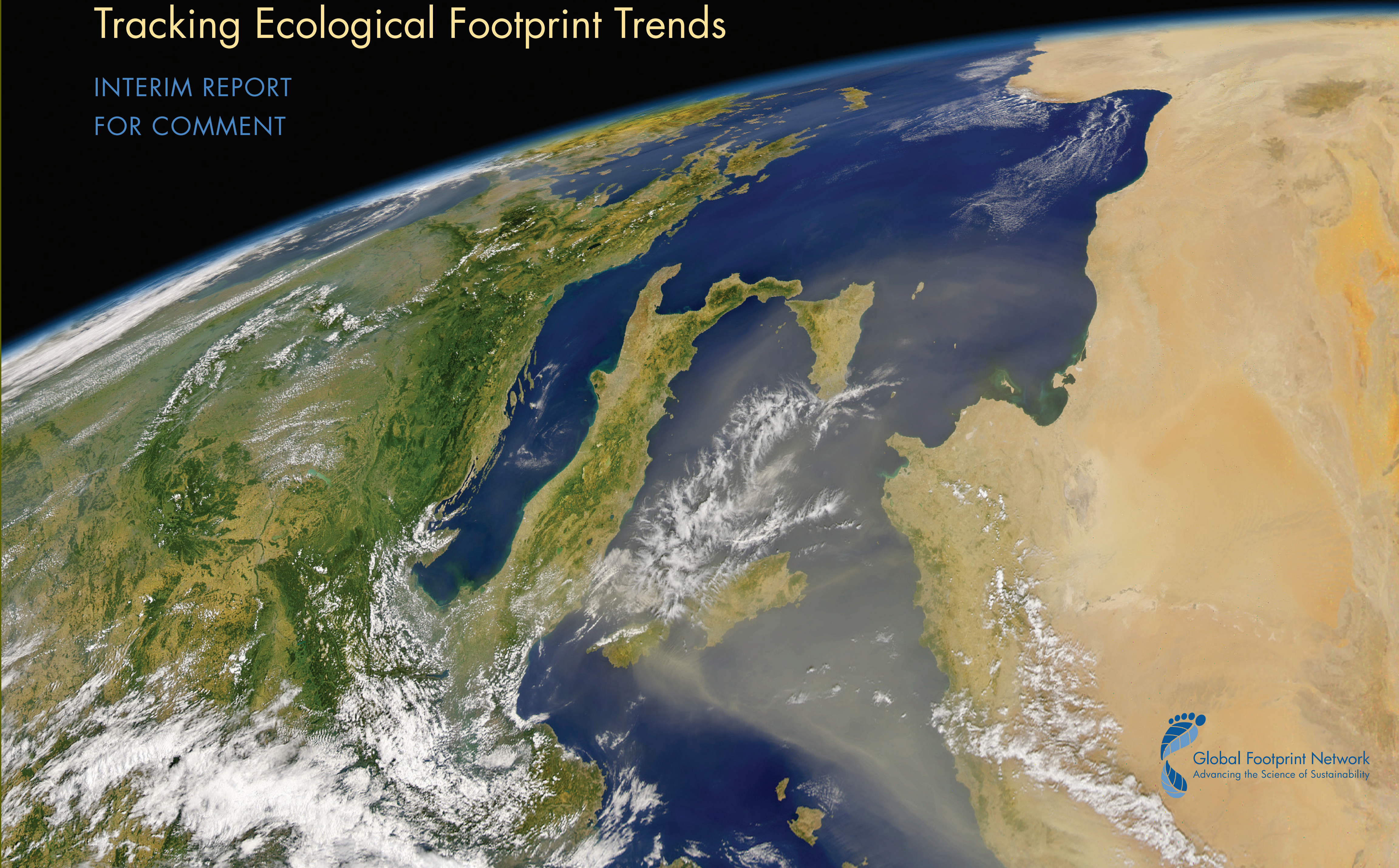
THE FUTURE OF THE MEDITERRANEAN

Tracking Ecological Footprint Trends

INTERIM REPORT
FOR COMMENT



Global Footprint Network
Advancing the Science of Sustainability

CONTENTS

Global Footprint Network
Promotes a sustainable economy by advancing the Ecological Footprint, a tool that makes sustainability measureable.

Funded by:
MAVA Foundation
Contributes to maintaining terrestrial and aquatic ecosystems, both qualitatively and quantitatively, with a view to preserving their biodiversity.

In collaboration with:
WWF Mediterranean
Works to conserve the natural wealth of the Mediterranean and to promote sustainable environment-friendly practices for the benefit of all.

UNESCO Venice
Fosters cooperation for contributions to capacity building and the provision of specialized expertise in science and culture with special emphasis on South East Europe and the Mediterranean region.

Plan Bleu
Aims to identify, collect and process environmental, economic and social information of use to decision-makers.

Tour du Valat
Works to halt the loss and help restore Mediterranean wetlands through promoting interchanges between wetland users and scientists.

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Cover image: African dust over the Mediterranean. Image courtesy the SeaWiFS Project, NASA/Goddard Space Flight Center, and ORBIMAGE.

FOREWORD

Yes, ecological health is important – all agree – but "what's in it for our economies?" This is the question we address with the Mediterranean Footprint Report. We believe that if we carefully looked at the resource dynamics, the link would be obvious. We would see that it is in each nation's most central self-interest to combat biocapacity deficits quickly and aggressively. Not only that, such action does not depend on whether our global neighbors follow suit or not. In fact, each country's own actions will become more urgent and valuable the less others do.

Let me spell out the argument: Why would it be in any individual country's interest to address a problem whose costs are ultimately borne by all of humanity?

Consider the nature of the most prominent environmental challenge: Climate change. First and foremost, climate change is a consequence of high fossil fuel dependence. Even though climate change is a global problem, the fossil fuel dependence that contributes to it carries growing economic risks for the emitting country – particularly for oil-importing countries in the Mediterranean Region. Working our way out of this addiction takes time, and the longer we wait to radically rethink and retool our societies, the less chance we will have to alter course.

But there is another important piece of the picture beyond fossil fuel. Climate change is not an issue in isolation, but rather, a symptom of a broader challenge: humanity's systematic overuse of the planet's finite resources.

Our natural systems can only generate a finite amount of raw materials (fish, trees, crops, fresh water etc.) and absorb a finite amount of waste (such as carbon dioxide emissions). Global Footprint Network quantifies this rate of output through a measure called biocapacity. Biocapacity is as measurable as GDP – and, ultimately, far more significant, as access to basic living resources underlies every economic activity a society can undertake.

Up to now, we have treated biocapacity as an essentially limitless flow, to the point that humanity's demand for nature's services now outstrips global biocapacity by 50 percent, according to our research – and as this report shows, the biocapacity demand of residents in the Mediterranean nations exceeds those nations' biocapacity by more than 150 percent.

In a world facing a biocapacity crunch, the winning economic strategies will be managing biocapacity on the one hand, and reducing demand for it on the other. Many believe the race to develop green technology – what columnist Thomas Friedman has dubbed the "Earth Race" – will bring the spoils of the future to the early movers and adopters, and secure innovative nations and enterprises with positions of advantage on the global stage. This is the carrot pushing green innovation. But there is an even more powerful stick. Those countries and cities trapped in energy- and resource-intensive infrastructure (and economic activities) will become dangerously fragile and will not be able to adapt in time to meet the emerging resource constraints. But those who adjust early will lead the next renaissance.

Mathis Wackernagel, Ph. D.
President, Global Footprint Network

MEDITERRANEAN SUSTAINABLE DEVELOPMENT INDICATORS

In 1989, Plan Bleu published a pioneering report on "Futures for the Mediterranean Basin" which recommended a design for the Mediterranean Strategy for Sustainable Development (MSSD). With the issuance of an update in 2005, entitled "A sustainable future for the Mediterranean: the Blue Plan's environment and development outlook" the report's recommendations were adopted by the Barcelona Convention Contracting Parties at their 14th conference in Portoroz, Slovenia, 8-11 November 2005.

Plan Bleu's key function as the "Mediterranean Environment and Development Observatory" (MEDO), draws heavily upon its expertise in sustainable development indicators. Within MEDO, 134 initial indicators were selected and adapted to the follow-up of the implementation of Agenda 21 in the Mediterranean. Of these, 34 priority indicators were subsequently chosen to monitor the progress made by the Mediterranean countries focussing upon the objectives defined for 9 MSSD priority issues including:

- Improving integrated water resource and water demand management;
- Ensuring sustainable management of energy;
- Mitigating and adapting to the effects of climate change.

In addition, some composite indicators such as the Human Development Index (HDI) and Ecological Footprint were considered to monitor overall progress in terms of sustainable development.

The MSSD priority indicators are unable to fully describe the complexity and diversity of sustainable development issues in the Mediterranean regions. Some additional indicators were thus selected, defined and populated in order to tackle priority issues such as: water, energy, tourism, the conservation of rural and coastal areas. These analyses, widely disseminated in the Plan Bleu publications and continuously updated, are useful to complement the analysis of Ecological Footprint and biocapacity trends in the Mediterranean region and its individual countries.

The "State of the Environment and Development in the Mediterranean", published by Plan Bleu in 2009, attempted to provide answers regarding water and energy. The promotion of water demand management and the use of related indicators, such as efficiency demand per sector and exploitation index of the renewable resources, should aid better inclusion of water scarcity.The main responses to the growth of the major socio-economic drivers and environmental pressures are a) to develop more sustainable energy consumption and b) encourage diversification of energy sources with a bigger share of renewable energy.

The MSSD and the related indicators are currently being revised by taking into account the impact of climate change on the Mediterranean environment and society. All this work on indicators and MSSD is also linked to the activities of the Centre for Mediterranean Integration in Marseille and the priority areas of the Union for the Mediterranean.

Henri-Luc Thibault
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www.planbleu.org

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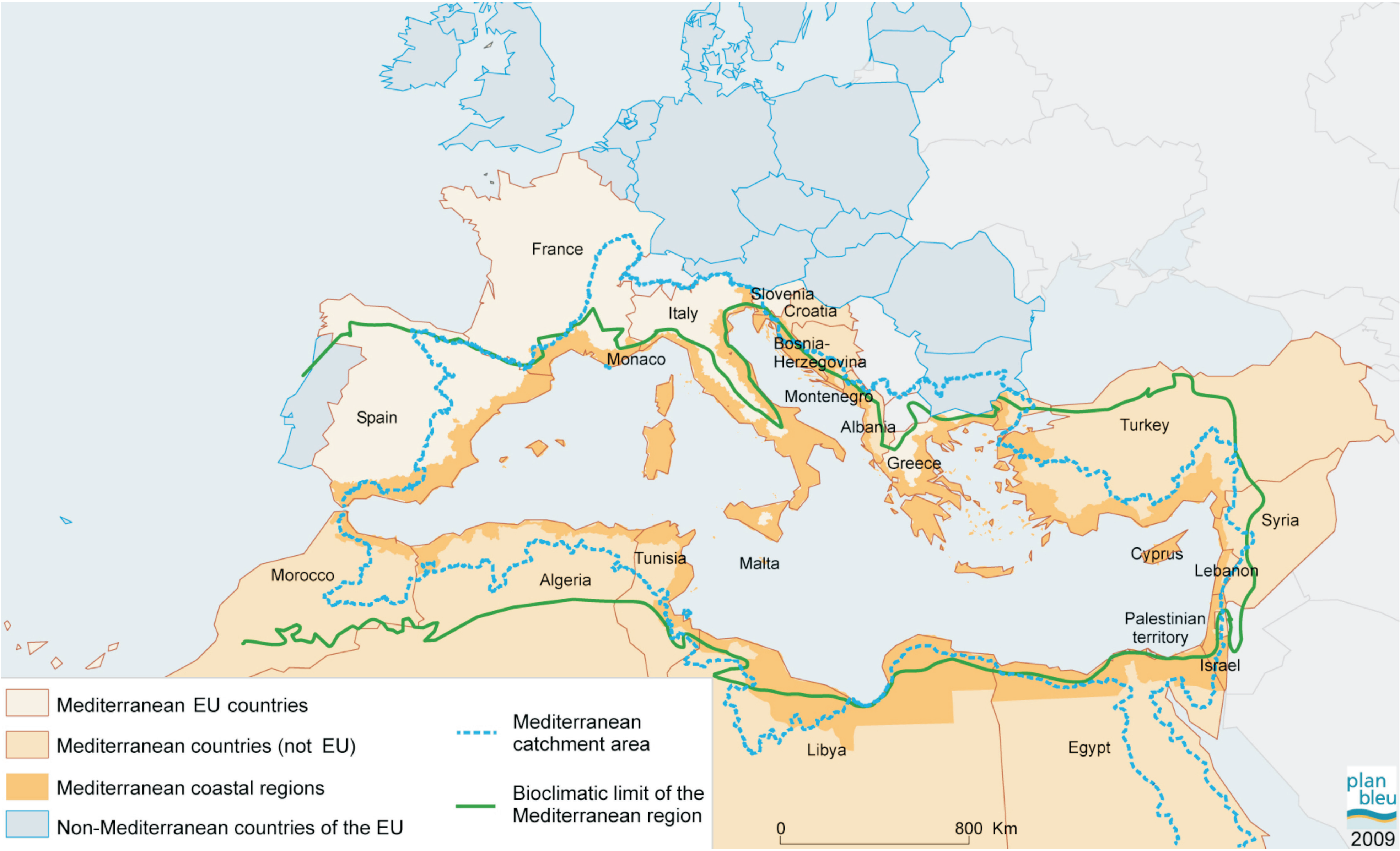


The definition of the Mediterranean Region used by Plan Bleu in their Mediterranean Environment and Development Observatory (MEDO). Within this report, the bioclimatic limit of the region is used as the primary definition of country inclusion.

SUMMARY

Global Footprint Network's Ecological Footprint Initiative in the Mediterranean Region is based on a simple premise: human societies and economies depend on the biosphere's natural capital and its many life-supporting ecological services. As demand on these ecological resources increases, economic success can no longer be secured without carefully managing and tracking the demand on, and availability of, natural capital. Thus tools are needed to illustrate the scale of change we are witnessing, and to provide a platform for weighing the policy options that will help nations remain competitive in an increasingly resource-constrained world.

This report aims to provide an ecological bank statement for Mediterranean countries, evaluating their use of local and global resources, and how this compares with nature's endowment. It makes this assessment through use of the Ecological Footprint, a measure of the bioproductive land and sea area required to produce the resources a population consumes and absorb its CO_2 emissions.

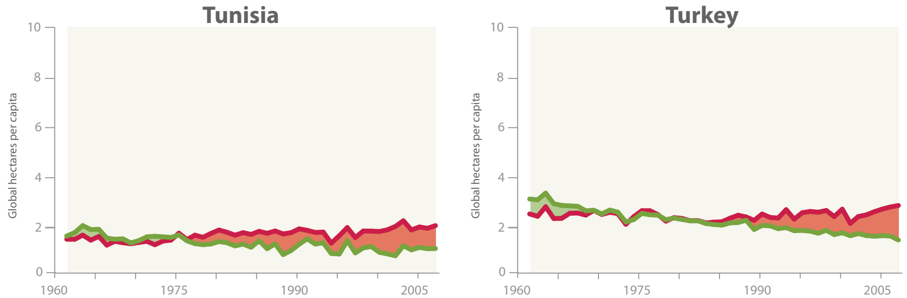
The main goal of this Initiative is to bring the reality of resource constraints into national and regional policy debates, help policy analysts and decision-makers more deeply understand the social and economic risks associated with resource limitation and finally engage with national governments to help them make more effective and informed decisions.

The results presented have far-reaching implications for the region's future:

- The average Ecological Footprint per capita for the Mediterranean Region increased 37 percent, from 2.4 global hectares per capita in 1961 to 3.3 gha per capita in 2007.
- Population has doubled over the considered period; the overall regional Ecological Footprint has increased 2.6 times.
- During the same period the biocapacity available in the Mediterranean Region decreased (- 38%) from 2.1 to 1.3 gha/capita.
- Three nations alone contribute to more than 50 percent of the Mediterranean region's Ecological Footprint: France (20%), Italy (19%) and Spain (15%).
- Only two nations provide approximately 50 percent of the natural endowment (biocapacity) of the Mediterranean Basin: France (31%) and Turkey (16%);
- Since 1961, the region has been in a situation of biocapcity deficit, with its demand for ecological services (Ecological Footprint) increasingly exceeding supply (biocapacity). In order to maintain this situation, the import of ecological assets from regions outside the Mediterranean is necessary.
- Such dependency on external assets makes the stability of the Mediterranean Region highly dependent on a) the availability of assets in external eco-regions from where such assets are drawn and b) the financial capacity to pay for these assets.
- The major trade partners have changed in the last 30 years from those with a biocapacity surplus (e.g. Canada, Scandinavia, South America) to those running a biocapacity deficit (e.g. USA, China, non-Mediterranean European states).
- In terms of financial capabilities we found that while the average per-capita GDP in the Mediterranean region was approximately twice as much as the world average in 1961, it is now only 50% higher.
- The region's declining financial situation poses challenges to its countries' ability to compete for limited ecological resources. Meanwhile, the region's reliance upon resources from abroad makes it vulnerable to price volatility and supply disruptions. These factors combine to pose significant economic, social and geopolitical risks.

These findings make clear that the way Mediterranean countries manage their ecological resources will be central to their long-term capacity to remain economically competitive and provide for the well-being of their people.

The aim of this report is to engage governments to address demand on and supply of ecological assets so these can be factors of competitive advantage, rather than sources of growing risk.



Panel 1: Per capita Ecological Footprint (red line), biocapacity (green line), biocapacity deficit (red area), and biocapacity surplus (green area) for all countries included in this report. With few exceptions, all countries have been in a state of biocapacity deficit throughout their historical record. Montenegro is omitted due to insufficient historical data. For comparison, all country graphs have the same scale; for more detail, see individual country pages.

INTRODUCTION

THE GOAL OF THIS REPORT

Since the rise of agriculture in the "Fertile Crescent", the Mediterranean region has been shaped by its diverse and vast ecological resources. Ecological deterioration, from forest loss to desertification, has always accompanied the history of the region. But never in its history has the population's pressure on the region's ecological resources been as intense as it is today. With an increase in both population and tourism in the area, growing demands on the region's ecological resources now threaten the foundation of its social and economic well-being. By 2007, the residents of nearly every country in the Mediterranean region demanded more biocapacity than was available within their respective borders. Simply stated, the Mediterranean region is running a severe biocapacity deficit – a situation that will only worsen until effective resource management becomes central to policy-making. If Mediterranean countries are to reverse current trends and to make their economies stable and productive, its leaders must find innovative approaches that work with, rather than against, the Earth's limited resources. If we keep ignoring the impact of human pressures on ecosystems and biodiversity, and thereby on the economies that depend on them, we will further erode our economic and social potential. Failing to take action has a cost and is becoming a fundamental threat, particularly at a time when the world's ecological overshoot is on the rise. Revealing the implications of growing biocapacity deficits, for ecosystems and economies, is at the heart of this report and Global Footprint Network's Mediterranean Initiative.

Revealing the implications of growing biocapacity deficits, for ecosystems and economies, is at the heart of this report.

TRACKING HUMAN DEMAND ON BIOCAPACITY

The Mediterranean region reflects what is happening around the world. In 2007, humanity consumed resources 1.5 times faster than Earth could renew them - up from using about 60 percent of Earth's capacity in 1961 (Ewing et al., 2009). Considering the rapid increase in human demand, the 21st century is likely to be shaped by significant ecological constraints. The consequences of these constraints can already be seen around the world in the form of climate change, water scarcity, urban crowding, declining fisheries, food crises, and soaring energy costs. Yet most governments still lack robust tools to measure their natural capital, and leaders remain reluctant to take rapid action to reduce their resource risks. Effectively navigating the future will require tools that can help visualize the scale of change we are witnessing, providing a platform for weighing policy options and thus secure national well-being. Since the late 1940s, governments have used Gross Domestic Product (GDP) to measure the health and vitality of their nations. With growing resource scarcity, leaders will need to look beyond GDP and measure not only the value-added of their economic activities, but also human quality of life and resource availability in order to understand potential trade-offs.

THE MEDITERRANEAN INITIATIVE

Global Footprint Network launched its Mediterranean Initiative to bring the reality of ecological resource constraints to the center of the Mediterranean policy debate, and to support decision-makers with tools that will help them weigh policy trade-offs. These tools will enable policy analysts and decision-makers to more fully identify the risks that resource limitations pose to their countries' economic and social well-being. It should also help them pinpoint the opportunities that lie in aggressive, timely efforts to reduce their overall resource dependence.

Reversing current trends will take time. In the last four decades, for example, humanity has continuously increased its demand for ecological services and resources – by about 80 percent as measured by Ecological Footprint Analysis (Ewing et al., 2009). Human use of nature's ecological flows and services now significantly exceeds what nature can renew. Even if we continued on a moderate trajectory as projected by the UN, it would take twice the renewable capacity of the biosphere to meet our demands by the early 2030s. Yet, it is questionable whether this level of overshoot is physically possible.

While ecological assets are an often underestimated component of a country's economy, the goods and services that sustain a healthy human society – including access to food, safe water, sanitation, culture, manufactured goods, and economic opportunity – all depend on functioning and healthy ecosystems. If human demand on nature continues to exceed what nature can regenerate, this will lead to substantial changes in the resource base, posing difficulties for socio-economic management and undermining human welfare. To achieve lasting development success – lasting prosperity and human well-being – governments, businesses, and individuals will need to find solutions that avoid liquidation of natural capital.

DESCRIPTION OF INDICATORS

ECOLOGICAL FOOTPRINT AND BIOCAPACITY

The Ecological Footprint answers one particular research question: How much of the planet's regenerative capacity (or biocapacity) is demanded by human activities, such as eating, moving, the provision of shelter, and use of goods and services? It measures the biologically productive land and water required to produce all the resources a population consumes, and to sequester its carbon dioxide emissions, using prevailing technology (see Appendix A for further details on the resources included). On the carbon sequestration side, current national Footprint calculations only track CO_2 due to lack of data for other waste streams. Footprint and biocapacity results are expressed in the unit of global hectares (gha) – hectares of land or sea area with world average bioproductivity in a given year.

While the Ecological Footprint quantifies human demand, biocapacity acts as an ecological benchmark and quantifies nature's supply: resource production, built up areas, and carbon uptake services. A population's Footprint can thus be compared to the biocapacity that is available to support that population, as expenditure is compared against income in financial terms.

The total Ecological Footprint of a country is driven by the average consumption of individuals, multiplied by the population: two areas over which a country's inhabitants have some control. Conversely, biocapacity is determined by the total available bioproductive area, times the biocapacity per unit of bioproductive area.

GROSS DOMESTIC PRODUCT

Gross Domestic Product (GDP) assesses the total final value of the products and services produced within an economy, as measured by market transactions. GDP approximates the average income of a country's residents and so has historically been tied to their well-being. However, advances in the availability of data have led to the preferential use of Gross National Income (GNI) for measures of well-being; GNI is related to GDP but adjusts for income flows between countries, such as through interest payments on debt. Nevertheless, GDP remains a popular tool for estimating the total output within a country and is used as an indicator of economic health.

In order to make comparisons of GDP numbers across time and between countries, GDP is often expressed in dollars at Purchase Price Parity (PPP). For example, the nominal GDP per capita in France in 2007 was $US 33,814, though in PPP terms it was only $31,446. In other words, it could buy in France only the amount of goods and services that $31,446 could buy in the US in 2005.

GDP is comprised of private and government expenditures, plus investment and net exports. Examination of these different components can give insight into relative contributions to overall resource demand. Investment, particularly in constructed infrastructure, also affects future consumption patterns.

DEMOGRAPHICS

Changes in total population, and the structure of that population, are key drivers for both pressure on and availability of ecological resources. Overall demand on resources is proportional to population size and per capita consumption. Inversely, the quantity of goods and services provided by the biosphere per person shrinks proportionally to population size.

Excluding wars and epidemics, changes in population structures and size generally occur slowly. This means that, like investment, population policies today will help shape future scenarios of ecological resource use.

By looking at the current age structure of the population, it is possible to determine likely future growth rates in both population and economic output. Since people under the age of 15 and over the age of 64 are usually dependent upon the working population (whether directly or through state redistribution), an increase in the population of these age groups will increase dependency on the working age population and potentially reduce economic productivity.

The leaning tower of Pisa: Piazza del Duomo. By Paul Mannix.

DESCRIPTION OF INDICATORS

GLOSSARY OF ECOLOGICAL FOOTPRINT TERMS

Biocapacity

Biocapacity represents the ability of ecosystems to produce useful biological materials and to absorb carbon dioxide emissions (CO_2) generated by humans, using current management and extraction technologies. Useful biological materials are defined as those materials that the human economy actually demanded in a given year. Biocapacity includes only biologically productive land: cropland, forest, fishing grounds, grazing land, built-up land; deserts, glaciers, and the open ocean are excluded.

Biocapacity deficit

Biocapacity deficit is the converse of biocapacity surplus, and occurs when a country's Ecological Footprint of consumption exceeds its biocapacity. Biocapacity deficits are maintained through the import of natural resources from abroad, over-use of domestic resources, or dependency on the global commons (through the release of CO_2 to the atmosphere). See figure INT-1 for graphical illustration.

Biocapacity density

The biocapacity density is the amount of biocapacity per hectare of physical land, including non-productive land.

Biocapacity surplus

Biocapacity surplus is the converse of biocapacity deficit, and occurs when a country's Ecological Footprint of consumption is lower than its available biocapacity. Although a country in biocapacity surplus may still import natural resources, over-use individual components of domestic resources, and emit carbon dioxide to the global commons, a biocapacity surplus indicates that a country *may* be capable of maintaining its current lifestyle utilizing only domestically available resources. See figure INT-1 for graphical illustration.

Ecological Footprint

Ecological Footprint accounts answer a specific research question: how much of the biological capacity of the planet is demanded by a given human activity or population? To answer this question, the Ecological Footprint measures the amount of biologically productive land and water area an individual, a city, a country, a region, or all of humanity uses to produce the resources it consumes and to absorb the carbon dioxide emissions it generates, with today's technology and resource management practices. This demand on the biosphere can be compared to biocapacity, a measure of the amount of biologically productive land and water available for human use.

