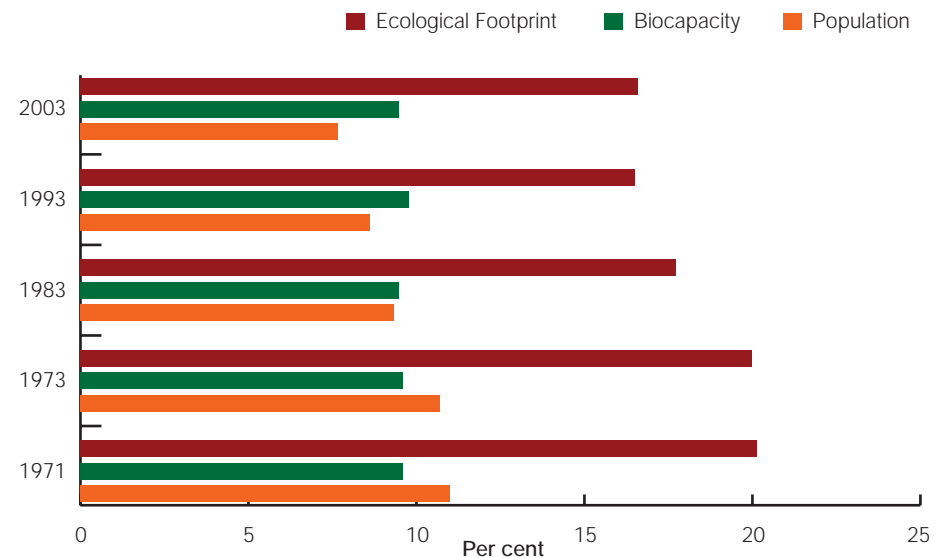


Fig 15: EU's share of the global total, 1971-2003



Moving into credit

Europe has been running an ecological deficit since the 1960s, and its Ecological Footprint is rising faster than both its biocapacity per person and the world average available per person. Although biocapacity can increase, for example as a result of increasing agricultural efficiency, it is limited. Managing and diminishing the footprint provide greater potential in the search for sustainability. It is not a question of whether Europe can afford to stem its footprint's rapid escalation – it cannot afford not to.

Human-made infrastructure can last for many decades. Figure 17 compares typical lifespans for some human and physical assets – together, Europeans born and the infrastructure built today will shape resource consumption for much of the rest of the 21st century. Transport and urban infrastructures – including energy

generation – become traps if they operate on large footprints. In contrast, future-friendly infrastructure – cities designed to be resource efficient, with carbon-neutral buildings and pedestrian and public-transport oriented systems – can support a high quality of life with a small footprint. The longer infrastructure is built to last, the more critical it is to ensure that we are not creating a destructive legacy that will undermine future well-being. Cities, nations, and the EU itself, should consider how competitiveness will be impacted if economic activity is hampered by infrastructure that can only operate with large resource demands.

And if, as is predicted, the global population grows to 9 billion, humanity will need to find ways for the average person to live well on less than half the current global average footprint.

MEASURING FOR SUSTAINABILITY

Economic indicators are essential, but without resource accounting, ecological deficits will go unnoticed and are likely to persist. By the time their effects become apparent, it may be too late to change course. The visible effects of climate change provide the greatest evidence of the need to change thinking beyond individual economic sectors, and embrace the concept that in the long term healthy economies can only thrive within healthy environments.

Resource accounting and reporting are essential to combating and mitigating the effects of climate change, preserving fish stocks, and minimizing waste – all European issues. They can establish baselines, set targets, protect ecological assets, monitor the

progress of sustainability strategies, and help prevent or at least mitigate the effects of environmental crises and their associated socio-economic consequences.

The managerial usefulness of indicators and accounting measures such as the Ecological Footprint and WWF's Living Planet Index, a measure of biodiversity, is attested to by their adoption as indicators for the 2010 targets of the Convention on Biological Diversity. Together with other indicators of the health of key aspects of the biosphere and human well-being, they can help provide the full set of information necessary to keep Europe on target in its quest for a sustainable future.