Ecological Footprint of consumption

The Ecological Footprint of consumption is the most commonly reported type of Ecological Footprint. It is the area used to support a defined population's consumption. The Ecological Footprint of consumption (in global hectares) includes the area needed to produce the materials consumed and the area needed to absorb the waste. The consumption Footprint of a nation is calculated in the National Footprint Accounts as a nation's primary production Footprint plus the Footprint of imports minus the Footprint of exports, and is thus, strictly speaking, a Footprint of apparent consumption. The national average or per capita Consumption Footprint is equal to a country's Consumption Footprint divided by its population.

Ecological Footprint of production

In contrast to the Ecological Footprint of consumption, a nation's Ecological Footprint of production is the sum of the Footprints for all of the resources harvested and all of the waste generated within the defined geographical region. This includes all the area within a country necessary for supporting the actual harvest of primary products (cropland, pasture land, forestland and fishing grounds), the country's built-up area (roads, factories, cities), and the area needed to absorb all fossil fuel carbon emissions generated within the country. In other words, the forest Footprint represents the area necessary to regenerate all the timber harvested (hence, depending on harvest rates, this area can be bigger or smaller than the forest area that exists within the country). Or, for example, if a country grows cotton for export, the ecological resources required are not included in that country's Ecological Footprint of consumption; rather, they are included in the Ecological Footprint of consumption of the country that imports the t-shirts. However, these ecological resources are included in the exporting country's Ecological Footprint of production.

Ecological overshoot

Ecological overshoot is the converse of ecological remainder, and occurs when a country's Ecological Footprint of production (with the exclusion of carbon) exceeds its domestic biocapacity.

The Ecological Footprint of production (excluding carbon) represents just the Ecological Footprint demand for a country's own biocapacity. Therefore, a state of ecological overshoot means that a country is over-using domestic resources and is indicative of unsustainability. See figure INT-1 for graphical illustration.

Ecological remainder

Ecological remainder is the converse of ecological overshoot, and occurs when a country's Ecological Footprint of production (with the exclusion of carbon) is lower than its available biocapacity.

A state of ecological remainder can occur even when a country is over-using individual resources, such as forests, and so is not an indicator of sustainability. However, a state of ecological overshoot is indicative of unsustainability. See figure INT-1 for graphical illustration.

Global hectares (gha)

To allow different types of land to be compared using a common denominator, equivalence factors are used to convert physical hectares of different types of land, such as cropland and pasture, into the common unit of global hectares. The use of global hectares recognizes that different types of land have a different ability to produce useful goods and services for humans. One hectare of cropland can produce a greater quantity of useful and valuable food products than a single hectare of grazing land, for example. By converting both cropland and pasture into global hectares, they can be compared on an equal basis.

A global hectare is defined as a hectare with world-average productivity for all biologically productive land and water in a given year. Biologically productive land includes areas such as cropland, forest, and fishing grounds, and excludes deserts, glaciers, and the open ocean. Global hectares are the common, standardized unit used for reporting Ecological Footprint and biocapacity across time and for areas throughout the world. Because total global production changes over time, the amount of physical material produced by a single global hectare also changes over time.

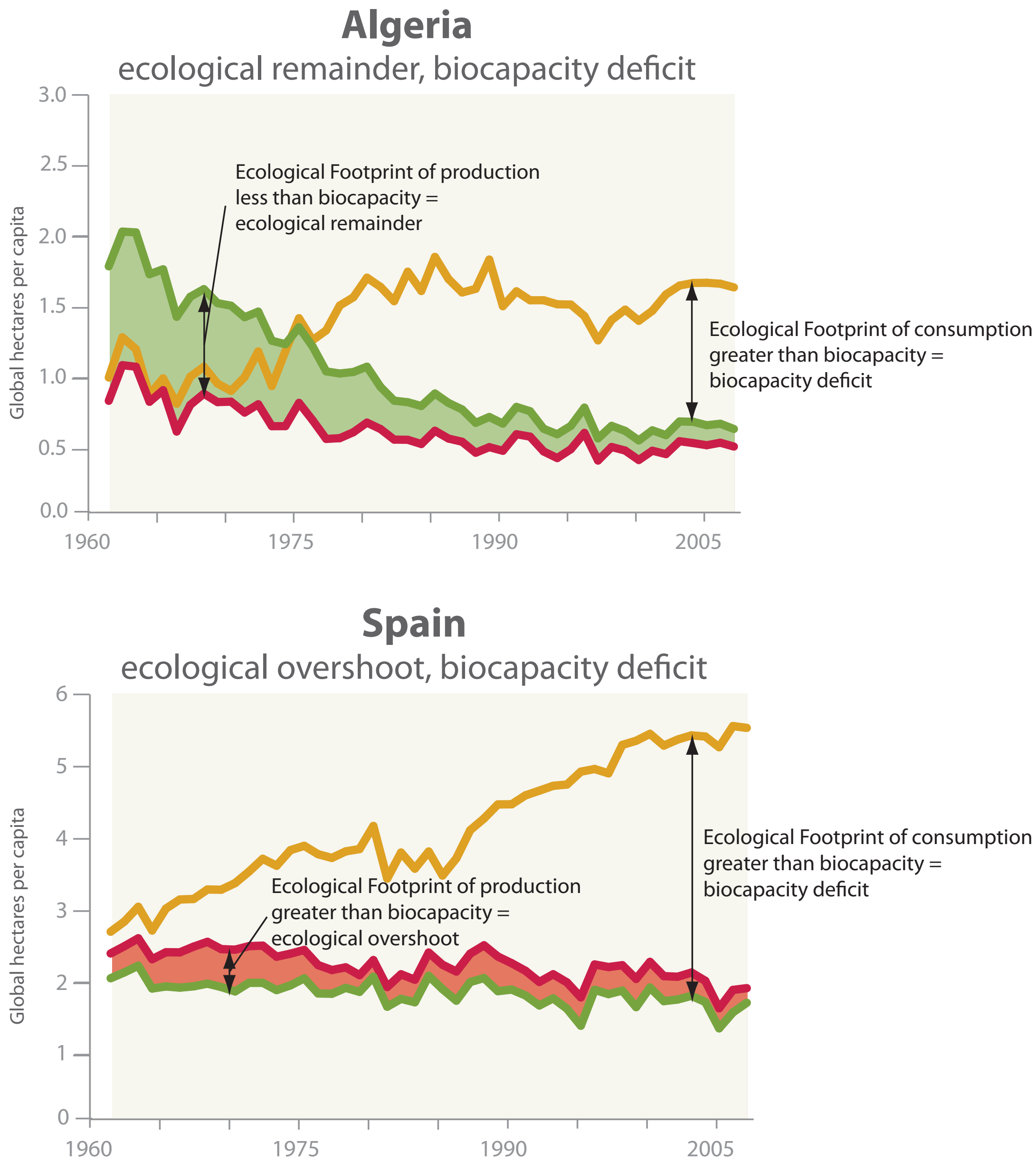


Figure INT-1: Graphical illustration of the states of ecological remainder, ecological overshoot, and biocapacity deficit. Ecological Footprint of consumption shown in yellow, Ecological Footprint of production shown in red, and biocapacity shown in green.

CONSEQUENCES OF ECOLOGICAL AND FINANCIAL DEFICITS

Economic theory postulates three primary factors of production: labor, capital, and land. Labor refers to the use of human effort and expertise in production. Capital encompasses humanly constructed items, which can then facilitate further production, such as machinery and buildings. Land stands for natural resources that are used as inputs into the production system.

Natural resources also provide the food required for labor, and capital formation always requires labor and natural resource inputs. Consequently, natural resources are a necessary part of all production and, therefore, income.

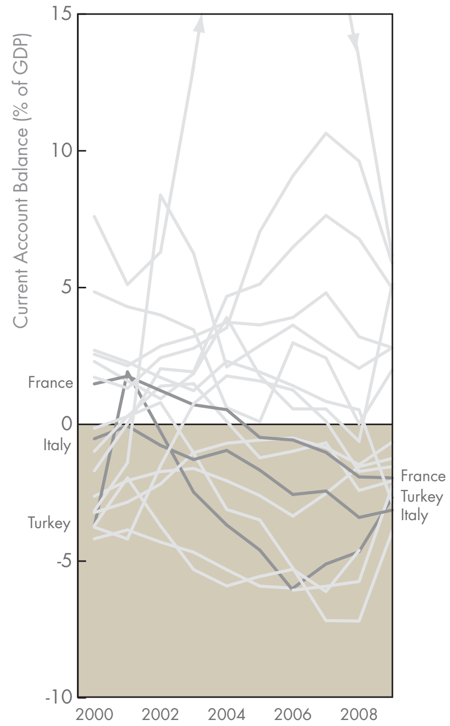
Natural resources can be generally classified into two groups: renewable and non-renewable resources. Renewable resources, such as forest products, have a certain growth rate, and harvest below this growth rate can be continued indefinitely[1]. Non-renewable resources, such as oil and coal, are those which formed earlier in the Earth's history and have a growth rate which is negligible when compared with human extraction rates.

The discovery and the development of the ability to extract large stocks of coal and oil have driven huge growth in economic output since the late 1700s. This greatly increased the value of both human labor and man-made capital, since each person or machine could produce many more goods. This availability of energy made the extraction of natural resources much more economical, and in turn, led to a vast increase in the availability of resources. This led to an increase in individual consumption, and allowed populations to grow. Although these increases began to reach physical limits when the production of food and other renewable resources failed to keep pace, production was enhanced through two main routes: expanding the land area used for production; and raising yields through management practices and the application of fossil fuel derived fertilizers and pesticides.

In the early 21st century, it has become apparent that the seemingly unlimited resource availability is running into constraints – climate change, freshwater scarcity, biocapacity loss. Some are calling this new era of constraints "peak everything" (Heinberg, 2007). The economic sub-system is therefore rather susceptible to changes in the availability of natural resources. A decrease in food production relative to demand will lead to social stress and reduced ability of labor to produce; a decrease in fossil fuel inputs will directly reduce industrial output and reduce the ability to produce food according to current farming practices. Countries experiencing such domestic restriction currently turn to international trade in order to maintain a given level of output. However, in an era of global shortages, dependency on trade carries certain geopolitical risks.

Non-renewable and renewable resources are susceptible to different factors driving their prices, and through price volatility, resource access becomes unpredictable. Non-renewable resource supply, especially for fossil fuels, is highly inelastic, in part due to the easy monopolization of these resources by a limited number of countries and companies. Oil extraction also cannot be easily expanded, and reductions in extraction are politically unacceptable, since some national governments depend heavily on the resource revenue. Due to their entrenched nature in international economic systems, demand for those resources is also highly inelastic. It therefore takes large variations in prices in order to balance supply and demand; volatility which is seen when looking at international oil and mineral prices.

This volatility is exacerbated by an upward trend in price. Products are usually priced at the marginal cost of production, i.e., the cost of providing the last unit: If production costs to drill for the last barrel of oil increases, the price of all oil rises. With increasingly expensive resource exploitation, as in



The yearly current account balance (net income from trade, factor income, and transfer payments) for selected G20 countries with Mediterranean countries highlighted.

the case of deep-sea drilling for oil, prices can increase quite significantly.

Renewable natural resources, in contrast, are not easily monopolized due to their dispersed nature. However, for many decades supply has only increased in response to additional demand, and often with a lag of one to two years. Prices, therefore, are highly susceptible to supply-demand imbalances: When supply starts to fall behind demand then

[1] The total quantity extracted is sustainable. However, care must be taken that localized extraction is not overly intensive and that the ecosystem is not disrupted during harvest.

prices increase quickly. This effect was seen during the Russian droughts and wildfires of 2010, when a drop in grain production led to a 70 percent increase in wheat prices over a single month. As global land availability becomes restricted, this volatility will increase.

Thus, there are risks to countries that are net importers of natural resources, particularly that they will see a rapidly worsening current account if prices start to increase. If this current account deficit cannot be funded through credit, then economic output and income will have to decrease.

Conversely, countries that are net exporters of natural resources have often developed their political system based on expected income from these exports. Fluctuations in this income can generate significant political stress (see Algeria, pp. 22).

The coupling of a negative trade balance in natural resources, as indicated by measures such as the Ecological Footprint, and natural resource price volatility has led many resource-poor countries to see their financial trade balance become increasingly unfavorable, undermining their long-term capacity to provide for the well-being of their residents.

There has, historically, been one way for countries to escape the negative effects of a financial trade deficit. A trade deficit must be financed through a capital account surplus, meaning that debt owed to foreign countries increases. At low levels, this debt is relatively manageable; with a growing GDP, the ability to finance the debt increases. However, due to the ultimate dependency of economic output on natural resources, as resource constraints become more dominant, achieving such growth becomes more difficult. If countries opt to spur GDP growth through additional deficit-driven government spending, they will boost their output but also increase their debt. While the economic situation may look favorable in the year of the stimulus, this strategy is likely to result in a higher ratio between debt and GDP. This higher debt burden then decreases the country's ability to grow in future years. The other option, austerity, is likely to shrink the economy, which also increases the ratio between debt and GDP. In other words, high financial debt ratios at a time when it is physically difficult to expand an economy can become uncontrollable.

An additional concern is the rapid and unpredictable changes in economic conditions. Price volatility induced by resource constraints can rapidly shift the relative prices of commodities within an economy, and overextended debts can lead to sudden credit adjustments. Both compromise the ability to finance spending or stimulate economic activities. In most countries, such shocks will prompt large cutbacks in spending and increased unemployment. For countries with independent currencies, this may lead to devaluation. In essence, countries that are both highly dependent on resources from abroad and who have already accumulated significant financial debts will have more difficulties affording their resource inputs, with crippling effects for economic performance. One result is a decrease in the residents' purchasing power. In addition, if such a decrease affects the population unevenly, emerging resentments may put the population under additional stress.

Greece, for example, with a large and growing biocapacity deficit (see Greece, pp. 34), recently found its current account balance deficit dramatically increasing, partly due to the rising price, and amounts, of imported resources. The account deficit to GDP ratio increased from about 20 percent in 2000 to 63 percent in 2008. As international creditors increasingly doubted Greece's ability to service and repay the debt, higher interest rates were demanded, ultimately leading to a near-default on the debt. With external financial backing from the EU, Greece avoided bankruptcy, but is now forced to adopt austerity measures. Unfortunately, because of the large size of the debt, although these measures decrease growth in the absolute value of the debt, they also decrease economic output and hence raise the debt/GDP ratio. With previous growth, Greece has depended ever more greatly on natural resources from abroad. But with its deteriorated financial situation, the country's ability to import foreign goods and maintain domestic well-being may be in jeopardy.

REGIONAL COMPARISONS

Globally, total Ecological Footprint has risen 2.5 times between 1961 and 2007 (Figure Glo-1). However, per capita Ecological Footprint per capita has increased by only 14 percent, suggesting that population growth has contributed over 90 percent of the increase in demands on ecological systems in the last 46 years.

However, such a simple analysis ignores the vast differences between regions. In Europe and North America, population growth has been relatively slow while consumption per capita has increased. At the other end of the spectrum, Africa has seen its Ecological Footprint per capita decline since 1961, while its population has more than tripled.

Figures Glo-1 - Glo-4 illustrate these changes. In 1961 (Glo-3), the Ecological Footprint per capita in North America was 2.5 times the average Ecological Footprint in Africa, while the populations were broadly similar. By 2007 (Glo-4), Africa had nearly three times the population of North America, but less than a fifth of the Ecological Footprint per capita.

With these changes as a backdrop, the Mediterranean region has seen a combination of these factors as drivers of its Ecological Footprint. While the region's population has doubled between 1961 and 2007, the Ecological Footprint per capita has increased 36 percent.

As a consequence, while the population size and consumption levels of the Mediterranean relatively closely matched that of Latin America in 1961, by 2007 the region was starting to show consumption levels more similar to those of European countries.

Figure Glo-2 looks at the trend in Ecological Footprint per capita by each region in more detail, and in context of the available biocapacity per capita from the world as a whole. It is interesting to note that, in 1961, all regions except North America were operating within available biocapacity. By the mid-1970s, Europe, Latin America, and the Mediterranean were operating above this limit, and by 2007 only Africa was well within this limit. If current trends continue, then Africa will also exceed globally available biocapacity per capita within a decade.

Figure Glo-2 also highlights the interesting trend mentioned before, where the Mediterranean started out by closely following the trend seen in Latin America, but after 1995 started on a trend similar to non-EU European countries. It is also important to note that nearly all regions are seeing only very slight increases in the Ecological Footprint per capita, with the exception of the Middle East / Central Asia and Other Europe in the post-2000 era. Given the overlap between these regions and the Mediterranean, this points to the potential for a Mediterranean collaboration in working to limit increases in the Ecological Footprint.

While it falls outside of the scope of this document to discuss in detail, population growth is clearly one of the leading factors that needs to be addressed within the context of ecological limits. If population had remained constant since 1961, all regions, except North America and the European Union, would be operating within the globally available biocapacity per capita.

The Mediterranean Region has been defined, for the purposes of this report, as those countries who directly border the Mediterranean Sea plus three countries, Jordan, Macedonia, and Portugal, which are ecologically characterized by biomes that are typical of the Mediterranean region. Only countries with populations greater than 500,000 are included in Ecological Footprint results.

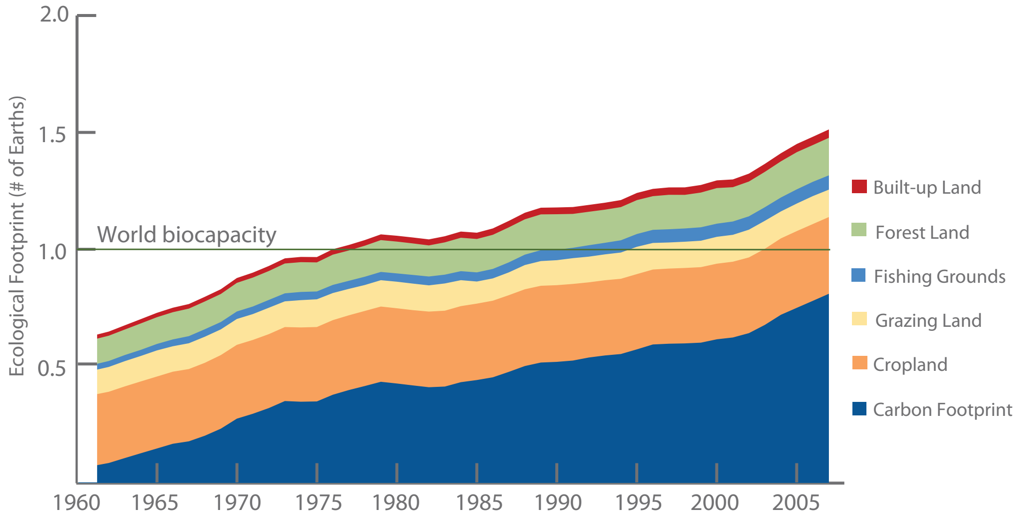


Figure Glo-1: The Global Ecological Footprint trend, by land use type.

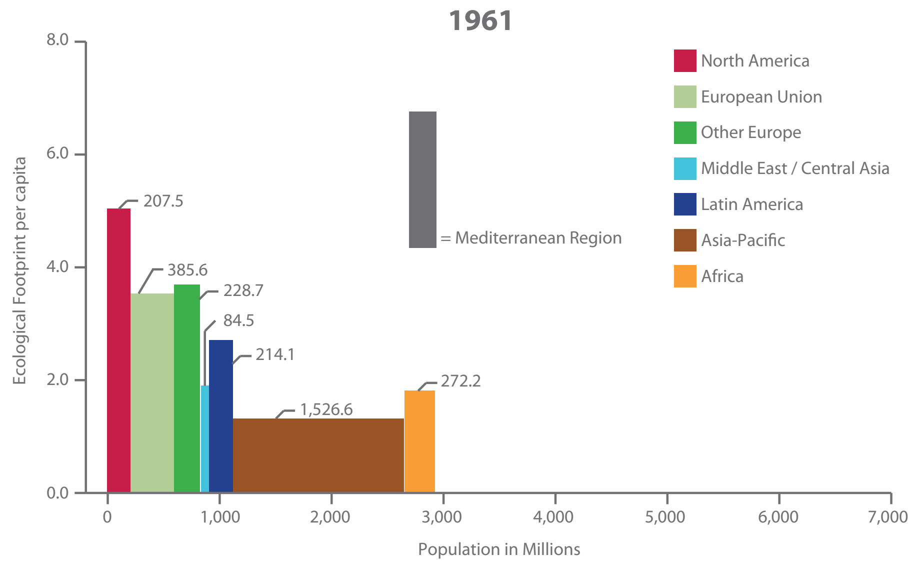


Figure Glo-3: Ecological Footprint and population of major regions in 1961.

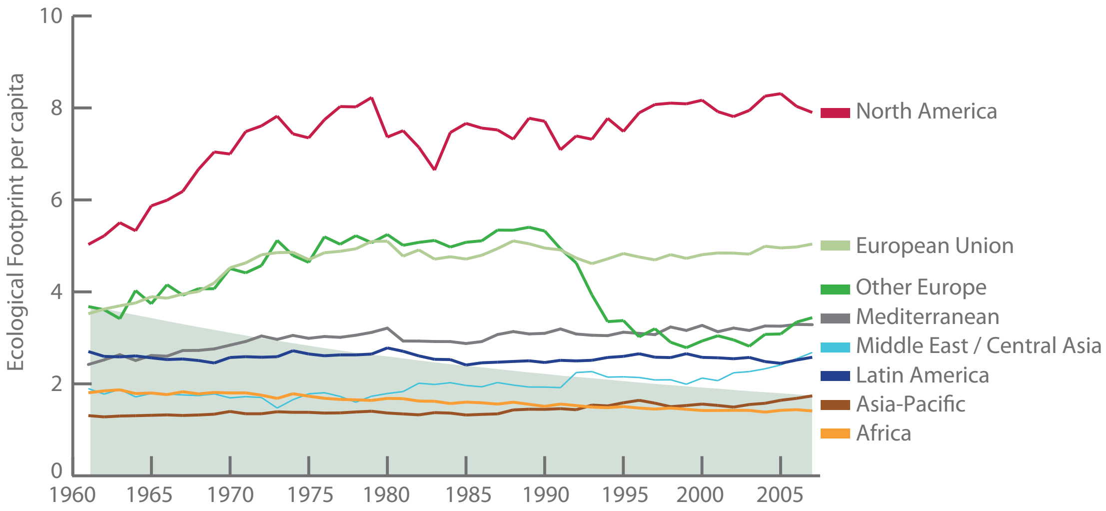


Figure Glo-2: Trends in the Ecological Footprint per capita of major regions over time. The light green area represents the world average per capita biocapacity. Note that the Mediterranean region encompasses countries that also fall into the Africa, Middle East / Central Asia, European Union, and Other Europe regions.

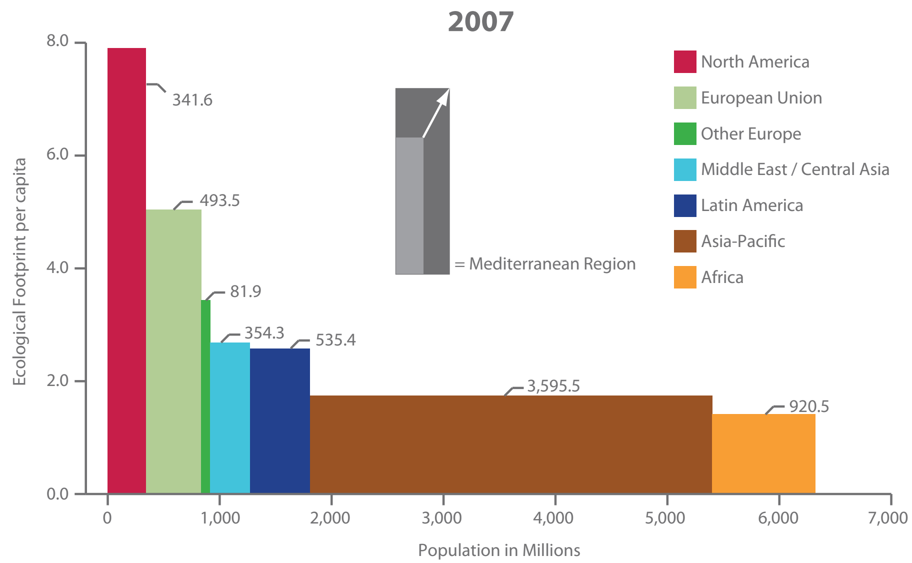


Figure Glo-4: Ecological Footprint and population of major regions in 2007.

MEDITERRANEAN - CONTRIBUTIONS TO ECOLOGICAL CHANGE

The Mediterranean region has undergone many changes over the last 50 years: expansion of the European Economic Community and the formation of the European Union; multiple wars and independence movements; the break-up of the former Socialist Federal Republic of Yugoslavia; the discovery of oil deposits and world fluctuations in oil price.

As a backdrop to these political events, the region's population has grown steadily - from 250 million in 1960 to nearly 500 million in 2010. Simultaneously, the economic output of the region has grown eightfold - from $500 billion to over $4 trillion. These changes all contribute to increasing pressure on the Mediterranean ecosystems, as well as its wildlife and natural resources. Regarding the latter, the Mediterranean region's total Ecological Footprint has increased by 2.6 times between 1961 and 2007, as shown in Figure Med-2.

Figure Med-1 shows a general slight increase in the per capita Ecological Footprint, though with a decrease in the early 1980s due to the recession experienced by France, Italy, and Spain. Figure Med-3 shows a general

Country	Percent of region's Ecological Footprint
France	20%
Italy	19%
Spain	15%
Turkey	13%
Egypt	8%
Greece	4%
Algeria	3%
Portugal	3%
Other	15%

Country	Percent of region's biocapacity
France	31%
Turkey	16%
Spain	12%
Italy	11%
Egypt	8%
Morocco	4%
Algeria	3%
Greece	3%
Other	12%

Table 1. The contribution of each country to the Mediterranean Region's Ecological Footprint and biocapacity

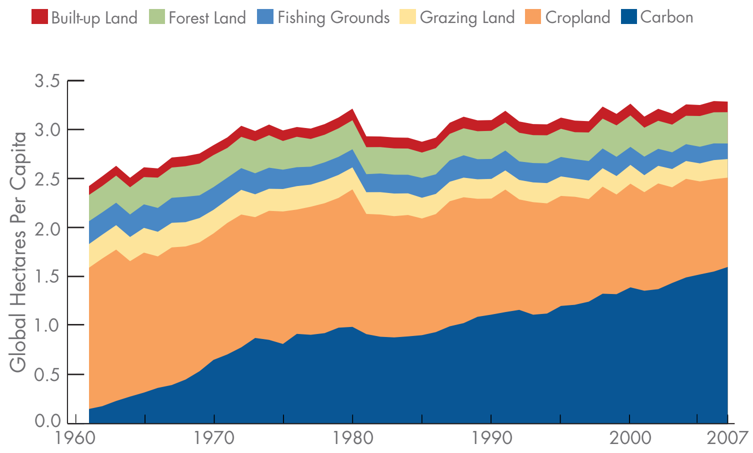


Figure Med-1: Ecological Footprint per capita within the Mediterranean Region, by component, 1961-2007

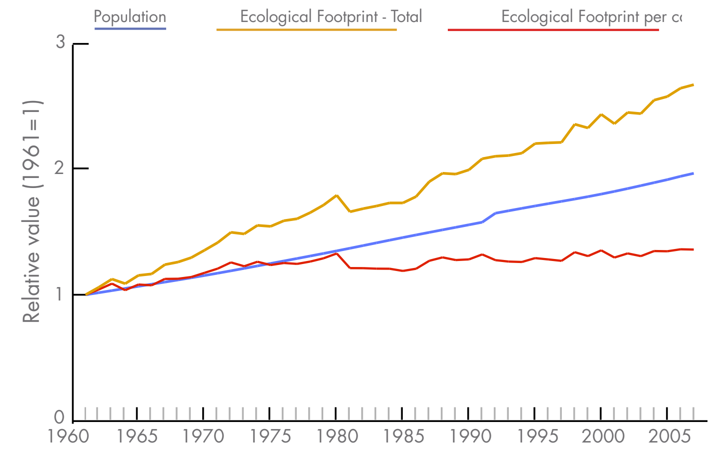


Figure Med-2: Contributing drivers of the Mediterranean Region's Ecological Footprint, 1961-2007

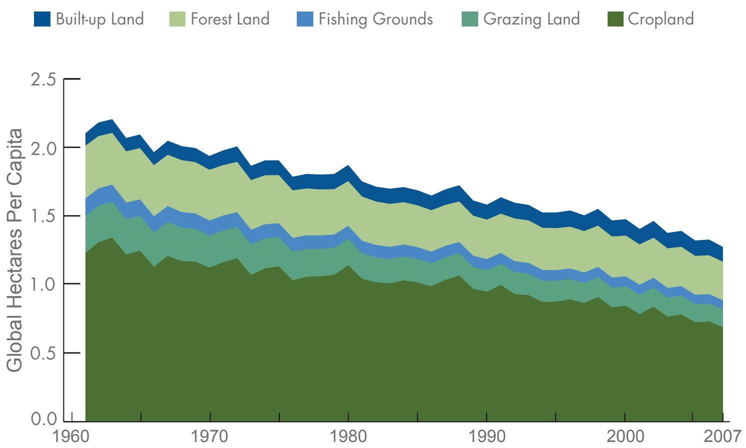


Figure Med-3: Biocapacity per capita within the Mediterranean Region, by component, 1961-2007

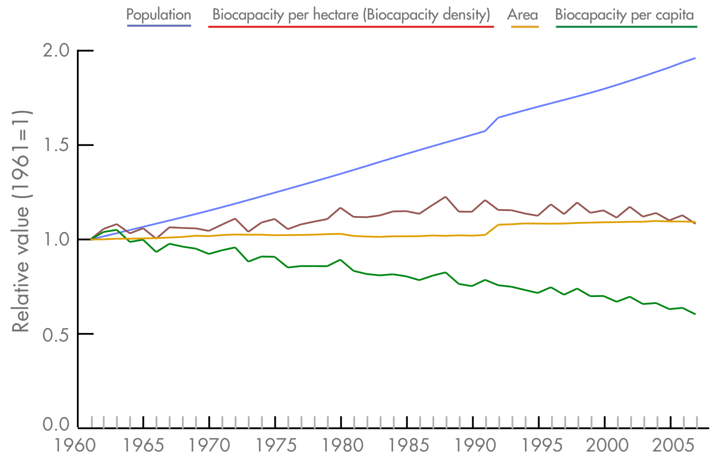


Figure Med-4: Contributing drivers of the Mediterranean Region's biocapacity, 1961-2007 decline in biocapacity per capita over the same period, predominantly through increased population. Figure Med-4 then shows how this population increase has masked the slight increases in yield and bioproductive area. A jump in population and available land area can be seen in 1992, when the former Yugoslav countries of Bosnia-Herzegovina, Croatia, Montenegro, and Slovenia were included in the accounting. Since 1961, the region has experienced a deficit in biocapacity compared to the Ecological Footprint, as shown in Figure Med-5. The deficit has grown from 0.3 to 2.0 global hectares per person between 1961 and 2007. This deficit has been financed by the import of ecological resources and, predominantly, by the demand for global forests as a sink of carbon dioxide emissions. Figure Med-6 illustrates this external dependency.

The contribution to total GDP from each component in Figure Med-7 (household consumption, government consumption, and investment) has remained stable over time, indicating that there have been no sudden increases in investment activity that would constrain possible trajectories for the Ecological Footprint in the medium-term.

The region's population, while growing steadily, has drastically altered in composition: Figure Med-8 shows how the working age population has expanded greatly and the population under 15 has remained stable since the 1980s. This suggests that population growth will start to diminish over the next few decades.

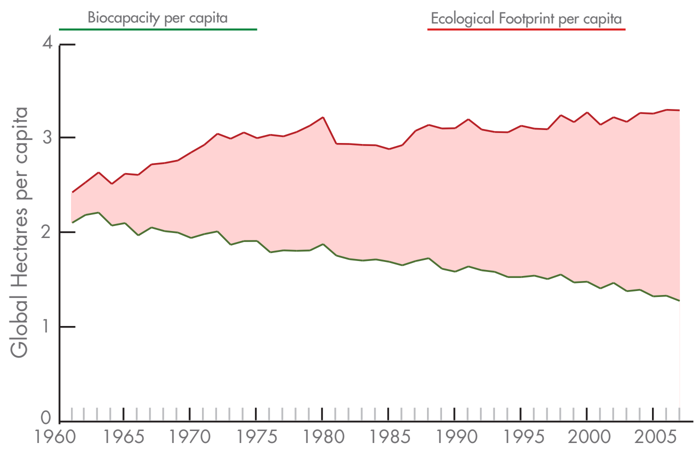


Figure Med-5: Mediterranean Region's per capita biocapacity deficit, 1961-2007

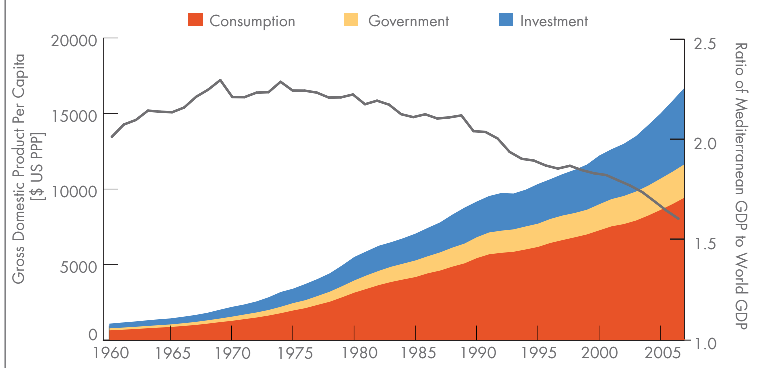


Figure Med-7: Mediterranean Region's GDP by component (left axis) and GDP relative to world average (right axis), 1961-2007

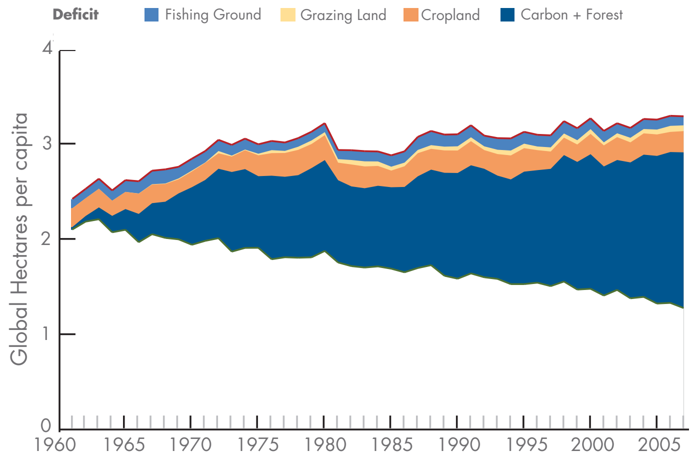


Figure Med-6: Mediterranean Region's per capita biocapacity deficit by contributing land-use type, 1961-2007

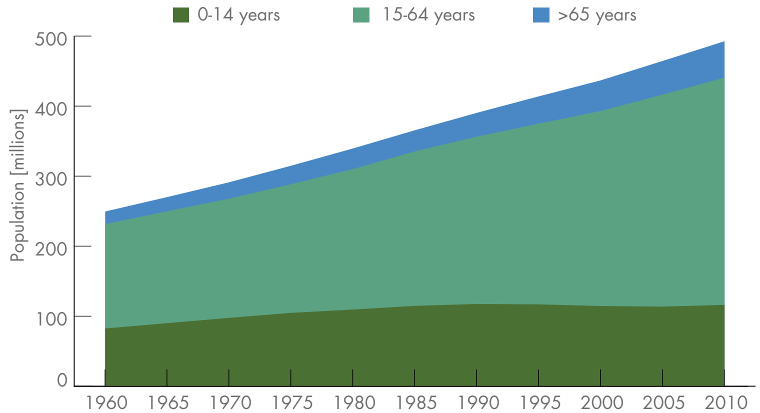


Figure Med-8: Mediterranean Region's population by age group, 1961-2010

MEDITERRANEAN - BIOCAPACITY DEFICITS AND ECOLOGICAL OVERSHOOT

The Mediterranean region has long placed demands for ecological resources that far exceed what it can sustainably produce domestically. Figure Med-9 shows that in 1961, only four countries (Turkey, Syria, Tunisia, and Algeria) were able to produce, on aggregate, more resources than they consumed. The remainder of the countries consumed significantly more than their domestic ecosystems produced; the greatest deficits occurred in countries with high consumption (Portugal), low biocapacity (Libya), or a combination of both (Israel).

By 2007 (figure Med-10), the deficit situation had spread to all Mediterranean countries with the exception of Montenegro. Algeria saw an especially large change

CONSUMPTION AND BIOCAPACITY BALANCE

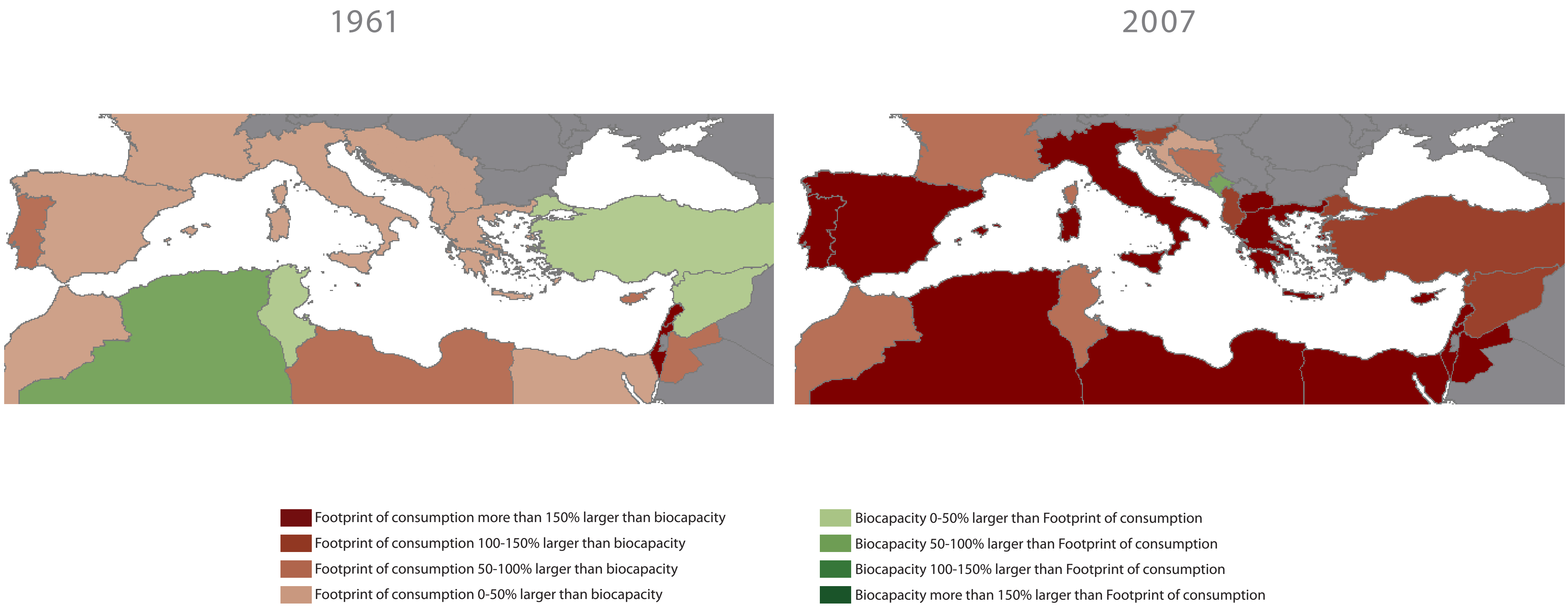


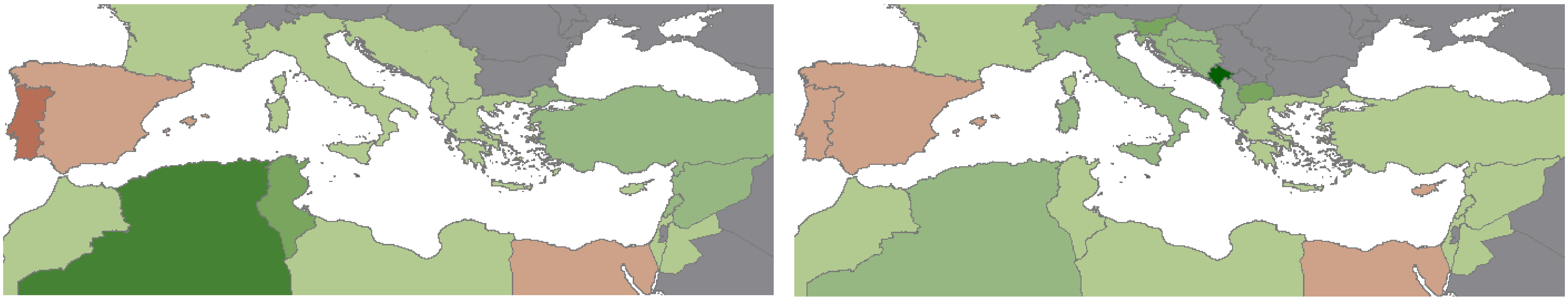
FIgure Med-9 (left) and figure Med-10 (right) . Biocapacity surplus (green) and deficit (red) status of the Mediterranean countries. Biocapacity surplus is defined as a domestic Ecological Footprint of consumption less than domestic biocapacity; biocapacity deficit as an Ecological Footprint of consumption greater than domestic biocapacity. The depiction and use of boundaries, geographic names, and related data shown on maps and included in lists and tables in this report do not imply official endorsement or acceptance by Global Footprint Network and partners.

in circumstance, moving from a situation of large bicoapacity surplus to a situation of large biocapacity deficit.

Knowing the demands of each country relative to their domestic biocapacity doesn't inform us of risks to their domestic production systems, since a deficit can be maintained through either domestic overuse, imports, or dependency on the global commons. Figures Med-11 and Med-12 show the relative ecological overshoot (the ratio of domestic production of all land types except carbon to biocapacity), indicating that, as of 2007, Portugal, Spain, Egypt, and Cyprus were harvesting domestic resources at unsustainable rates.

PRODUCTION AND BIOCAPACITY BALANCE

1961 | 2007



- Footprint of production more than 150% larger than biocapacity
- Footprint of production 100-150% larger than biocapacity
- Footprint of production 50-100% larger than biocapacity
- Footprint of production 0-50% larger than biocapacity
- Biocapacity 0-25% larger than Footprint of production
- Biocapacity 25-50% larger than Footprint of production
- Biocapacity 50-100% larger than Footprint of production
- Biocapacity 100-150% larger than Footprint of production
- Biocapacity more than 150% larger than Footprint of production

FIgure Med-11 (left) and figure Med-12 (right) . Ecological remainder (green) and overshoot (red) status of the Mediterranean countries. Ecological remainder is defined as a domestic Ecological Footprint of production (minus the carbon Footprint of production) less than domestic biocapacity; ecological overshoot as a domestic Ecological Footprint of production (minus the carbon Footprint of production) greater than domestic biocapacity. The depiction and use of boundaries, geographic names, and related data shown on maps and included in lists and tables in this report do not imply official endorsement or acceptance by Global Footprint Network and partners.

MEDITERRANEAN - TRADE LINKS

The Mediterranean basin has supported international trade for millenia, and this trade continues to pose both risks and opportunities for the maintenance of a high quality of life. By trading, the region opens up its natural resources to global exploitation by rich, resource intensive economies. This dynamic can be seen in Figure Med-13 and Figure Med-14, where the Ecological Footprint exported out of the region to the US and EU (formerly the EEC) has grown dramatically in the last 30 years. Growth in exports to the EU has been especially strong, likely as a result of the incorporation of many countries into the free trade union. The large contribution of the carbon

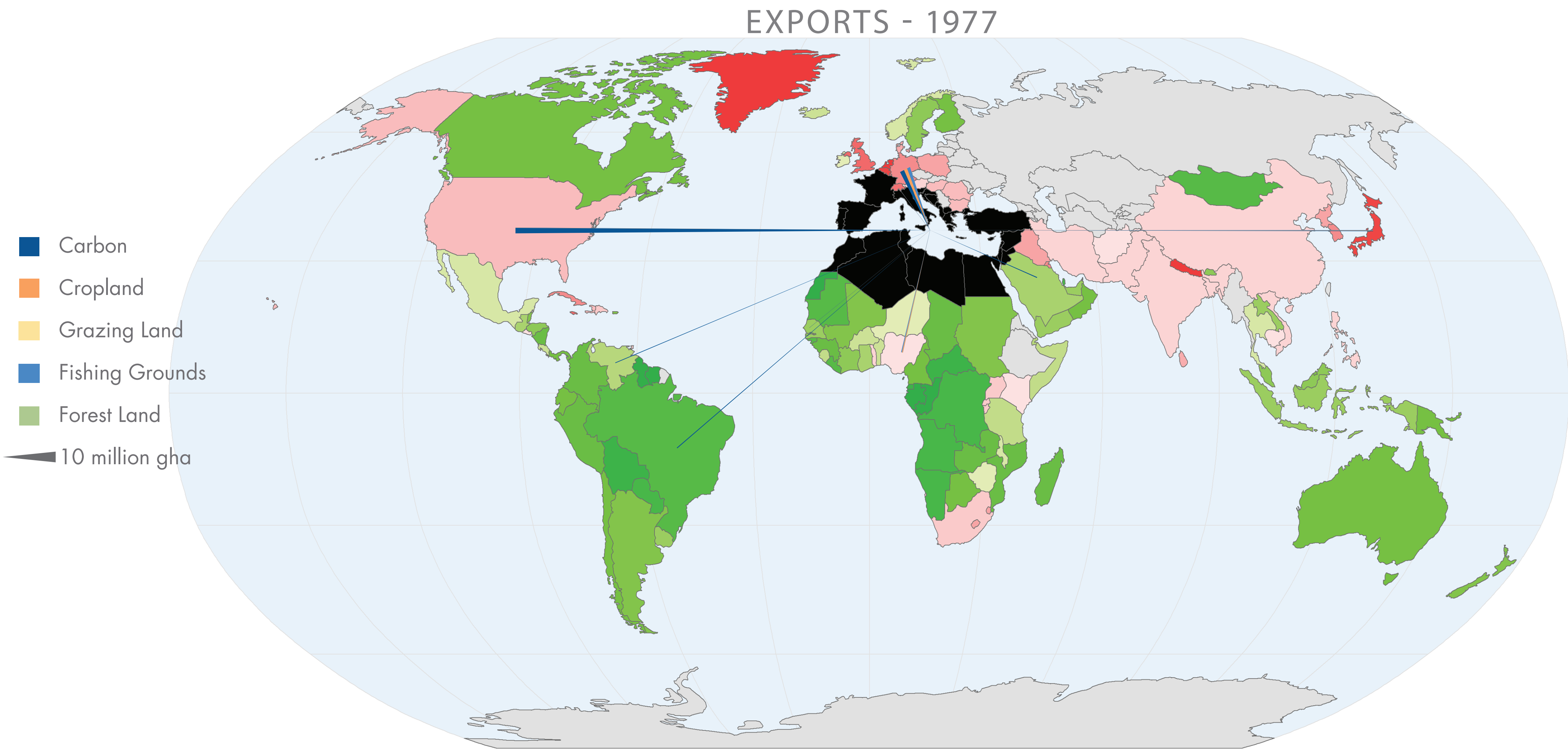


FIgure Med-13. Ecological Footprint exports to major trade partners of the Mediterranean region in 1977, and the biocapacity surplus (green) and deficit (red) status of those partners. Non-Mediterranean European Economic Community partners are grouped together. Arrows representing trade flows are colour-coded to represent the type of bioproductive land traded. The size of the arrows is a function of the extent of the trade flows.

Footprint in overall trade suggests that the region is highly exposed to energy price volatility through oil shortages or carbon pricing. Unsurprisingly, the majority of ecological resource exports are to countries which are experiencing a biocapacity deficit (Ecological Footprint of consumption greater than domestic biocapacity), though exports to Brazil are a key outlier in this. If the Mediterranean region is able to stabilize its ecosystems and domestic demand in such a way as to maintain exports it will be able to take advantage of the higher prices that are likely to follow an increased deficit in other countries.

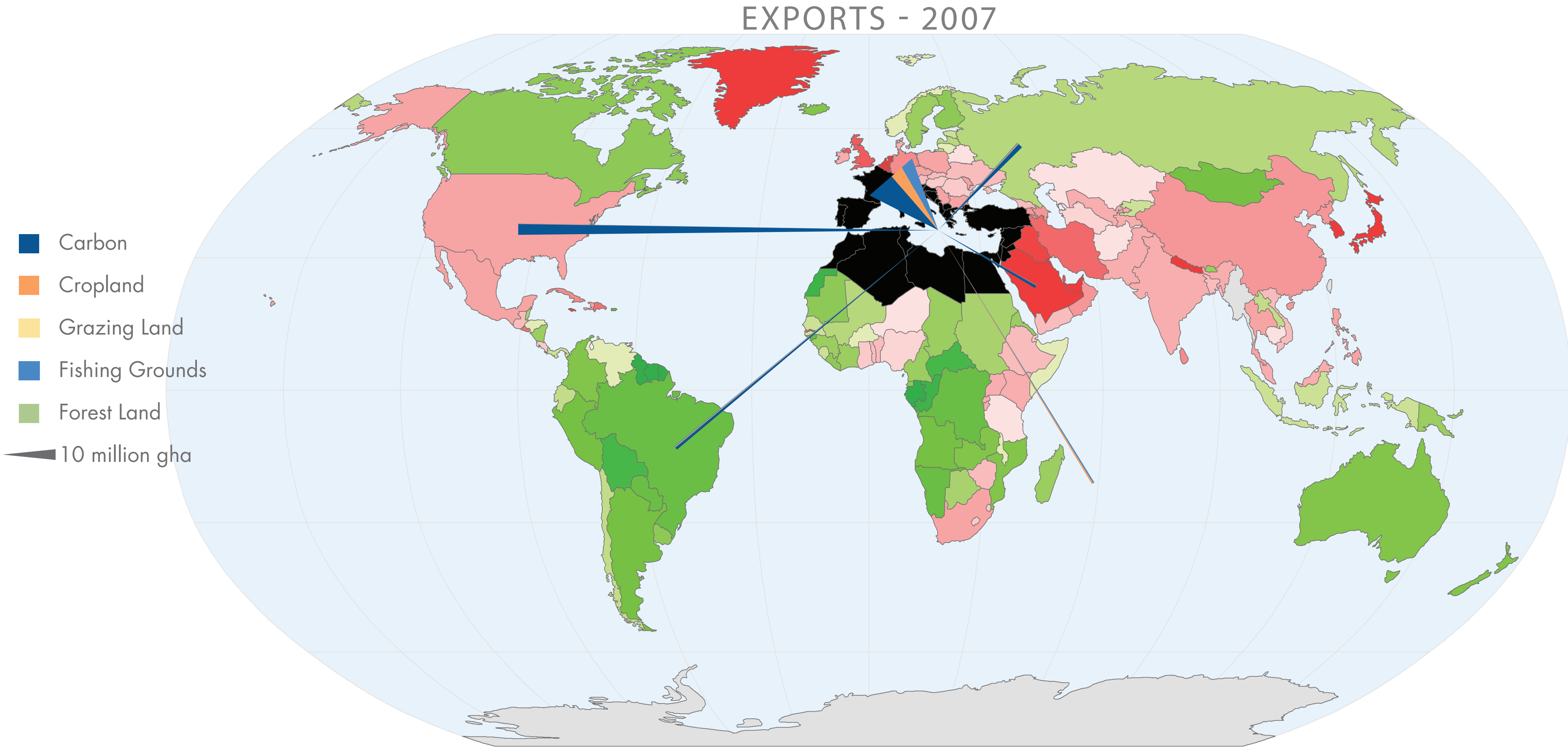


FIgure Med-14. Ecological Footprint exports to major trade partners of the Mediterranean region in 2007, and the biocapacity surplus (green) and deficit (red) status of those partners. Non-Mediterranean European Union partners are grouped together. Arrows representing trade flows are colour-coded to represent the type of bioproductive land traded. The size of the arrows is a function of the extent of the trade flows.