Fig 16: EU countries and world average Ecological Footprint, 1971-2003 (global hectares per person)

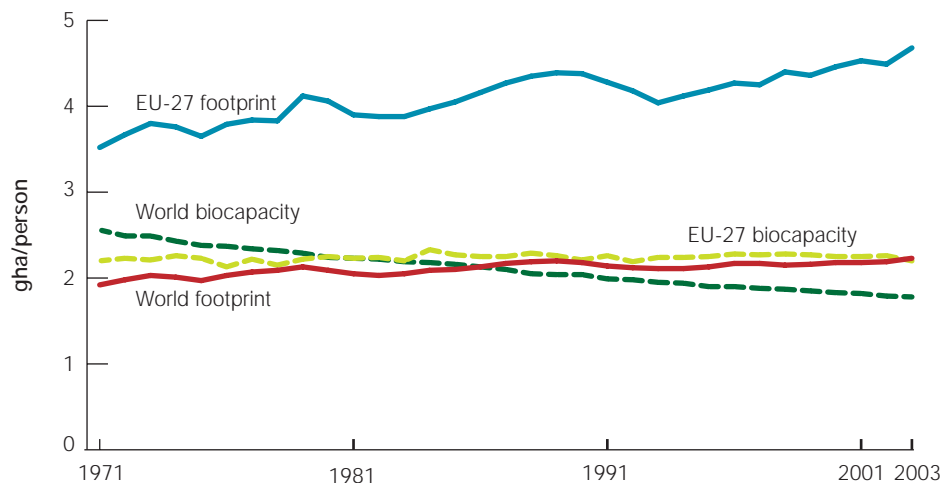
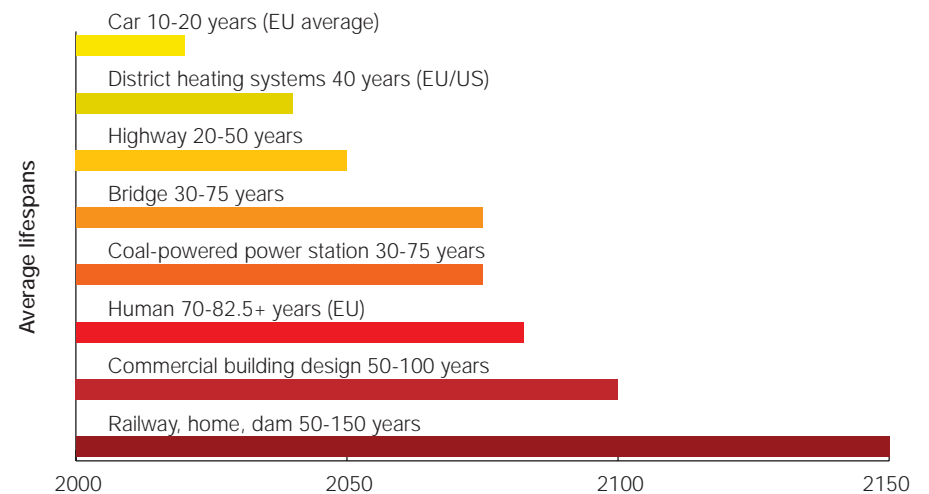


Fig 17: Lifespans of people, assets and infrastructure





WWF, Global Footprint Network and the Zoological Society of London track the state of the world's biodiversity and humanity's demands on the natural world through the twin indicators of the Living Planet Index and the Ecological Footprint. Together they show how humanity is now making unprecedented demands on Earth in terms of the resources we use and the wastes we produce to support our lifestyles and the toll that these are taking on the species that share our planet.

The challenge of reducing our footprint, highlighted in *Europe 2007, Gross Domestic Product and Ecological Footprint* produced as a contribution to the "Beyond GDP" conference (European Parliament, November 2007), goes to the very heart of our current economic models. Comparing the Ecological Footprint with a recognized measure of human development, the United Nations Human Development Index, this report clearly shows that what we currently accept as "high development" is a long way away from the world's stated aim of sustainable development. As countries improve the well-being of their people, they are bypassing the goal of sustainability and becoming ecological debtors – using far more resources than the planet can sustain. It is inevitable that this path will limit both the abilities of poor countries to develop and of rich countries to maintain prosperity.

It is time to make some vital choices. Change that improves living standards while reducing our impact on the natural world will not be easy. But we must recognize that choices we make now will shape our opportunities far into the future. The good news is that it can be done. We already have technologies that can lighten our footprint, including many that can significantly reduce climate-threatening carbon dioxide emissions. But we must all do more. The message of this report is that we are living beyond our means, and that the choices each of us makes today will shape the possibilities for the generations that follow us.

The footprint data contained in this report were generated by the Global Footprint Network's National Footprint Accounts, 2006 Edition.

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WWF for a living planet®

WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by:

- conserving the world's biological diversity
- ensuring that the use of renewable natural resources is sustainable
- promoting the reduction of pollution and wasteful consumption.

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