MEDITERRANEAN - TRADE LINKS

In 1977, the Mediterranean region was predominantly dependent upon resource imports from countries which had a biocapacity surplus, such as Norway, Iceland, Argentina, Canada, and Saudi Arabia. By 2007, imports had both grown in volume and shifted to trading partners which are in biocapacity deficit. The only major trade partner for imports that still had a biocapacity surplus in 2007 was Russia. Although most of these imports take the form of embodied carbon emissions, this situation hints at potential severe restrictions in the Mediterranean's ability to import resources in the future. These restrictions may take the form of price increases due to carbon pricing, oil shortages, or the depletion of natural support systems in the countries which have a biocapacity deficit.

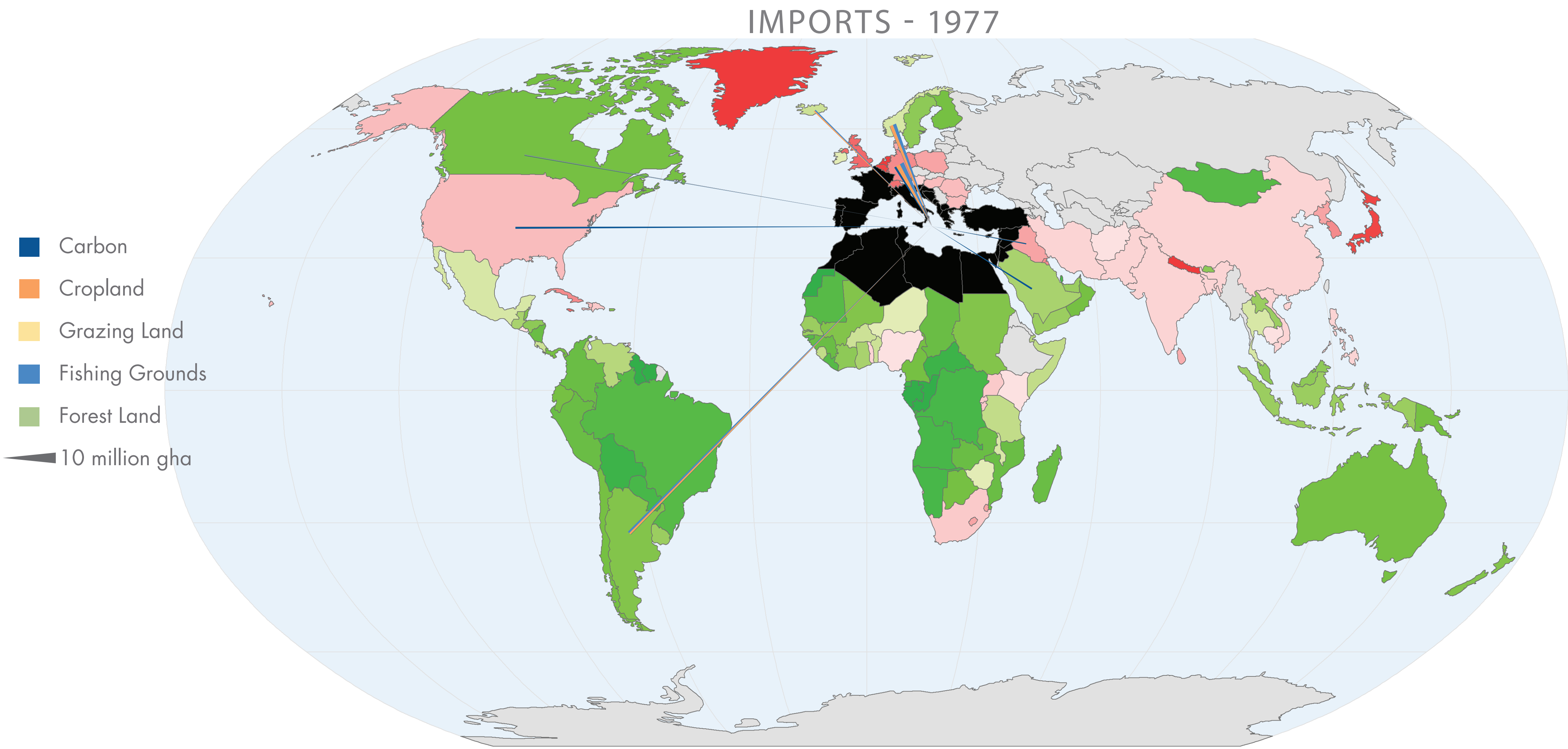


FIgure Med-15. Ecological Footprint imports from major trade partners of the Mediterranean region in 1977, and the biocapacity surplus (green) and deficit (red) status of those partners. Non-Mediterranean European Economic Community partners are grouped together. Arrows representing trade flows are colour-coded to represent the type of bioproductive land traded. The size of the arrows is a function of the extent of the trade flows.

At the same time, trade offers opportunities to profit from the maintenance of domestic ecosystems and from resource efficiencies that arise through trade. Some countries are able to support higher sustainable yields for certain land-use types, and by making these products available globally they can support greater well-being. However, a key piece in ensuring that trade contributes to efficiency is that externalities such as ecosystem degradation and climate change be integrated into pricing systems.

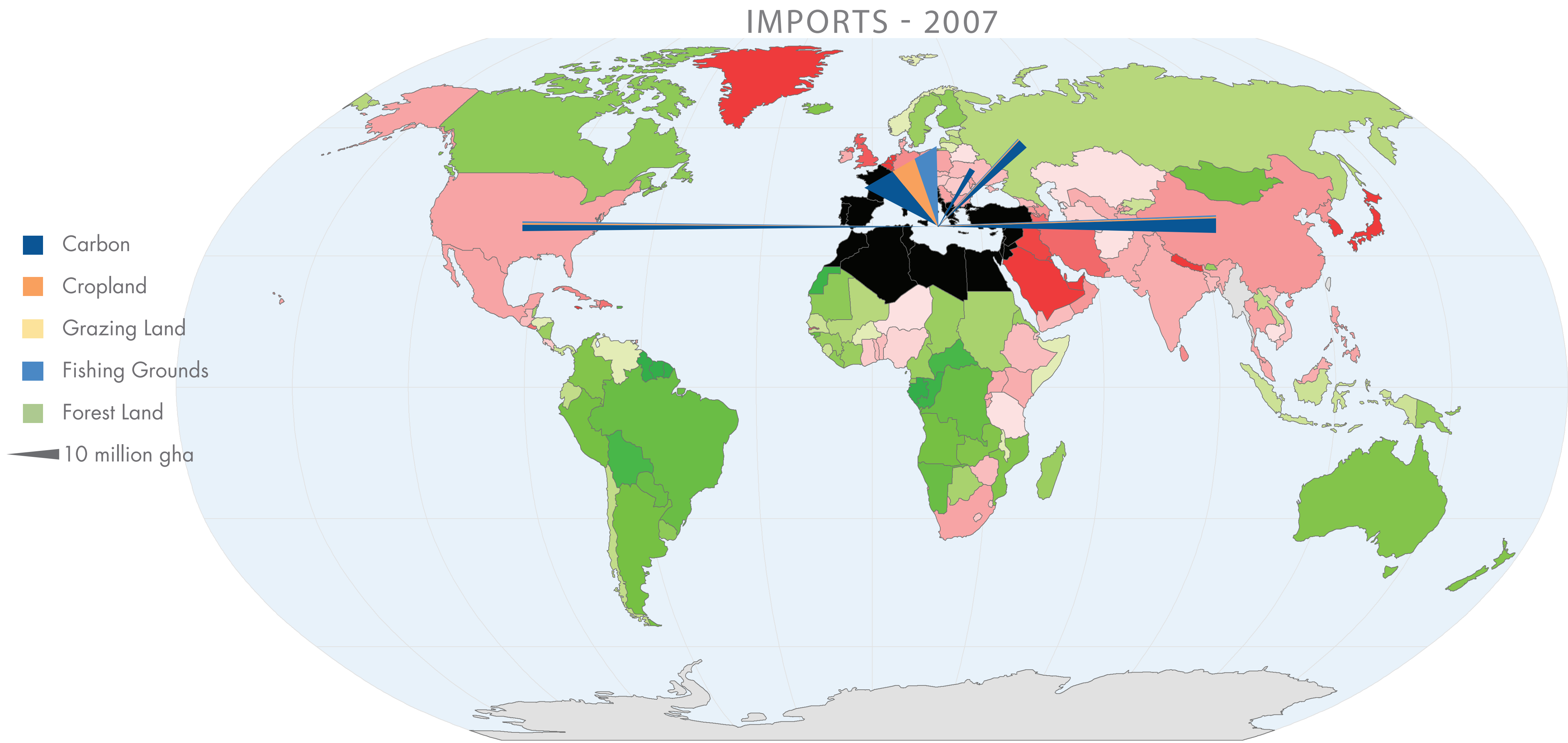


FIgure Med16. Ecological Footprint imports from major trade partners of the Mediterranean region in 2007, and the biocapacity surplus (green) and deficit (red) status of those partners. Non-Mediterranean European Union partners are grouped together. Arrows representing trade flows are colour-coded to represent the type of bioproductive land traded. The size of the arrows is a function of the extent of the trade flows.

MEDITERRANEAN - WORKING TOWARDS LASTING HUMAN DEVELOPMENT

The welfare of human society is inextricably linked to the well-being of the planet and nature's resources upon which it depends. According to the IUCN, sustainable development is a commitment to "improving the quality of human life while living within the carrying capacity of supporting ecosystems". The United Nations Development Programme (UNDP), based on Amartya Sen's work, further defines development as the enlargement of freedoms to pursue society's goals.

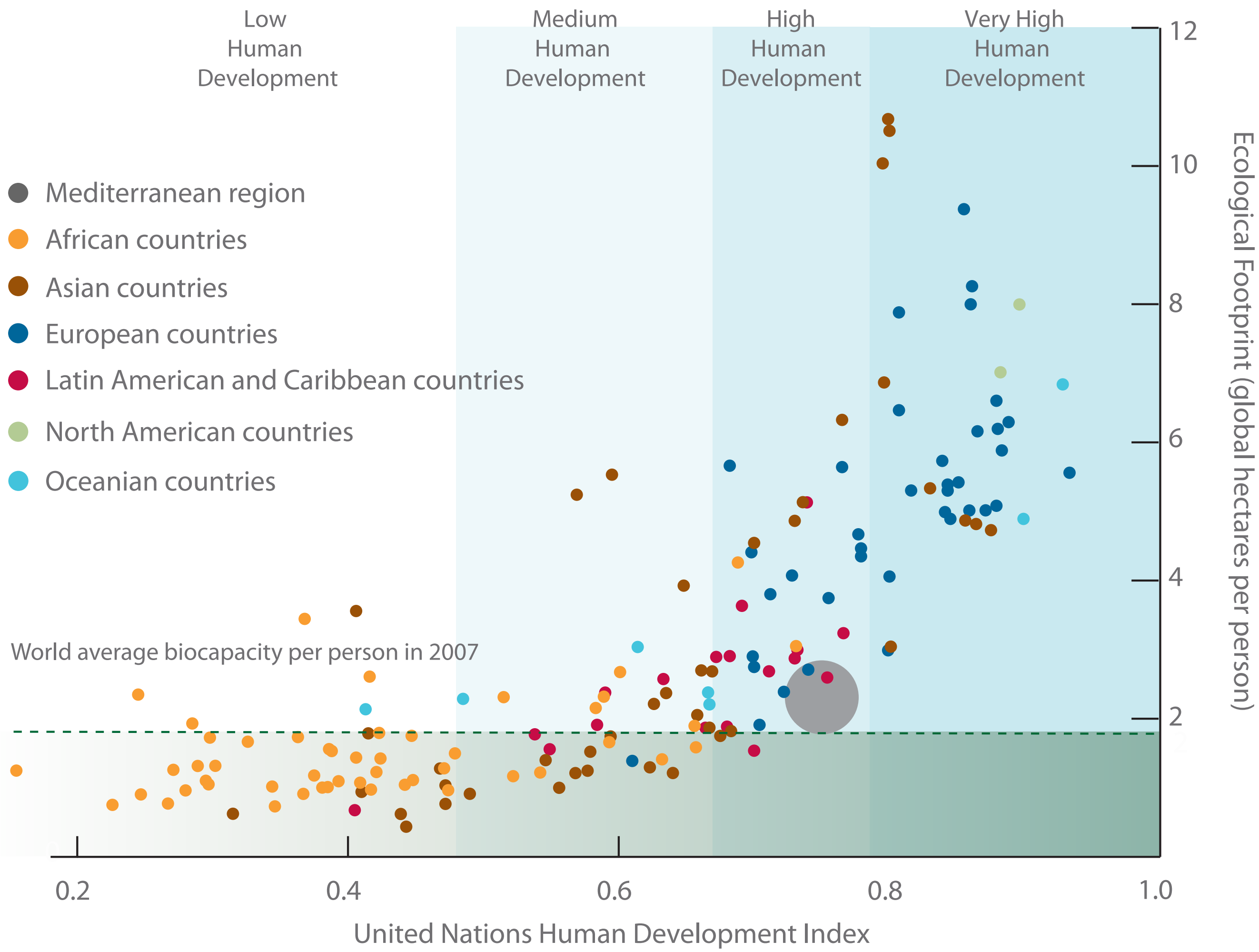


Figure Med-17: Human Development Index and Ecological Footprint, 2007

One way to assess the attainment of two necessary criteria for sustainable development by a country is to compare its level of development with its demands upon the biosphere. The UNDP's Human Development Index (HDI) is widely adopted as an indicator of development (combining indicators of life expectancy, education, and income per capita), and the Ecological Footprint measures demand for the regenerative capacity of the Earth. In the HDI, countries above the median value are considered by the UNDP to have "high human development". Conversely, with 1.8 global hectares biocapacity available per person worldwide, individual Footprints would need to stay beneath that value to avoid unsustainable development. Living within this value respects the principle of intra- and intergenerational equity, helping enable adequate access to resources by all. These minimum requirements for sustainability can be represented by the two lower-right quadrants in Figure Med-17.

The Mediterranean region has a relatively high HDI value of 0.74. In 2007, three countries (Morocco, Syria, Egypt) within this region are classified as having Medium Human Development, that is a value of HDI between the 25th and 50th percentile of all countries, and nine (France, Israel, Spain, Greece, Italy, Slovenia, Malta, Cyprus, Portugal) have very high human development (above 75th percentile). However, in 2007 only five nation states within the Mediterranean (Algeria, Egypt, Montenegro, Morocco, Syria) had an Ecological Footprint of less than the global average available biocapacity per capita: 1.8 global hectares. This implies that whilst the majority of residents in the Mediterranean enjoy a lifestyle that enables them to pursue their own well-being, their consumption habits are not replicable world-wide in a sustainable manner.

MEDITERREANEAN - MAINTAINING BIODIVERSITY

Biodiversity, a contraction of "biological diversity", refers to the degree of variation of life forms within a region. High biodiversity is critical to the robustness of most ecosystems: Sufficient populations of individual species and a broad spectrum of species help to absorb shocks from environmental, or human, pressures.

Since the resources we extract are also based upon these ecosystems, biodiversity plays a critical role in maintaining our ability to derive benefit from the natural world. Reductions in soil microbe diversity can reduce fertility; the absence of pollinators can prevent the formation of some fruits; and fish harvests are based on extensive marine food chains with many links that can be disrupted by declines in biodiversity.

Biodiversity can come under threat from numerous sources. Natural variations in environmental conditions can temporarily alter the distribution of species, often causing declines in species adbundance but increases in species diversity. Direct human pressure through the removal of habitat is often the most disruptive force: The speed with which it occurs prevents the diversification of life forms to adapt to the new environment, and continued human presence on the land prevents recolonization by reservoir populations elsewhere.

One way to measure the pressure on biodiversity is to look at resource extraction compared with the regeneration rate. The greater the Ecological Footprint of production, without the inclusion of carbon dioxide emissions, relative to the local biocapacity, the greater the direct pressure on biodiversity. With the inclusion of carbon in the Ecological Footprint, the link becomes less well defined, but total pressure on the ecosystem is approximated.

Figure Med-18 shows how the ecological remainder for the world as a whole has decreased since 1961, with an associated decline in biodiversity. Figure Med-19 replicates the same information for the Mediterranean region's wetland biodiversity (Galewski, 2008). These images hint at interactions between biodiversity and the ecological remainder/overshoot situation, but also illustrate that there is incredible complexity in the mechanisms between the many factors influencing biodiversity.

The Ecological Footprint was officially included in the list of indicator used by the 2010 Biodiversity Indicator Partnership (BIP) to monitor world governments' progress toward the 2010 biodiversity target set by the CBD in 2002, and will continue to be used in the future.

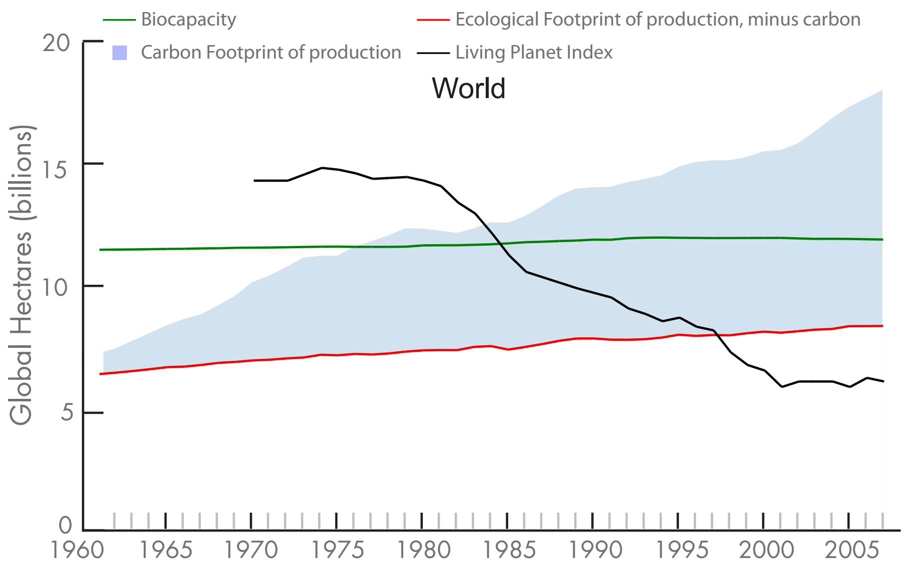


Figure Med-18: Comparison of trends in the global Ecological Footprint of production (red line: without carbon; blue area: with carbon) and biocapacity with the Living Planet Index

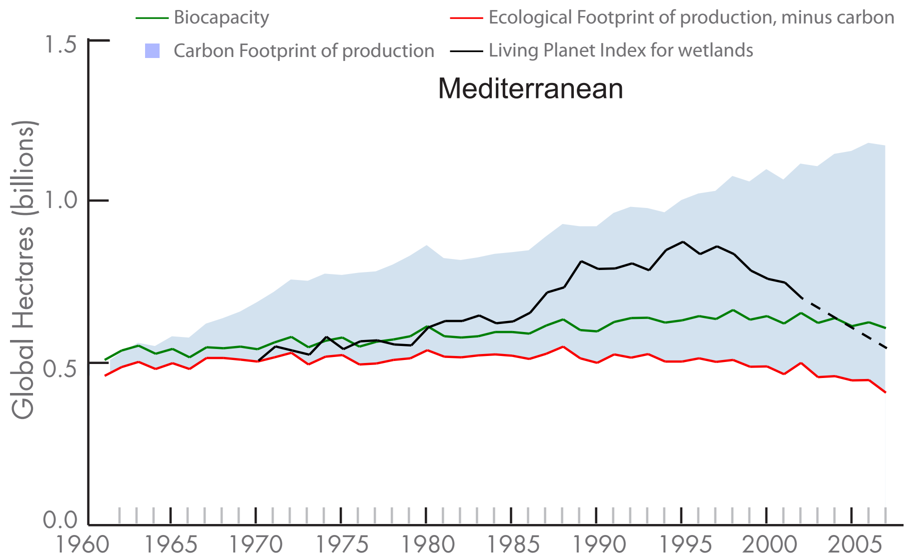


Figure Med-19: Comparison of trends in the Mediterranean Ecological Footprint of production (red line: without carbon; blue area: with carbon) and biocapacity with the Living Planet Index for Wetlands

ALBANIA

Albania is located in South-Eastern Europe and covers approximately 29,000 km². Prior to 1992, the country was known as the Socialist People's Republic of Albania, and had strong ties first to

the Soviet Union and then to the People's Republic of China. In 1992, elections removed the Communist party from power, and the economy collapsed. Recovery was slow and undermined by corruption and the formation and subsequent deterioration of unsustainable business models. These worsening economic conditions led to widespread riots in 1997 and the deployment of UN peacekeeping troops. Relations between Greece and Albania deteriorated significantly in this period, and Greek sanctions also limited economic recovery. The 1998-1999 Kosovo War led to an influx of ethnic Albanian refugees, responsible in part for stemming the contraction in Albania's population.

The economic contractions in 1992 and 1997 are reflected by a large double-dip in Albania's per capita Ecological Footprint. When this is compounded with a decrease in population, we see that Albania's total Ecological Footprint dipped below 1961 levels in 1997.

Albania's available biocapacity per person suffered from a doubling of population between 1961 and 1990, and a collapse in biocapacity density (biocapacity per hectare) in 1992. This collapse is likely due to a decrease in the ability to purchase fertilizers or work the land,

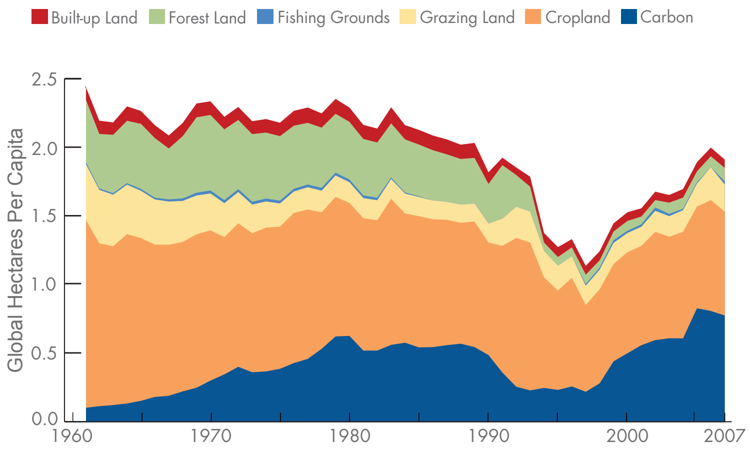


Figure ALB-1: Ecological Footprint per capita in Albania by component, 1961-2007

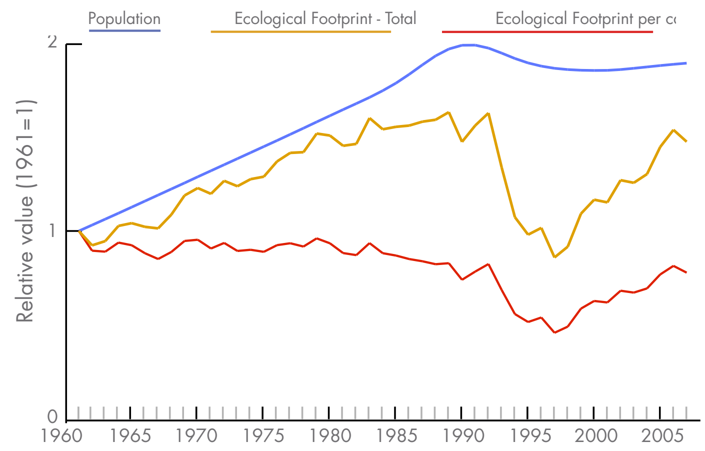


Figure ALB-2: Contributing drivers of Albania's Ecological Footprint, 1961-2007

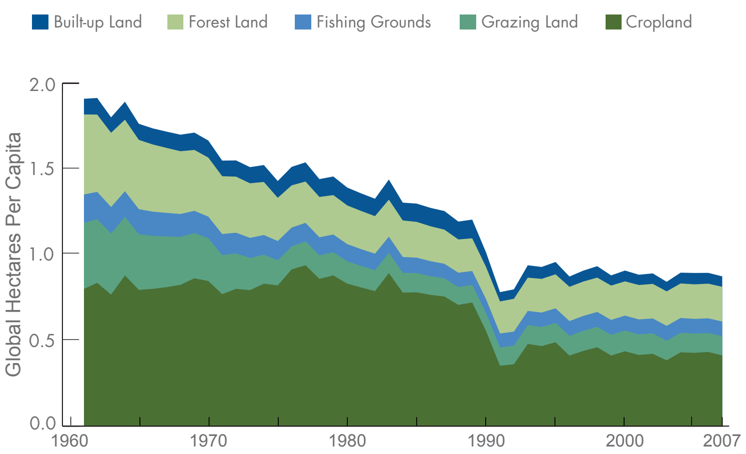


Figure ALB-3: Biocapacity per capita in Albania by component 1961-2007

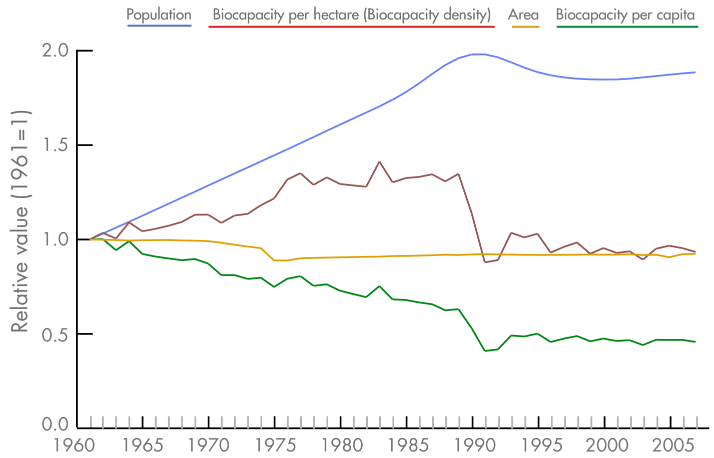
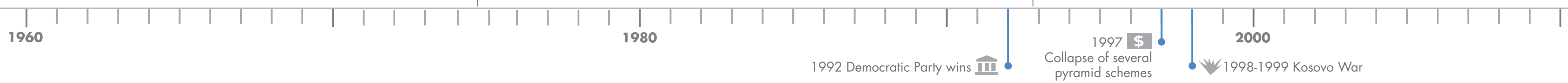


Figure ALB-4: Contributing drivers of Albania's biocapacity, 1961-2007



causing a decrease in crop yields. As a result of these changes, while Albania's Ecological Footprint per capita decreased by about 20 percent between 1961 and 2007, the available biocapacity per capita decreased by over 50 percent. The discrepancy between Albania's Ecological Footprint and biocapacity is potentially due to multiple reasons: increased emissions of carbon dioxide into the atmosphere, increased pressure on domestic land, or increased dependency on imports.

Figure ALB-6 shows how the composition of Albania's biocapacity deficit has changed over time. From the late 1960s to the economic collapse in the early 1990s, the majority of the deficit came from the combined pressures on forest land for timber harvest and carbon dioxide sequestration. Since the beginning of economic recovery in the late 1990s, however, cropland has contributed significantly to the deficit, indicating that Albania has not recovered its productivity in cropland.

Looking ahead, Albania's aging population is likely to maintain at a steady level. Impacts from the large increase in investment since 2000 are likely to be felt over the next few decades, and it remains to be seen whether these investments were made in a manner consistent with decoupling environmental pressure from economic growth.

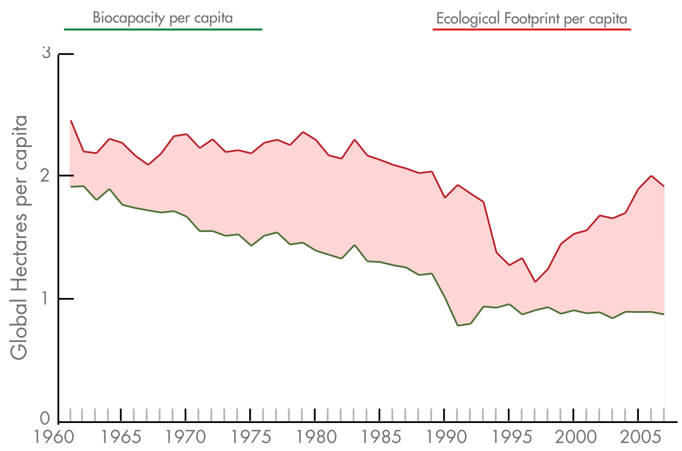


Figure ALB-5: Albania's per capita biocapacity deficit, 1961-2007

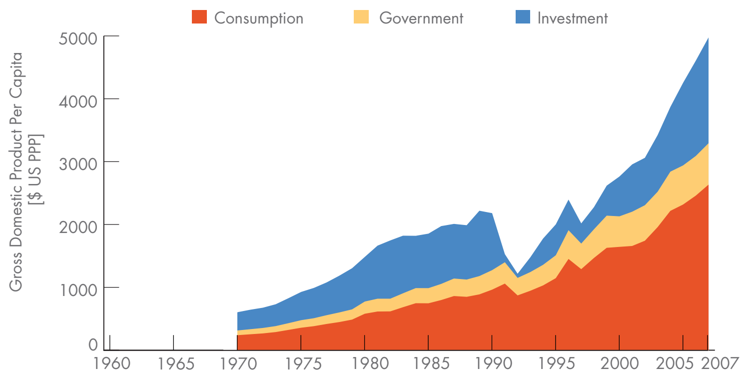


Figure ALB-7: Albania's GDP by component, 1961-2007

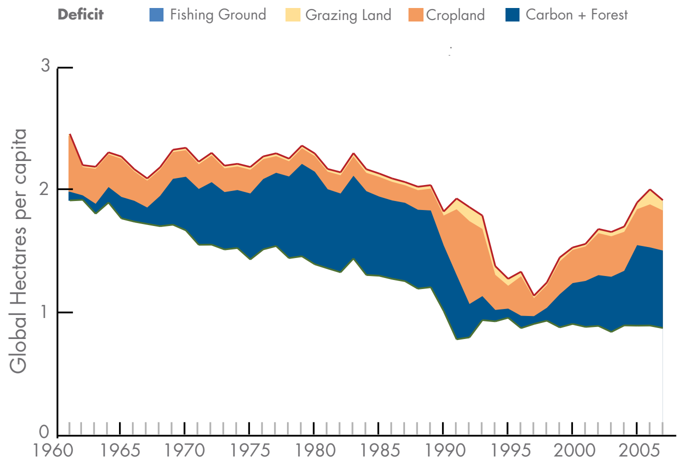


Figure ALB-6: Albania's per capita biocapacity deficit by contributing land-use type, 1961-2007

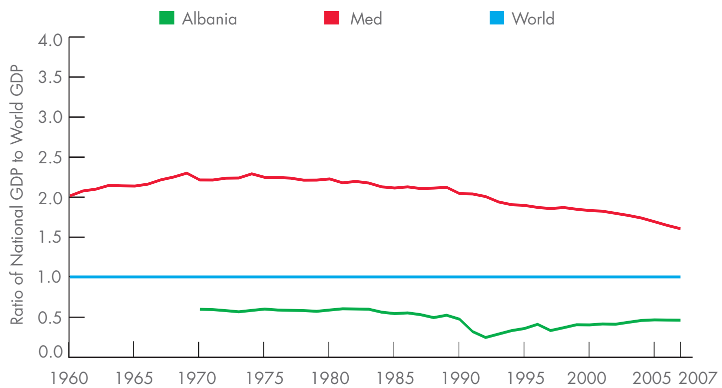


Figure ALB-8: Comparison of ratio of world GDP to Albania and the Mediterranean region, 1961-2007

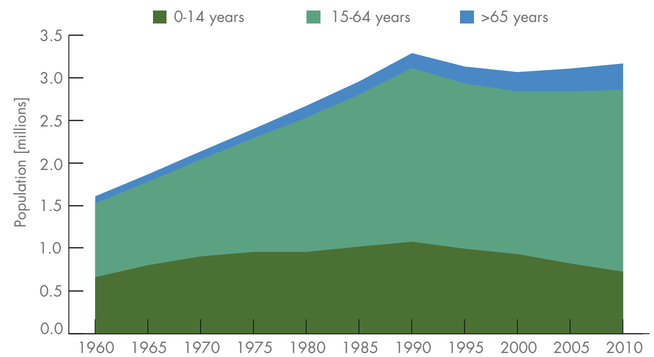


Figure ALB-9: Albania's population by age group, 1961-2010

ALGERIA

Algeria, located in North Africa and bordering Morocco, Tunisia, and Libya, covers approximately 2,400,000 km². Algeria gained independence from France in 1962, and experienced rapid

economic growth due to collectivizing agriculture and nationalizing the country's oil supply. However, as the price of oil dropped in the late 1980s, Algeria's economic dependency on oil exports became apparent and unemployment and shortages of goods became widespread. In 1991, the first elections were held, following the autocratic rule which had existed since independence. Disputes between the military and the elected government led to the Algerian Civil War. The Civil War lasted for approximately 11 years, at a cost of between 150,000 and 200,000 lives.

The rapid economic growth between 1965 and 1985 is likely to be the main driving factor behind the 90 percent increase in the Ecological Footprint per capita during this period. The interaction with high population growth over the same period led to a near-quadrupling of the total Ecological Footprint in the same period. Despite a decreasing Ecological Footprint per capita following the collapse in oil revenues and the ensuing political problems, continued population growth held the total Ecological Footprint constant between 1985 and 2000, since then it has resumed its upward trajectory.

Algeria has maintained a constant biocapacity density

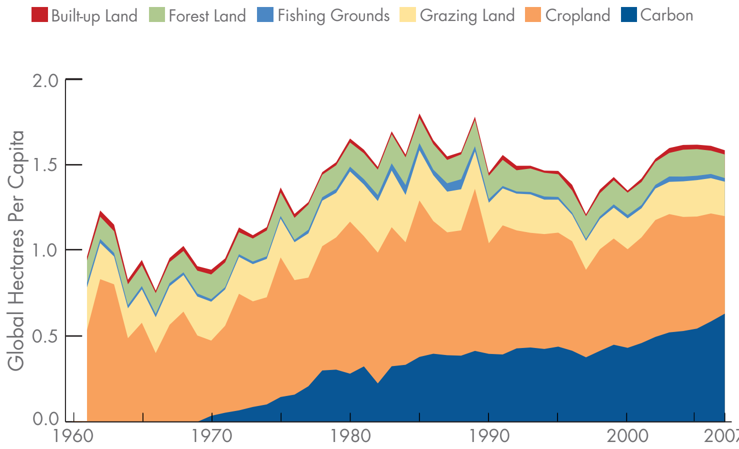


Figure DZA-1: Ecological Footprint per capita in Algeria by component, 1961-2007

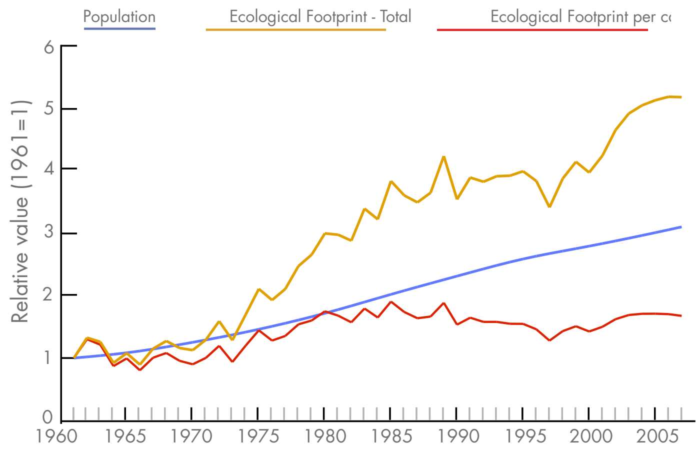


Figure DZA-2: Contributing drivers of Algeria's Ecological Footprint, 1961-2007

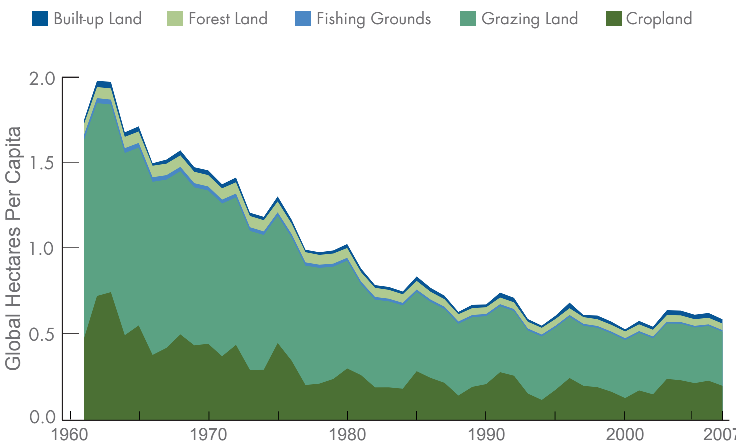


Figure DZA-3: Biocapacity per capita in Algeria by component 1961-2007

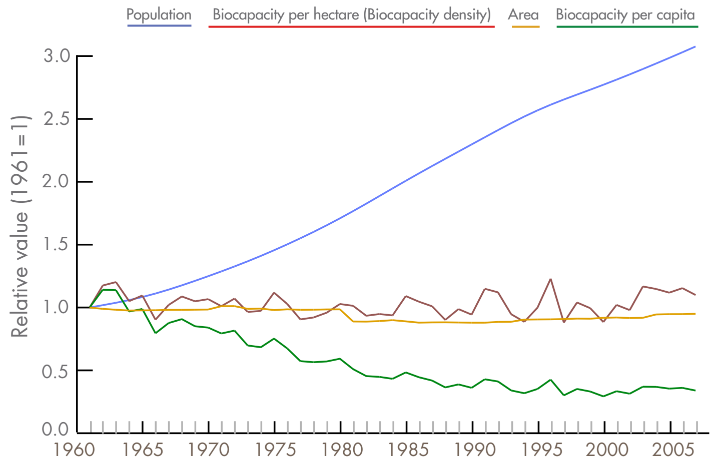
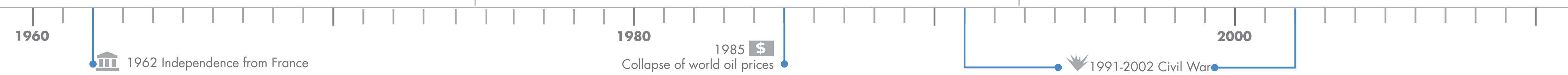


Figure DZA-4: Contributing drivers of Algeria's biocapacity, 1961-2007



since 1961, despite economic troubles, and this is in part due to the low contribution of cropland to Algeria's total biocapacity. However, population growth has ensured that available biocapacity per capita has decreased by 65 percent since 1961. Over the same period, the Ecological Footprint per capita has increased by over 65 percent. The impact from this discrepancy between Algeria's Ecological Footprint and biocapacity is potentially due to a number of factors: increased emissions of carbon dioxide into the atmosphere, increased pressure on domestic land, or increased dependency on imports.

Figure DZA-6 shows how the composition of Algeria's biocapacity deficit and surplus have changed over time: Prior to 1975, Algeria had a biocapacity surplus, comprised entirely of grazing lands. However, since then, Algeria has relied on land outside its borders to balance its deficit, equally split between imports of cropland and the cost of carbon dioxide emissions to be borne by everybody.

Looking ahead, Algeria's population growth is likely to decrease due to the declining youth population. Impacts from the large increase in investment since 2000 are likely to be felt over the next few decades, and it remains to be seen whether these investments were made in a manner consistent with decoupling environmental pressure from economic growth.

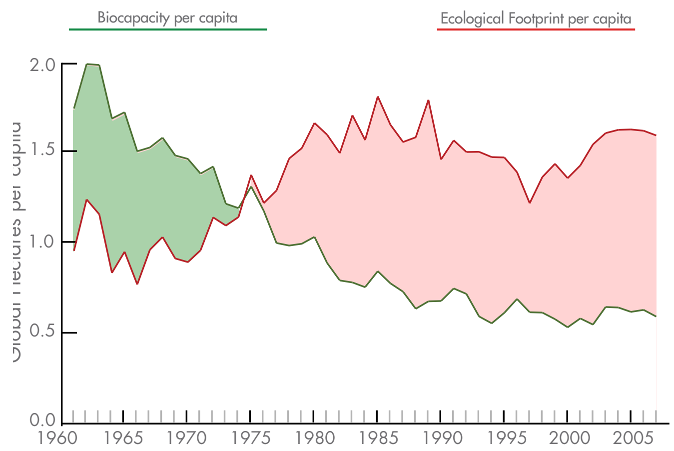


Figure DZA-5: Algeria's per capita biocapacity deficit, 1961-2007

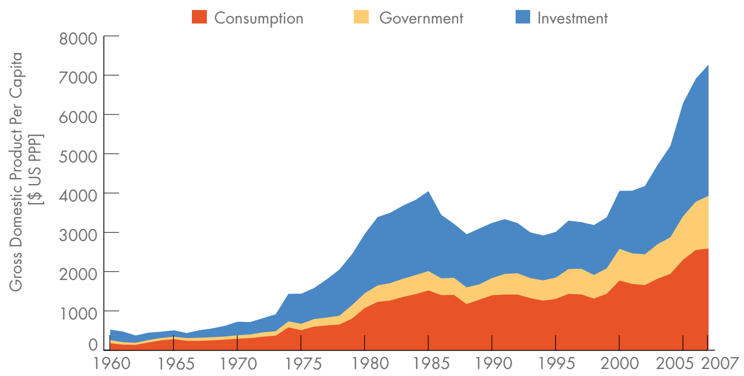


Figure DZA-7: Algeria's GDP by component, 1961-2007

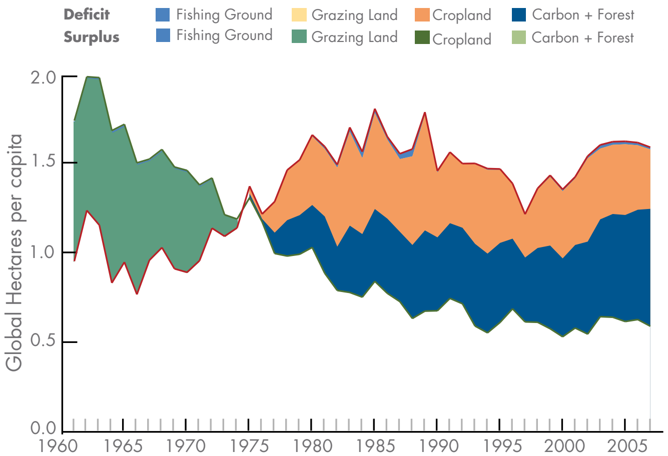


Figure DZA-6: Algeria's per capita biocapacity deficit by contributing land-use type, 1961-2007

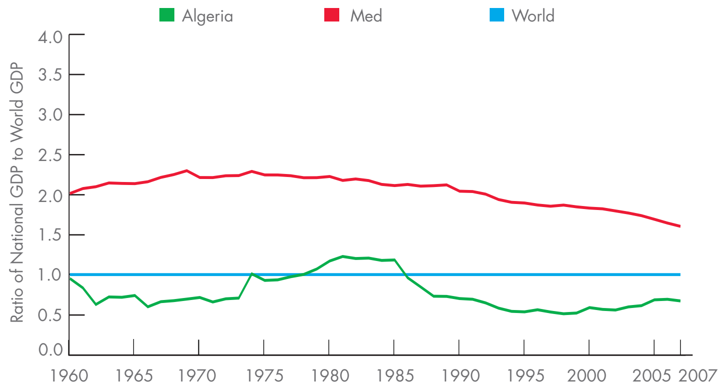


Figure DZA-8: Comparison of ratio of world GDP to Algeria and the Mediterranean region, 1961-2007

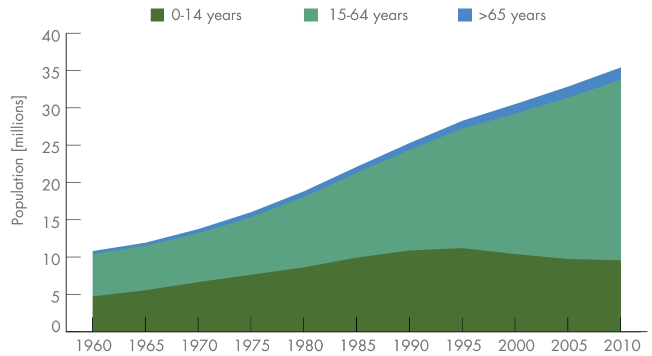
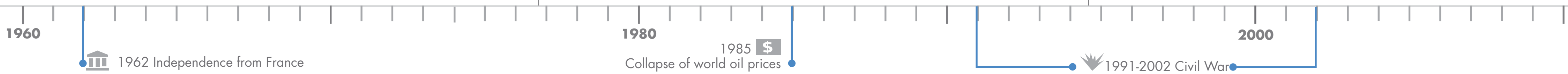


Figure DZA-9: Algeria's population by age group, 1961-2010



BOSNIA AND HERZEGOVINA

Bosnia and Herzegovina was formed between 1991 and 1992 out of one of the six republics of the Socialist Federal Republic of Yugoslavia. Splits between the three major ethnic groups - Serbs, Croats, and Bosniaks - over independence and control of lands led to warfare which ended with the involvement of NATO bombing against the Bosnian Serb army in 1995. During the conflict and actions carried out against civilian populations, many casualties occurred and large segments of the population were displaced. Since 1995, relations with neighboring countries have been relatively stable and in 2010, Bosnia and Herzegovina began the last step towards full NATO membership.

The impact of the war can be seen dramatically in Bosnia-Herzegovina's Ecological Footprint, which dropped to less than 1.5 global hectares per capita in 1995. When this was combined with the decrease in population through casualties and displacement, Bosnia-Herzegovina's total Ecological Footprint dropped by 37 percent between 1992 and 1995. However, in the years following the cessation of major conflict, the Ecological Footprint per capita rose extremely rapidly – averaging a growth of 19 percent each year between 1995 and 2005.

Bosnia's available biocapacity per person has remained

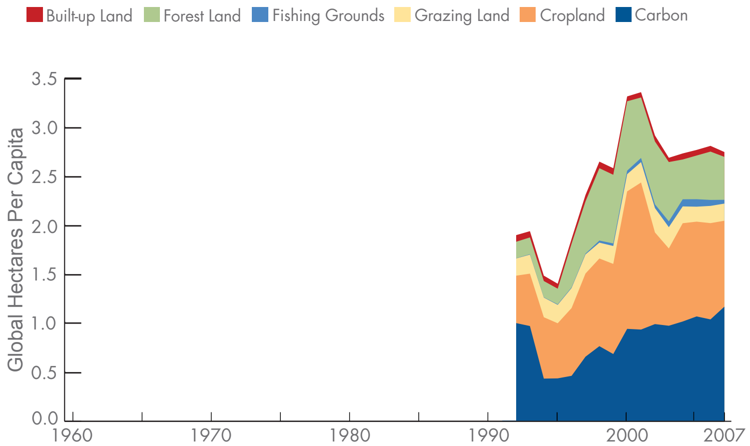


Figure BIH-1: Ecological Footprint per capita in Bosnia-Herzegovina by component, 1961-2007

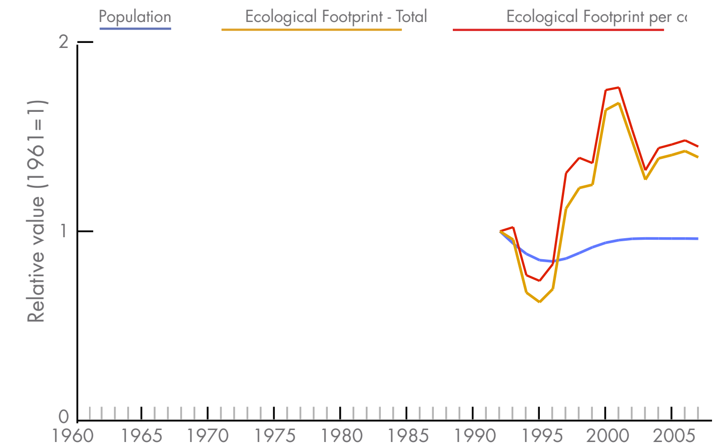


Figure BIH-2: Contributing drivers of Bosnia-Herzegovina's Ecological Footprint, 1961-2007

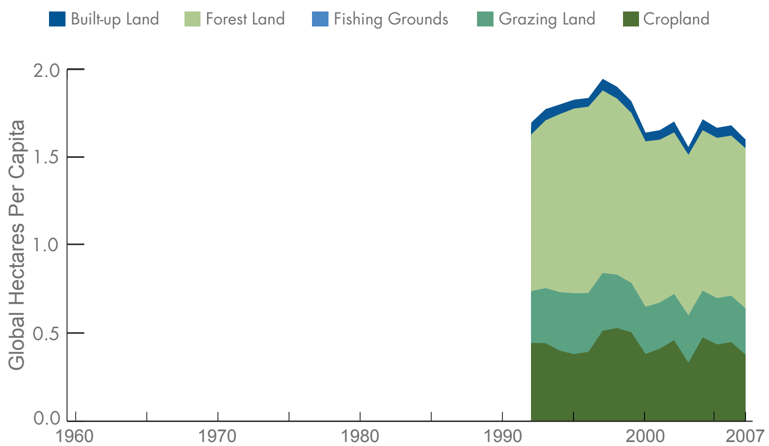


Figure BIH-3: Biocapacity per capita in Bosnia-Herzegovina by component 1961-2007

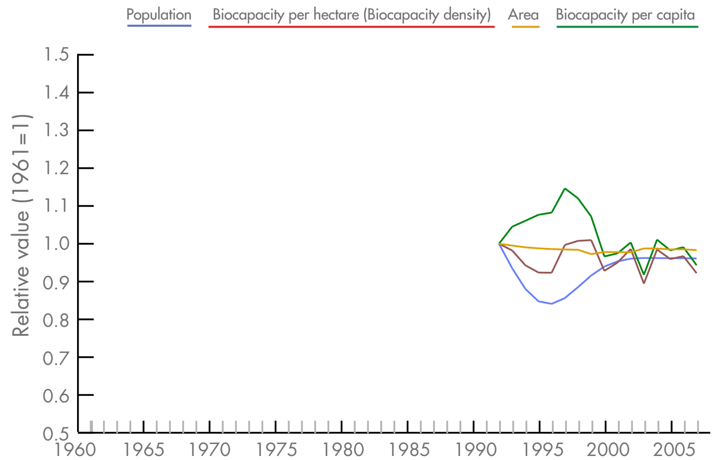
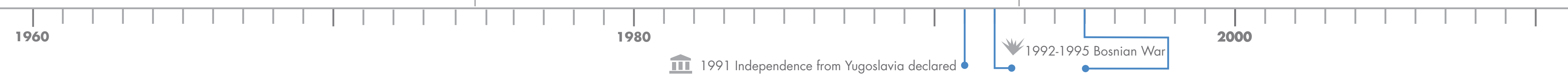


Figure BIH-4: Contributing drivers of Bosnia-Herzegovina's biocapacity, 1961-2007



relatively constant, except with a 15 percent rise and fall over the war and recovery period due to population changes. Biocapacity density remained surprisingly constant, despite the infrastructure damage and loss of labor and ability to purchase fertilizers during the war.

From independence until 1996, Bosnia-Herzegovina maintained a slight biocapacity surplus due to relatively abundant grazing lands. However, the rapid growth in Ecological Footprint in the late 1990s led to a biocapacity deficit of over 1.7 global hectares per person in 2001, and continuing at over 1.0 global hectare per person in the following years. This deficit was relatively equally distributed between demand for cropland (met through increased imports) and pressures on domestic and international forests for the production of timber and sequestration of carbon dioxide.

Despite the slight recovery in population following the end of the war, Bosnia-Herzegovina's population is likely to fall slightly over the coming years due to its aging structure. Surprisingly, most of Bosnia-Herzegovina's increase in GDP in recent years has been due to personal consumption. This indicates that there may still be ample opportunity to rebuild infrastructure destroyed during the war in a manner consistent with a lower Ecological Footprint.

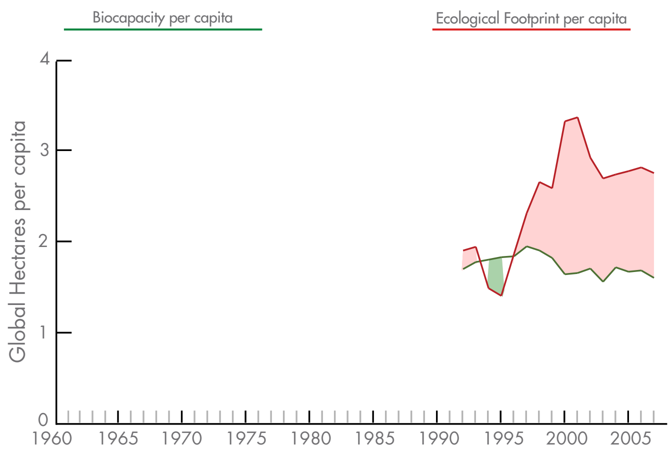


Figure BIH-5: Bosnia-Herzegovina's per capita biocapacity deficit, 1961-2007

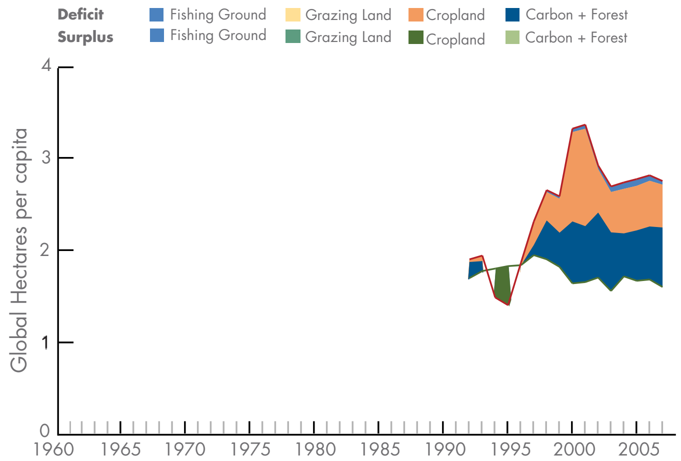


Figure BIH-6: Bosnia-Herzegovina's per capita biocapacity deficit by contributing land-use type, 1961-2007

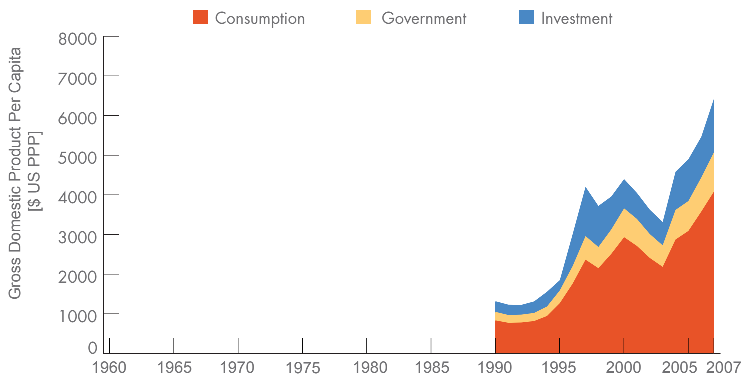


Figure BIH-7: Bosnia-Herzegovina's GDP by component, 1961-2007

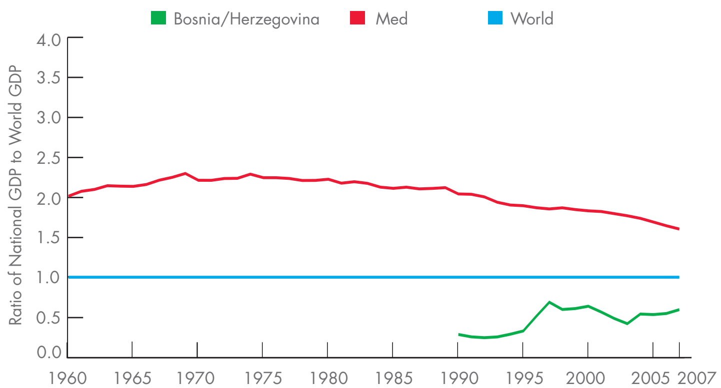


Figure BIH-8: Comparison of ratio of world GDP to Bosnia-Herzegovina and the Mediterranean region, 1961-2007

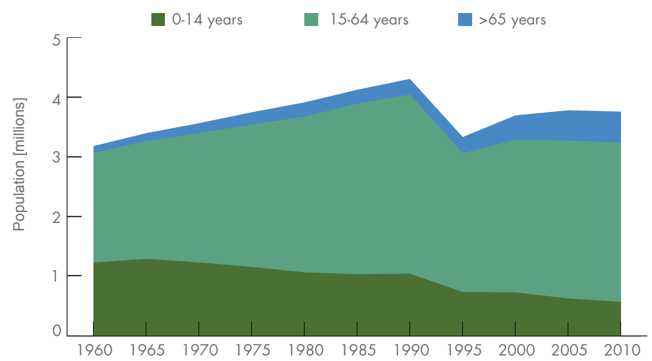
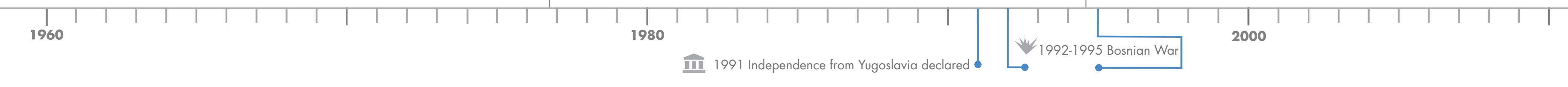


Figure BIH-9: Bosnia-Herzegovina's population by age group, 1961-2010



CROATIA

Croatia was formed between 1991 and 1992 out of one of the six republics of the Socialist Federal Republic of Yugoslavia. The Bosnian War (see Bosnia and Herzegovina) led to occupation

of parts of Crotia by Serb forces. Croatia was originally one of the wealthiest Yugoslav republics, but economic devastation from the war hindered investment. However, the relative political stability that has reigned over the last decade has led to rejuvenation of the Croatian economy, primarily through tourism, and has grown at an average rate of over 7 percent per year since 1995. State control of the economy remains in place, and this is supported throughout the population; nevertheless, Croatia joined NATO in 2009 and is a candidate for EU accession.

The impact of the Bosnian war on the Ecological Footprint was much lower than in Bosnia-Herzegovina. Despite stagnant economic growth, the Ecological Footprint per capita grew at a relatively constant rate of 6 percent per year between 1992 and 2002, after which it continued to grow at the slower rate of about 1 percent per year. Croatia's population stayed relatively constant during this period, leading to the total Ecological Footprint changing in the same manner as the per capita Footprint.

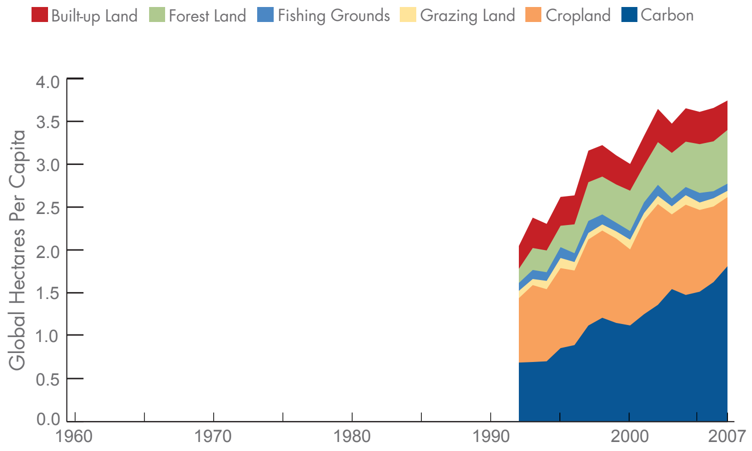


Figure HRV-1: Ecological Footprint per capita in Croatia by component, 1961-2007

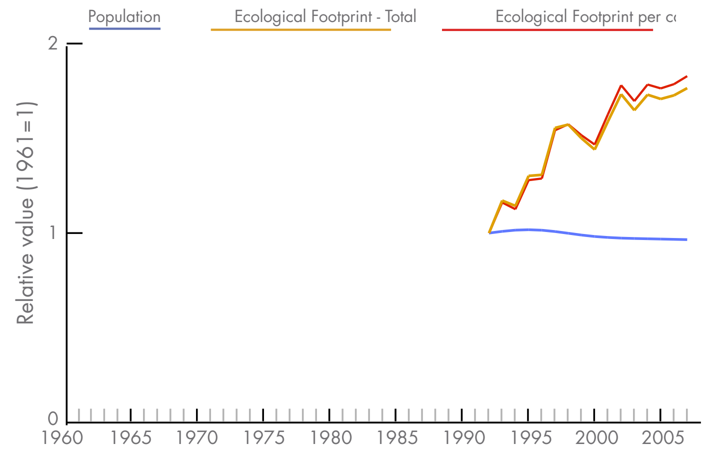


Figure HRV-2: Contributing drivers of Croatia's Ecological Footprint, 1961-2007

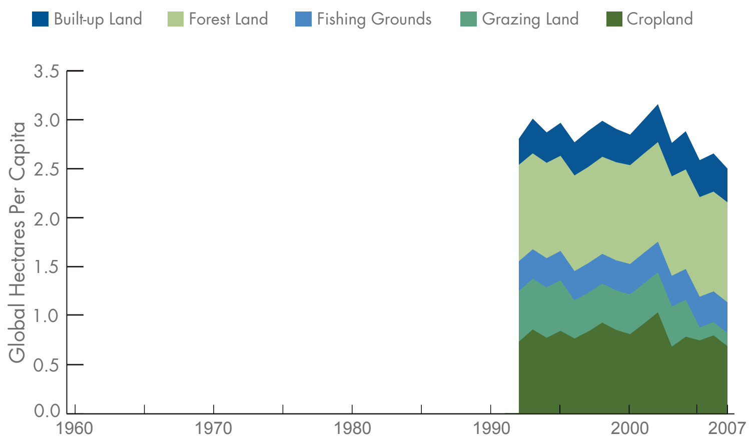


Figure HRV-3: Biocapacity per capita in Croatia by component 1961-2007

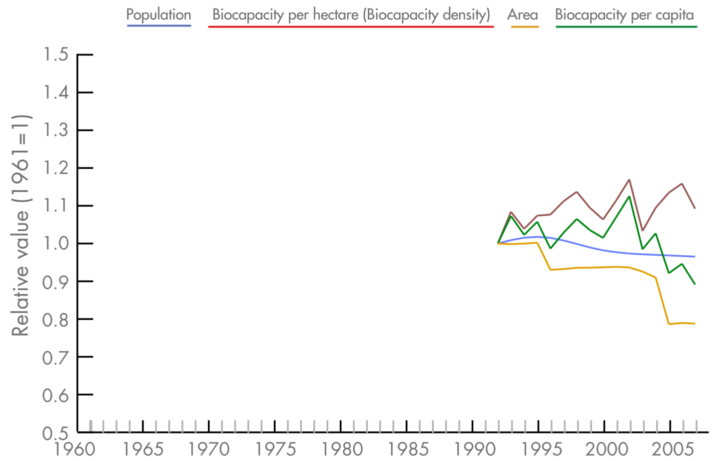


Figure HRV-4: Contributing drivers of Croatia's biocapacity, 1961-2007

Despite the relatively static population size, Croatia's biocapacity per capita has fallen by about 10 percent since 1992, despite a 10 percent increase in biocapacity density. This is entirely due to a decrease in the available productive land, especially grazing land. Given the marginal quality of grazing land, it is possible that land degradation in grazed areas destroyed their productivity.

Croatia's declining biocapacity and increasing Ecological Footprint have reversed the 0.8 global hectare per capita biocapacity surplus in 1992 to a 1.2 global hectares per capita deficit by 2007.

This biocapacity surplus was comprised in large part of grazing lands. With the removal of those lands the surplus rapidly shrunk. The deficit is almost entirely comprised of demands on forest products and the need for forest carbon sequestration. If Croatia's ability to import goods is reduced, or a price is put on carbon dioxide emissions, Croatia's economy may be highly vulnerable.

Croatia's population is likely to continue to decrease slowly over the coming years due to its aging population, which may have beneficial effects on maintaining biocapacity availability, though putting continued rapid economic growth at risk. The massive growth in investment's contribution to GDP indicates that infrastructure is rapidly being put in place that may lock in Ecological Footprint trend for decades.

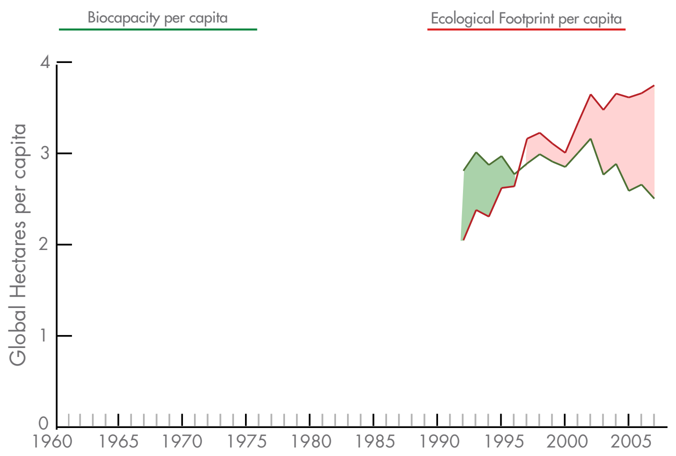


Figure HRV-5: Croatia's per capita biocapacity deficit, 1961-2007

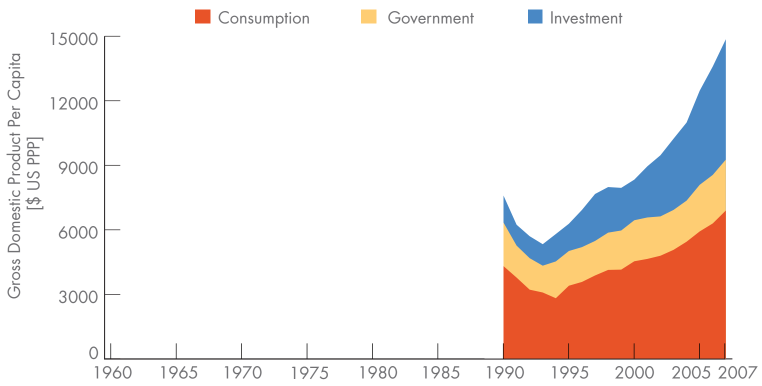


Figure HRV-7: Croatia's GDP by component, 1961-2007

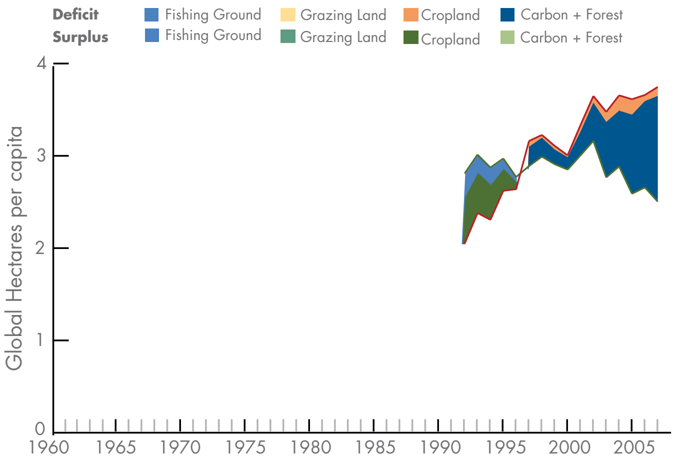


Figure HRV-6: Croatia's per capita biocapacity deficit by contributing land-use type, 1961-2007

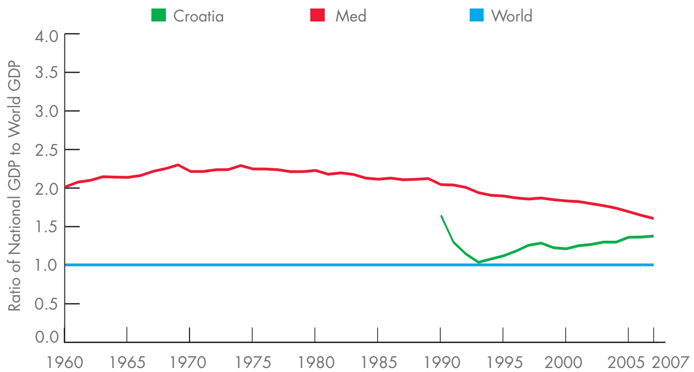


Figure HRV-8: Comparison of ratio of world GDP to Croatia and the Mediterranean region, 1961-2007

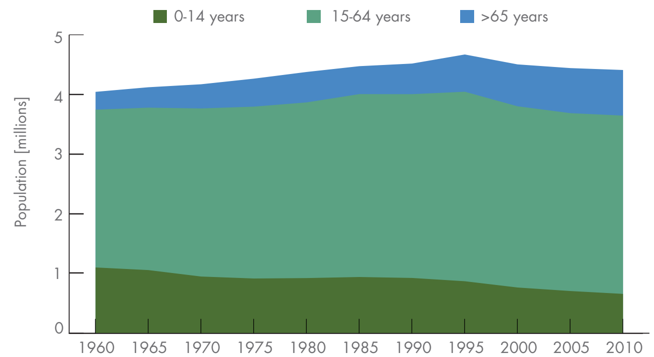


Figure HRV-9: Croatia's population by age group, 1961-2010

CYPRUS

Cyprus gained independence from Britain in 1960, and joined the Commonwealth in 1961. The country has long been split into the majority Greek Cypriot population and the minority Turkish

Cypriot population, a relic from its Ottoman history. Tensions between the two populations led to violence starting in 1963, ultimately leading to an attempted coup by the Greek Cypriots and, in 1974, Turkish occupation of the northern section of the island. In 1983, the Turkish occupied area declared independence, which remains unacknowledged by the UN today. Cyprus joined the European Union in 2004, though the majority of laws pertain only to the areas controlled by the Greek Cypriot government. Recognizing its fragility as a tourism-dependent, import economy, Cyprus signed an agreement with Lebanon regarding seabed exploration for oil and gas in 2007. Adoption of the Euro as the national currency took place in 2008.

A huge expansion in Cyprus' economic output starting in 1975, close to the cessation of violence, corresponded to continued growth in the Ecological Footprint per capita: an average of 3 percent per year over the 32 years to 2007. This compounded with population growth over the period to give over 4 percent annual growth in the total Ecological Footprint.

Cyprus has had slight reductions in its available bioproductive land, decreased biocapacity density, and

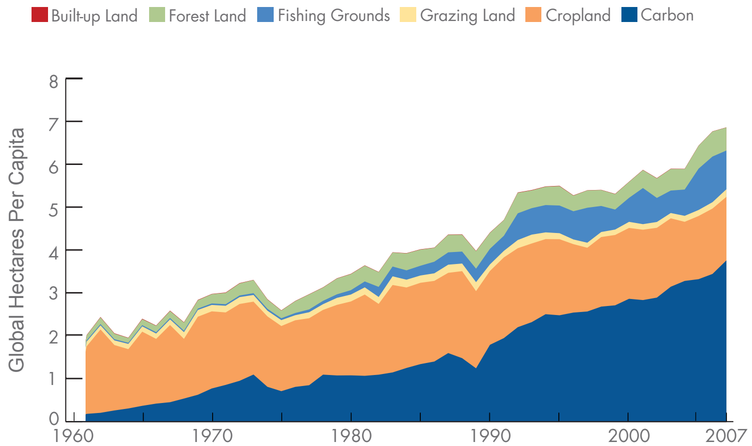


Figure CYP-1: Ecological Footprint per capita in Cyprus by component, 1961-2007

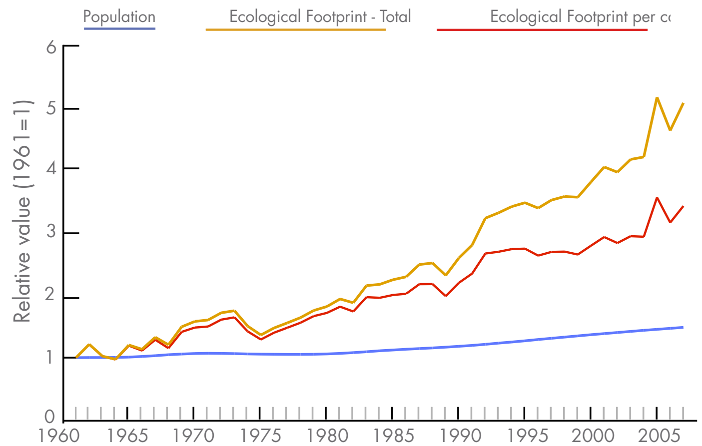


Figure CYP-2: Contributing drivers of Cyprus' Ecological Footprint, 1961-2007

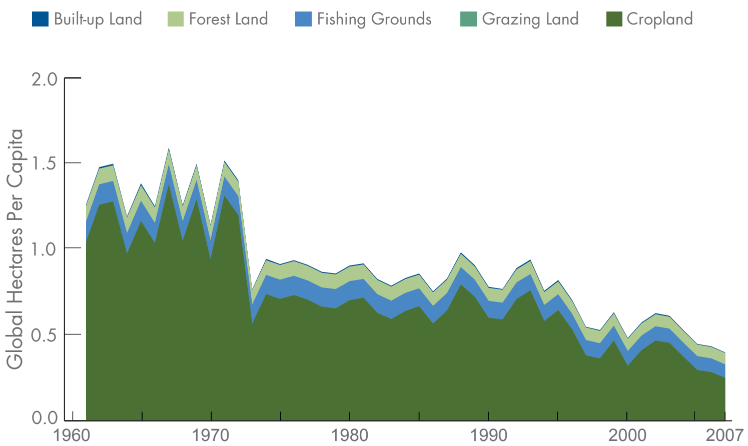


Figure CYP-3: Biocapacity per capita in Cyprus by component 1961-2007

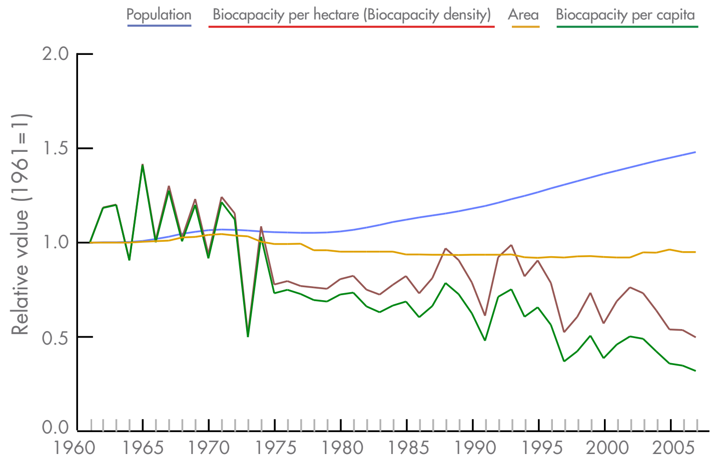


Figure CYP-4: Contributing drivers of Cyprus' biocapacity, 1961-2007

increasing population – factors which have conspired to decrease the available biocapacity per person by nearly 70 percent since 1961. The decrease in biocapacity intensity has been driven by declines in cropland - indicating that cropland is becoming less productive, possibly due to climatic changes since capital and labor inputs do not appear scarce.

Cyprus was already experiencing a biocapacity deficit in 1961 of nearly 0.8 global hectare per person. The demographic and economic driverse behind the Ecological Footprint and biocapacity have caused this to increase to nearly 6.5 global hectares per person in 2007.

This large biocapacity deficit is comprised of all land-use types, indicating a broad structural dependence on imported resources and global sequestration of carbon dioxide emissions. Although the strong tourism industry, currently accounting for nearly 80 percent of GDP, may help to maintain this deficit temporarily, it is likely that there may be severe constraints to continued well-being in the future.

Growth in Cyprus' population is likely to begin slowing, as the population ages and fertility drops. However, there is considerable demographic inertia built up, and Cyprus' population is projected to increase by a further 20 percent over the next 20 years. Consequently, it appears that Cyprus' biocapacity deficit and dependence on external resources is likely to intensify.

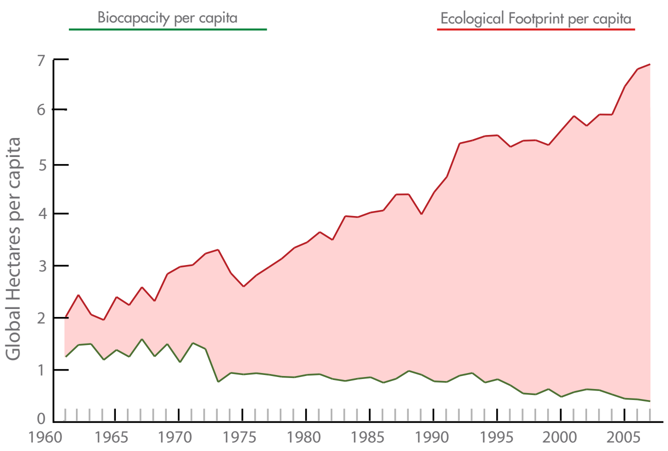


Figure CYP-5: Cyprus' biocapacity deficit, 1961-2007

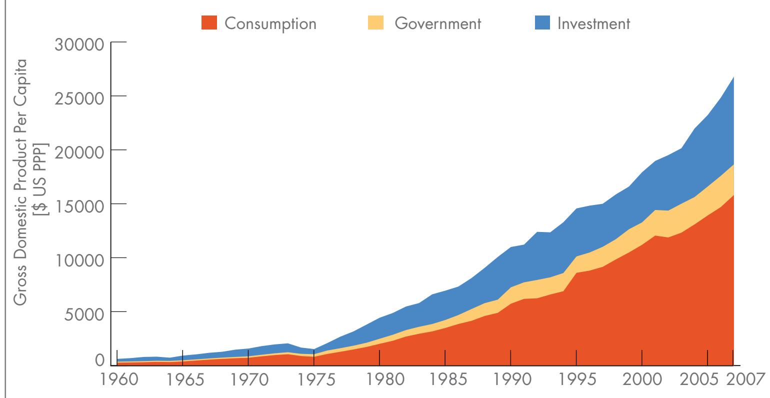


Figure CYP-7: Cyprus' GDP by component, 1961-2007

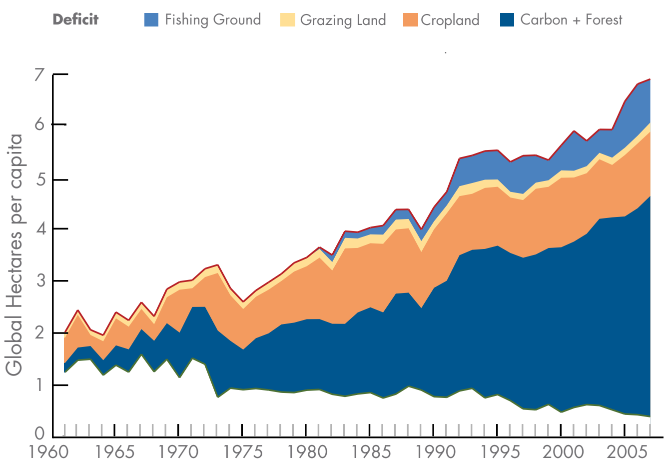


Figure CYP-6: Cyprus' biocapacity deficit by contributing land-use type, 1961-2007

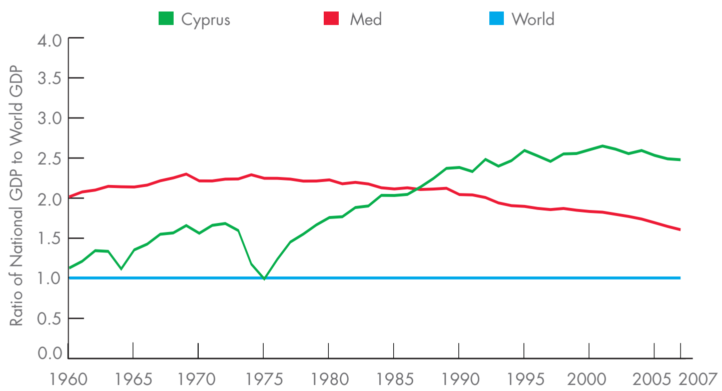


Figure CYP-8: Comparison of ratio of world GDP to Cyprus and the Mediterranean region, 1961-2007

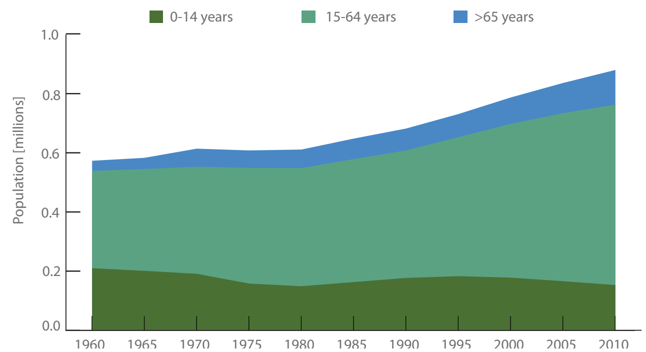


Figure CYP-9: Cyprus' population by age group, 1961-2010

EGYPT

In the early 20th century, Egypt gained independence from Britain and further developed its national identity. Egypt's vital location was brought to light when the country took control of

traffic through the Suez canal, which it straddles. The resulting invasion of Egypt by France, Britain, and Israel in 1956 set the stage for future conflict and highlighted the critical importance of trade in, and through, the region. Tensions in the area again increased in 1967 during the Six Day war between Israel and Egypt, Syria, and Jordan. At the war's end, Israel occupied the Gaza Strip and the Sinai Peninsula. Prior to the war, and during, Israeli forces and the Arab League attempted to gain control over water from the Jordan river. Attempts to regain the land lost in the Six Day War led to further conflict in 1973: US support of Israel during this conflict led to an oil embargo from Arab OPEC members to the US. The Camp David peace accords in 1978 returned the Sinai Peninsula to Egypt.

The recent popular uprising is creating much uncertainty on future development paths, but if democratization and civil participation get rooted, this increases the possibility of public participation in Ecological Footprint reduction strategies.

Egypt's Ecological Footprint has been growing steadily throughout the last 46 years, mostly through population growth. A jump in Ecological Footprint around the 1973 conflict may be due to government use of resources to fund the war.

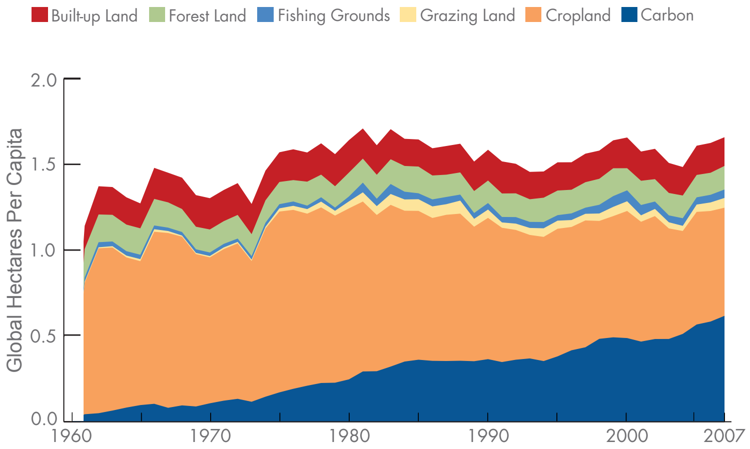


Figure EGY-1: Ecological Footprint per capita in Egypt by component, 1961-2007

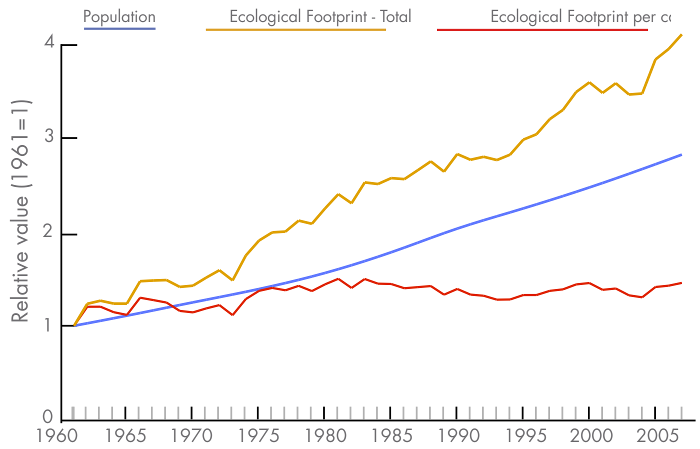


Figure EGY-2: Contributing drivers of Egypt's Ecological Footprint, 1961-2007

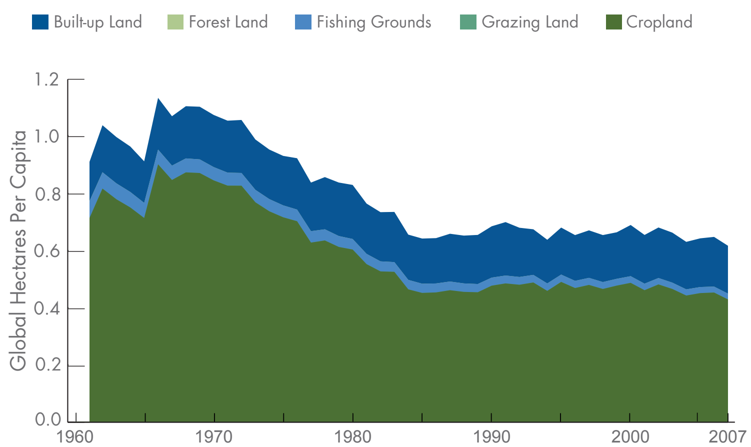


Figure EGY-3: Biocapacity per capita in Egypt by component 1961-2007

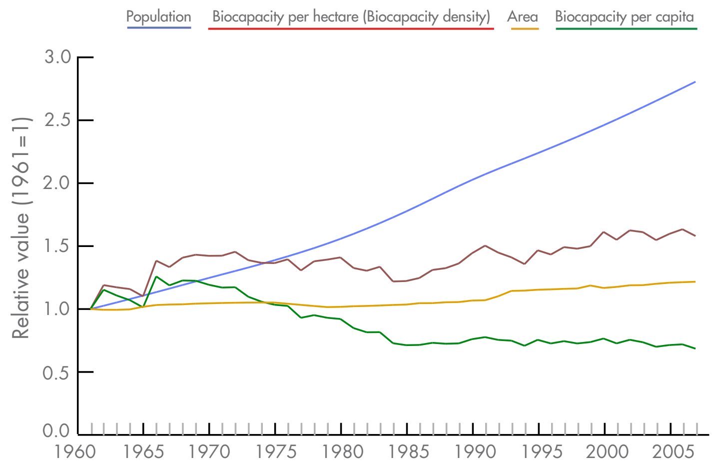
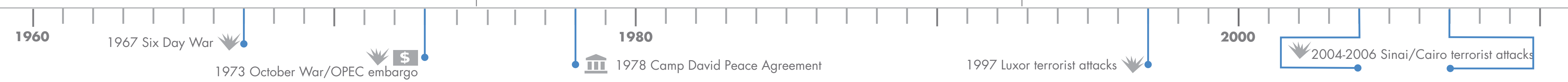


Figure EGY-4: Contributing drivers of Egypt's biocapacity, 1961-2007



Total biocapacity has increased over the period. The area of bioproductive land has increased (in contrast to the trend in most countries) by 22 percent, and the biocapacity per hectare has increased by 58 percent, likely due, in large part, to irrigation. However, the increase in biocapacity density occurred early on in the period, and later the effects have been dwarfed by the 180 percent rise in population.

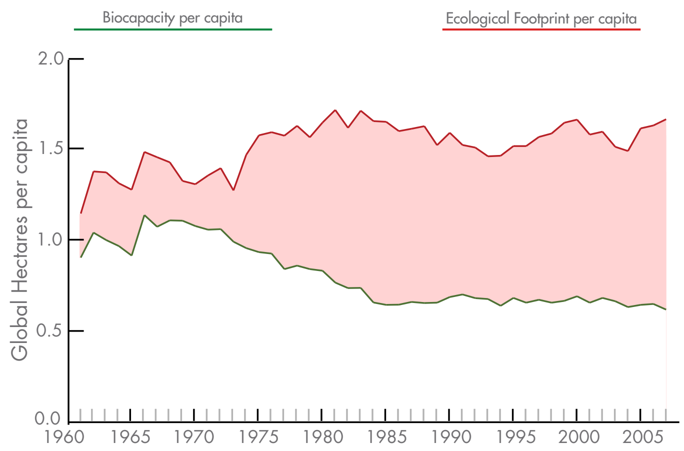


Figure EGY-5: Egypt's per capita biocapacity deficit, 1961-2007

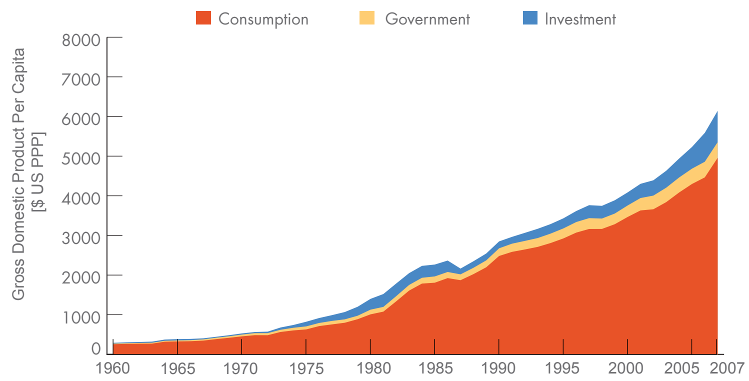


Figure EGY-7: Egypt's GDP by component, 1961-2007

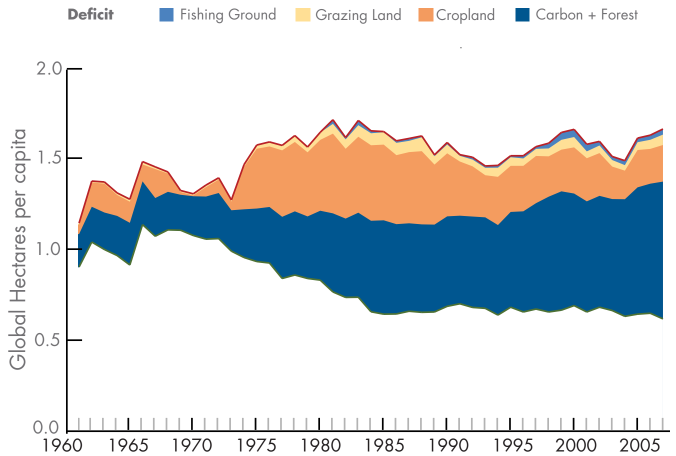


Figure EGY-6: Egypt's per capita biocapacity deficit by contributing land-use type, 1961-2007

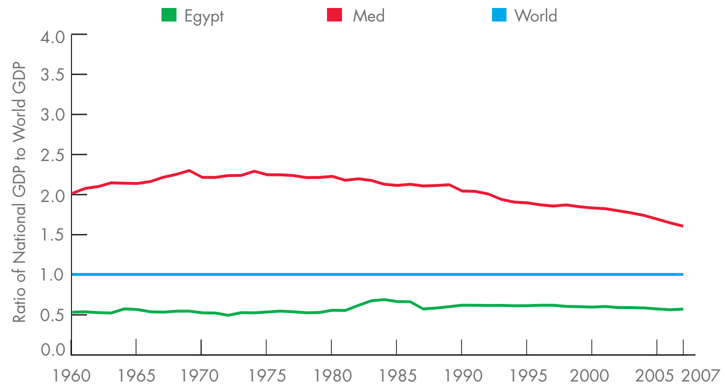


Figure EGY-8: Comparison of ratio of world GDP to Egypt and the Mediterranean region, 1961-2007

As a consequence of the growth in population, the biocapacity deficit increased rapidly from about 0.3 global hectare per capita in the 1960s to about 1.0 global hectare per capita in the 1990s, where it has remained since. The majority of the deficit is comprised of carbon dioxide emissions, though Egypt's dependence on cropland imports is also highlighted.

Egypt's economy is dominated by tourism and oil and gas exports, in addition to Suez Canal revenues. These revenues are thus highly volatile and this may contribute to the low investment portion of GDP.

Although aging, Egypt's population growth has significant inertia behind it and is likely to continue growing for the next few decades. Egypt's foreign renewable natural resource dependency is likely to increasingly become a problem, as seen in the 2008 food riots in Cairo.

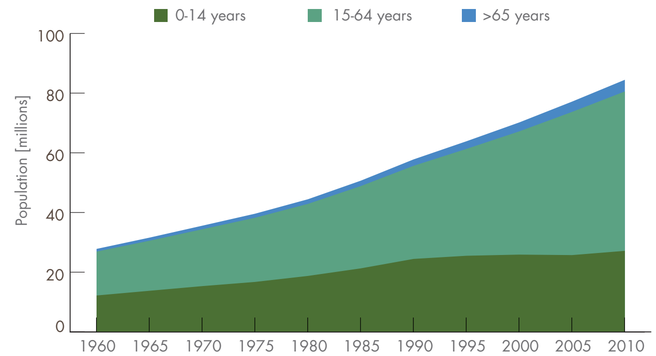
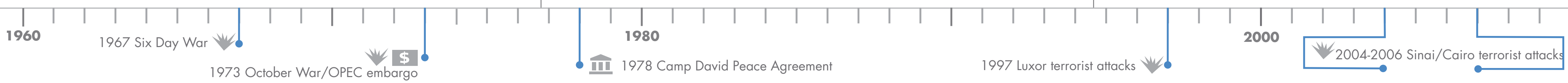


Figure EGY-9: Egypt's population by age group, 1961-2010



FRANCE

Decolonization of France's overseas territories heavily influenced the domestic political economy from the end of World War II and through the 1970s. Wars, military action, and military support in Israel (1948), Vietnam (1954), Egypt (1956), and Algeria (1954-1962) all precipitated changes in France's socio-economic state and led to large domestic changes, including the adoption of a new republican consitution under Charles de Gaulle, which is still in place today. Widespread strikes and protests in the late 1960s pushed French politics towards a more liberal political and social ideal. Throughout recent history, France has experienced significant immigration from countries on the southern shore of the Mediterranean, and in 2008, France helped launch the Union for the Mediterranean, which will serve as a forum for political and economic cooperation between the EU and its Mediterranean neighbors.

France's Ecological Footprint per capita increased from 1961 to 1972 as a result of continued economic growth covering the end of the Fourth Republic and the beginning of the Fifth Republic. The per capita Ecological Footprint has since remained stable, with the exception of recession-induced dips in the mid-1970s and early 1980's; however, steady population growth has continually increased the total Ecological Footprint. Biocapacity has remained high compared with other

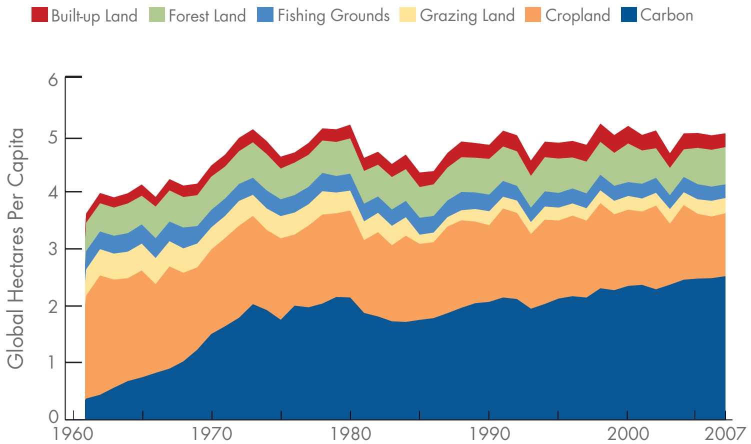


Figure FRA-1: Ecological Footprint per capita in France by component, 1961-2007

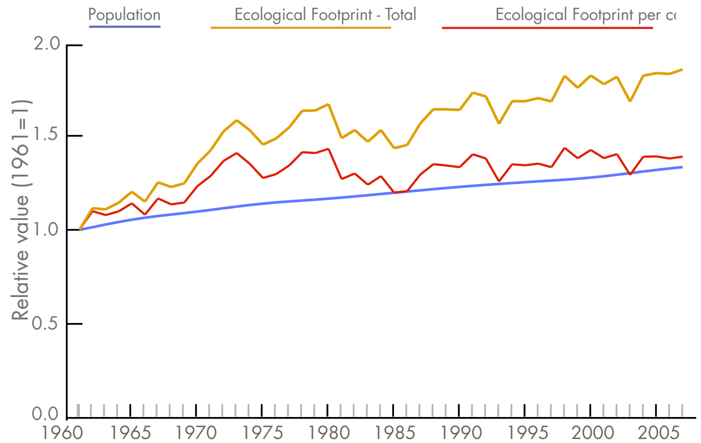


Figure FRA-2: Contributing drivers of France's Ecological Footprint, 1961-2007

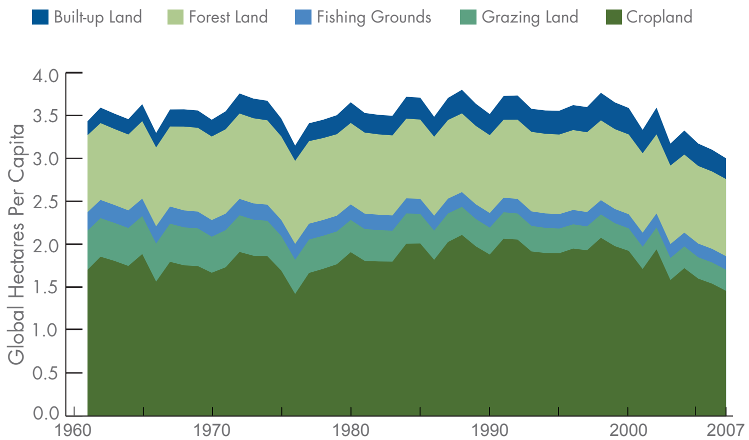


Figure FRA-3: Biocapacity per capita in France by component 1961-2007

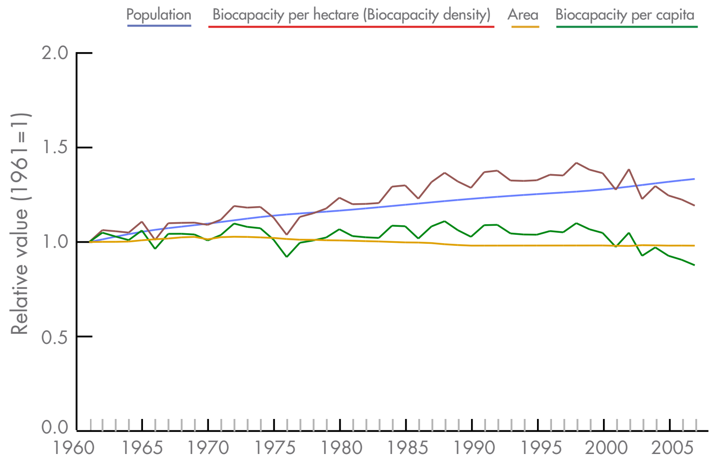


Figure FRA-4: Contributing drivers of France's biocapacity, 1961-2007

Mediterranean countries, and growth in total biocapacity due to increased biocapacity per hectare maintained biocapacity per capita from 1961 to 2000. Since 2000, however, a decline in biocapacity per hectare has allowed population growth to begin diminishing biocapacity per capita. Despite the maintenance of biocapacity per capita, the biocapacity deficit grew in the 1960s to about 1.5 global hectares per capita, and has been maintained at this level since then. From 2000 onwards, the declining biocapacity per hectare has led to an increase in the deficit to around 2.0 global hectares per capita. Despite France's extensive use of nuclear power, this deficit is almost entirely due to the demand for global forest sequestration of CO_2 emissions.

France has very stable growth in its population, mostly due to immigration and the higher fertility rates of immigrant groups. The size of the youth demographic has stayed constant for over 20 years, suggesting that continued growth will be seen going ahead.

France has seen growth in all components of GDP, with the investment component increasing in share in recent years. France has arguably developed one of the most advanced public transport infrastructures in the Mediterranean Region, which will likely assist the country in limiting its future Ecological Footprint.

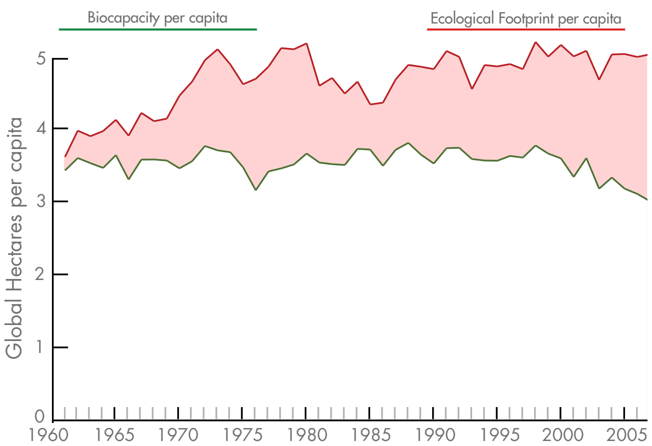


Figure FRA-5: France's per capita biocapacity deficit, 1961-2007

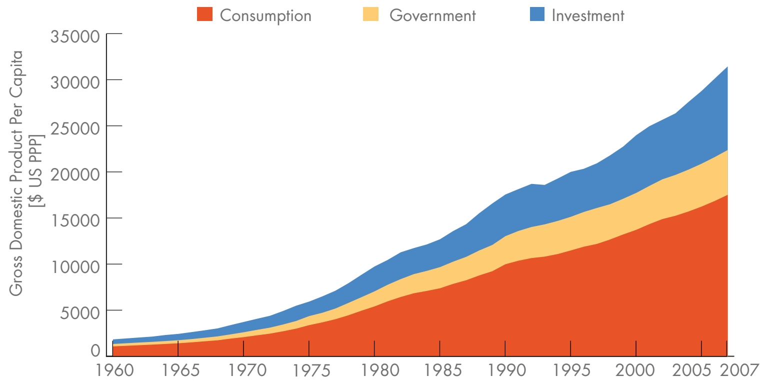


Figure FRA-7: France's GDP by component, 1961-2007

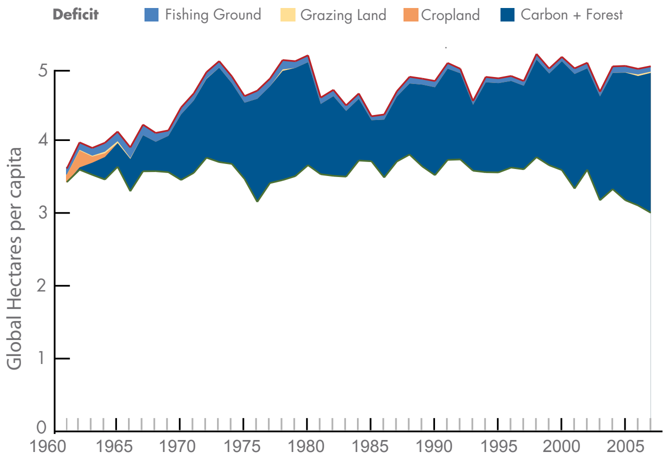


Figure FRA-6: France's per capita biocapacity deficit by contributing land-use type, 1961-2007

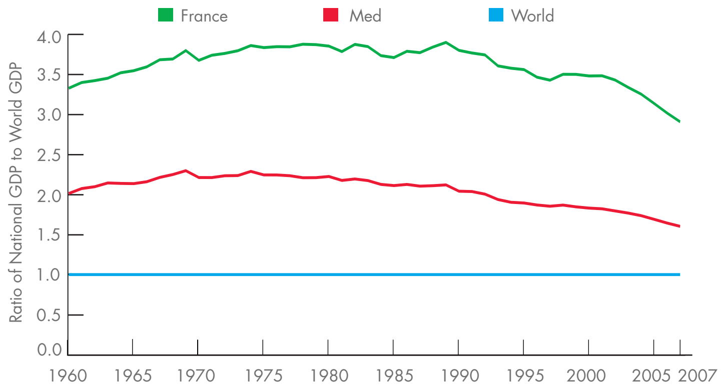


Figure FRA-8: Comparison of ratio of world GDP to France and the Mediterranean region, 1961-2007

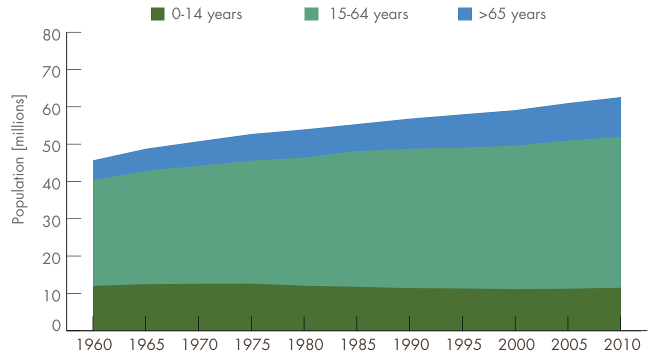


Figure FRA-9: France's population by age group, 1961-2010

GREECE

Following its founding in the 19th century and up until the middle of the 20th century, Greece went through turbulent times of continuous warfare and civil conflict, during which it also experienced

a major expansion of its grounds and rapid industrial and agricultural growth. After the end of the 2nd World War, and the civil war that succeeded it, the country went through yet another politically uneasy period that culminated in a military coup in 1967. The establishment of the Greek Constitutional Republic in 1975 signaled a period of rapid economic growth characterized by a rapid expansion in construction, services and consumption. Deindustrialization, subsidy dependencies and a continuously growing public debt also characterized this period and laid the foundations for the economic crisis that the country is undergoing today. Austerity measures adopted by the government have spurred public opposition and are leading to a significant restructuring of production and consumption patterns.

Greece's Ecological Footprint has grown steadily since 1970, with higher growth since the formation of the republic. Meanwhile, total biocapacity increased slightly until 1995 due to increases in biocapacity per hectare of productive land. Subsequently, this biocapacity density decreased, and although partially offset by an increased area of productive land, population growth took its toll on available biocapacity per capita. These changes led to

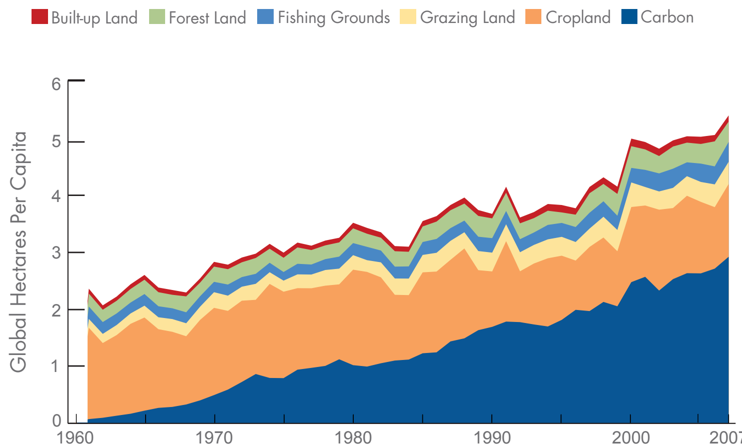


Figure GRC-1: Ecological Footprint per capita in Greece by component, 1961-2007

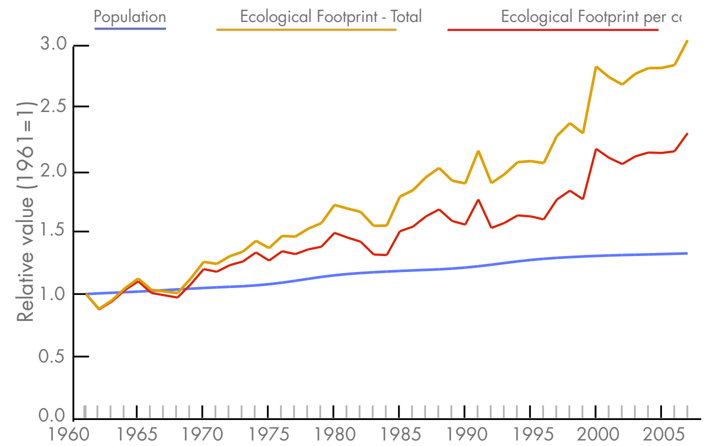


Figure GRC-2: Contributing drivers of Greece's Ecological Footprint, 1961-2007

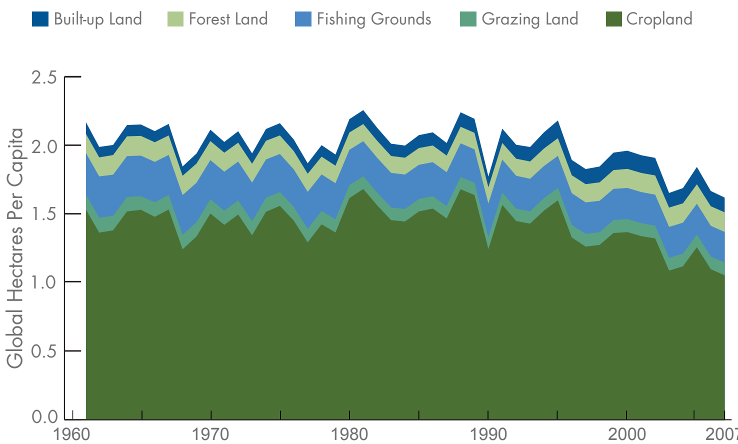


Figure GRC-3: Biocapacity per capita in Greece by component 1961-2007

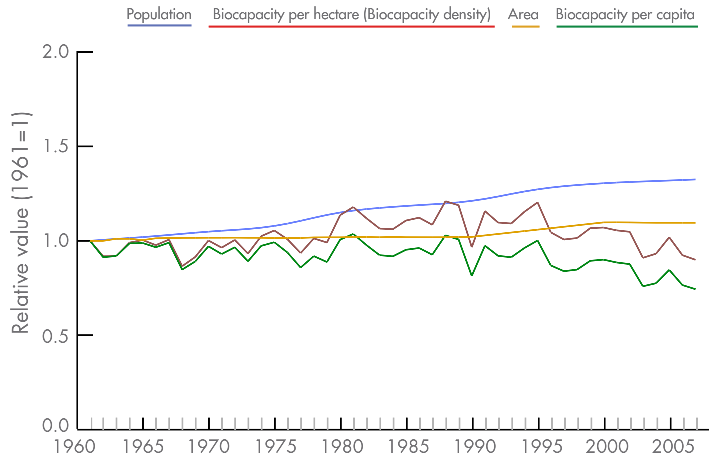


Figure GRC-4: Contributing drivers of Greece's biocapacity, 1961-2007

an increase in the biocapacity deficit from nearly zero to about 1.6 global hectares per capita in 1995 - a growth rate of about 0.05 global hectare per year. This rate then increased to nearly 0.2 global hectare per year until the deficit stood at 3.8 global hectares per capita in 2007. The biocapacity deficit is predominantly comprised of demand for forest land due to land-use change and carbon dioxide sequestration demands, indicating a strong dependence on fossil fuels in the Greek economy. Greece is also reliant upon imports of resources based on grazing land, which may contribute to economic problems as these resources become constrained.

Greece's economic output in recent years has been growing largely due to an influx of capital for investment (though there are likely to be large changes in this following the 2009 debt crisis). This indicates that much infrastructure may have been created that constrains changes to the Ecological Footprint in the medium-term future.

Greece's population is significantly aging from an already high median age, and the total population is likely to level out and begin a slow decrease soon. This may cause a decrease in the growth of the total Ecological Footprint, potentially allow ing time for economic restructuring for a resource constrained future.

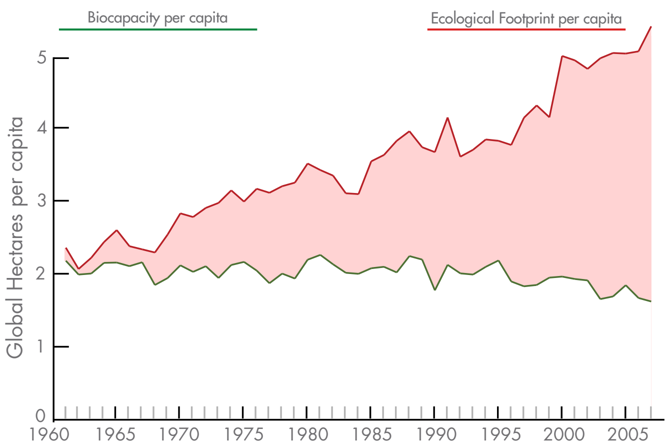


Figure GRC-5: Greece's per capita biocapacity deficit, 1961-2007

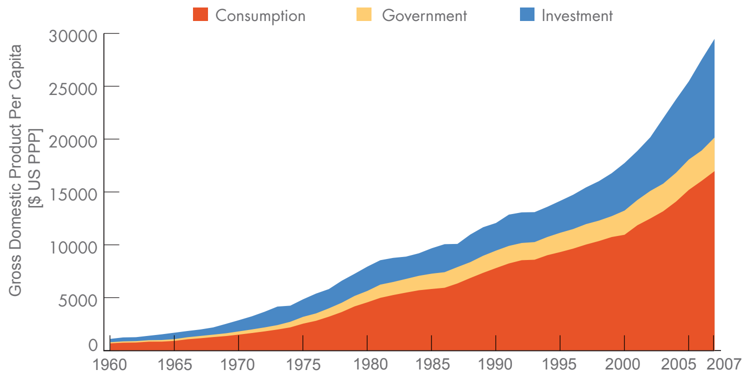


Figure GRC-7: Greece's GDP by component, 1961-2007

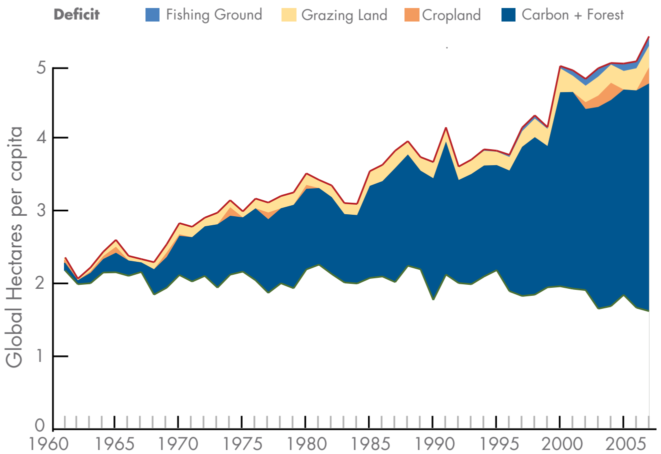


Figure GRC-6: Greece's per capita biocapacity deficit by contributing land-use type, 1961-2007

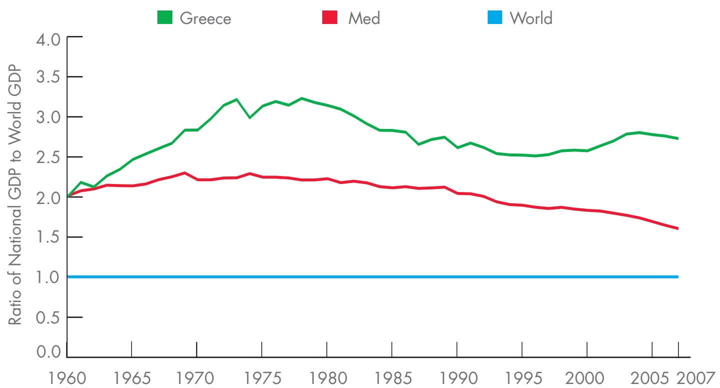


Figure GRC-8: Comparison of ratio of world GDP to Greece and the Mediterranean region, 1961-2007

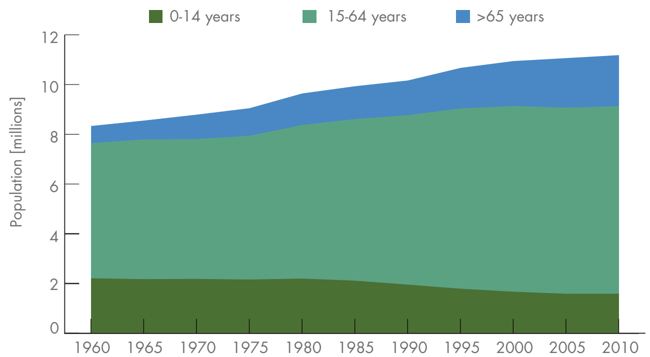


Figure GRC-9: Greece's population by age group, 1961-2010

ISRAEL

The State of Israel was created in 1948 and came under immediate pressure from bordering countries. During the Six Day War in 1967, Israel occupied the Gaza Strip and Sinai Peninsula

from Egypt, the West Bank from Jordan, and the Golan Heights from Syria. In addition to over-riding military interests, resource issues were presumably at play, since during and prior to the war, Israeli forces and the Arab League attempted to gain control over water from the Jordan river. Attempts by the three Arab states to regain the land lost in the Six Day War led to further conflict in 1973. US support of Israel during this conflict led to an oil embargo from Arab OPEC members to the US. The 1978 peace accords returned the Sinai Peninsula to Egypt, though tensions have remained almost continuously high in the region.

Israel's Ecological Footprint has three major defining patterns. From 1961 until 1970 the Ecological Footprint per capita rose rapidly, linked to rapid economic expansion and military successes. The regional tensions, military expenditure, and global competition in the textile industry started to take their toll on the economy between 1970 and 1985, during a period of relatively slow growth and extremely high inflation – coinciding with a stable total Ecological Footprint and a decline per capita Ecological Footprint. Following economic reforms in 1985, rapid growth in the economy and moderate growth in the Ecological Footprint

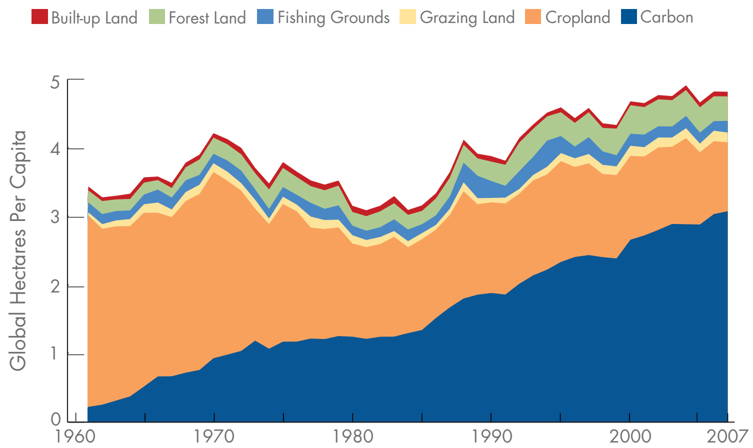


Figure ISR-1: Ecological Footprint per capita in Israel by component, 1961-2007

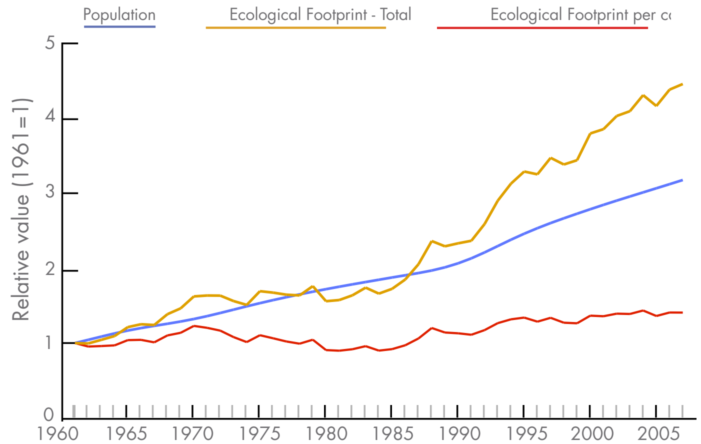


Figure ISR-2: Contributing drivers of Israel's Ecological Footprint, 1961-2007

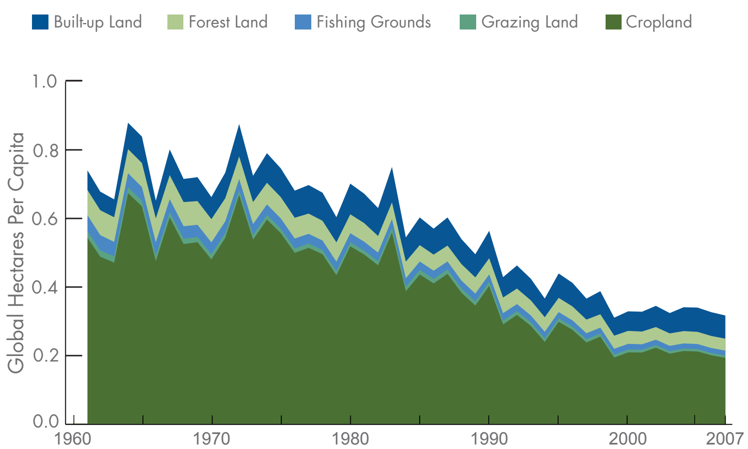


Figure ISR-3: Biocapacity per capita in Israel by component 1961-2007

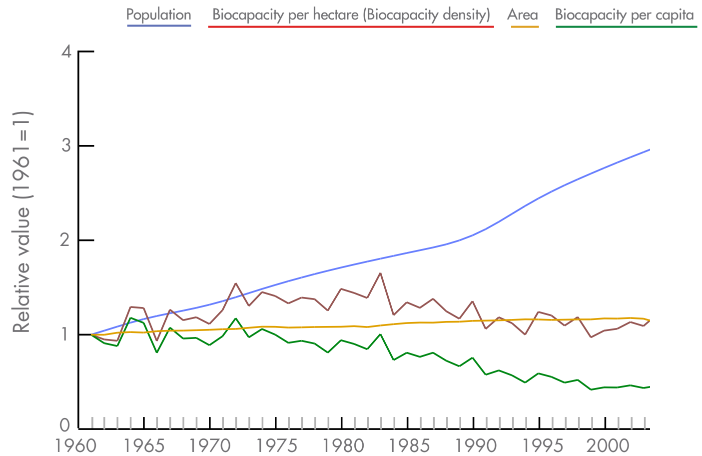
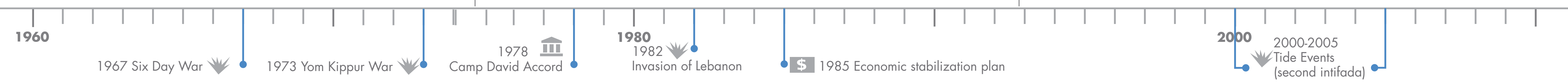


Figure ISR-4: Contributing drivers of Israel's biocapacity, 1961-2007



occurred. This, together with a substantial increase in population, led to a four-fold increase in Israel's total Ecological Footprint.

Israel has limited biocapacity due largely to its arid climate, though in the past it has had some success as a fruit exporter. Israel's area of productive land has grown slightly over the period examined, while productivity per hectare peaked in the 1980s and has since returned to levels seen in the 1960s. Population growth, especially rapid since the 1990s, has thus led to significantly reduced per capita biocapacity since 1961.

Consequently, Israel's biocapacity deficit has generally increased over the period, though it has always been significantly in deficit. Throughout the last 46 years, Israel has critically depended upon imported food, and has placed an ever growing burden upon global carbon sequestration.

Israel's economic performance and population size have been closely tied to waves of immigration, especially after the breakup of the Soviet Union and an influx of highly educated people. Strongly tied as it is to external events, predictions of the growth of the population and economy are difficult to make. However, limited resources, especially in food and water, are likely to place severe constraints on Israel's future development.

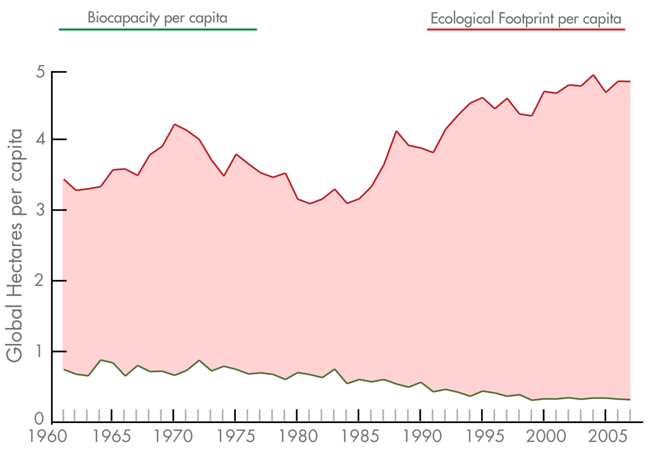


Figure ISR-5: Israel's per capita biocapacity deficit, 1961-2007

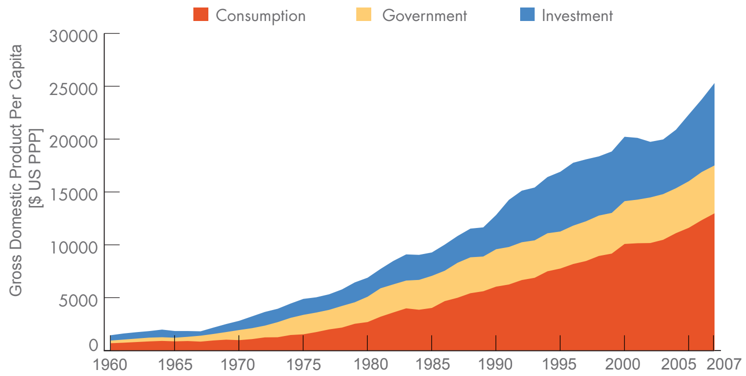


Figure ISR-7: Israel's GDP by component, 1961-2007

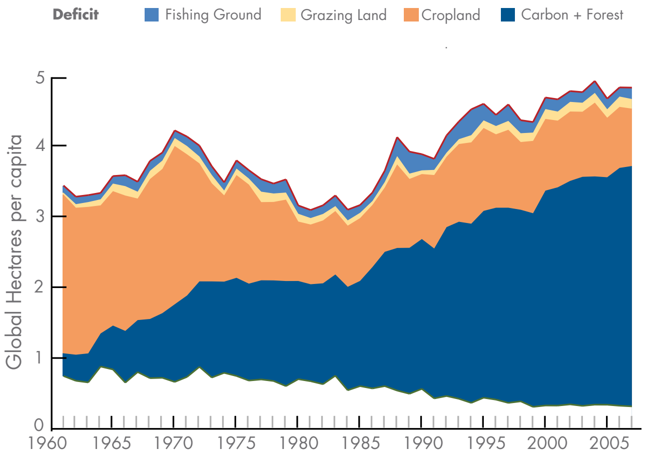


Figure ISR-6: Israel's per capita biocapacity deficit by contributing land-use type, 1961-2007

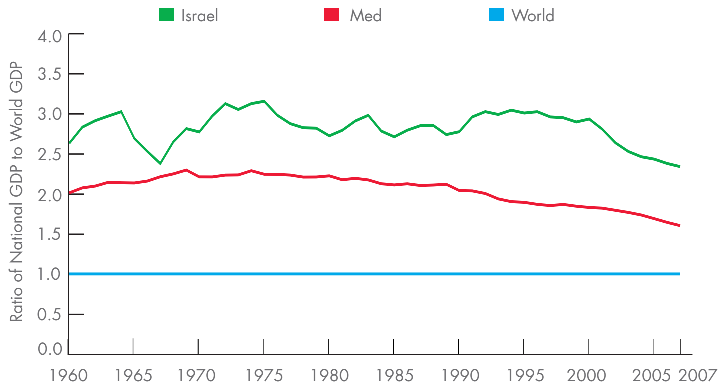


Figure ISR-8: Comparison of ratio of world GDP to Israel and the Mediterranean region, 1961-2007

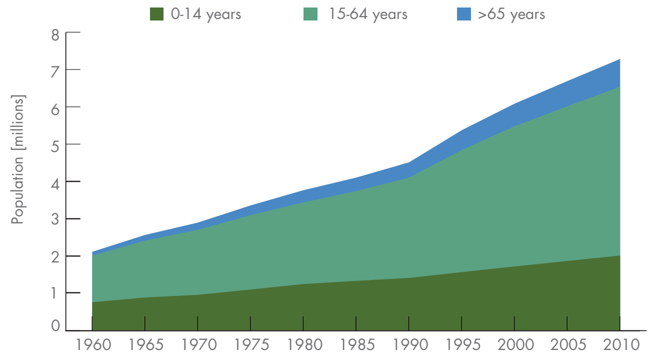
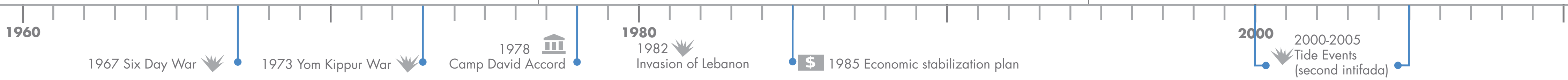


Figure ISR-9: Israel's population by age group, 1961-2010



ITALY

In 1957 Italy became a founding member of the European Economic Community. Italy enjoyed steady economic growth through the 1950s and 1960s following reconstruction after WWII,

known as the "miracolo economico." While economic growth was relatively stable, there have been more than 60 political turnovers since 1945. Widespread corruption and the heavy influence of organized crime (which may comprise as much as 27% of GDP) have weighed heavily on the political sphere. The 1960s - 1970s were punctuated by acts of rebellion and violence by both left-wing and right-wing extremist groups, which were known as the Years of Lead. In the 1990s Italy's judiciary launched the Mani Pulite (clean hands) investigations that uncovered widespread corruption amongst most of Italy's political parties that culminated in significant political restructuring and the beginning of the "Second Republic" in 1992. Italy joined the European Monetary Union in 1998 and has since been struggling with the requirement to keep its budget deficit below the 3% ceiling.

Italy's Ecological Footprint per capita has been increasing steadily since 1961, driven by the increased economic output starting in the 1950s. Population growth has been slow, which has helped limit growth in the total Ecological Footprint.

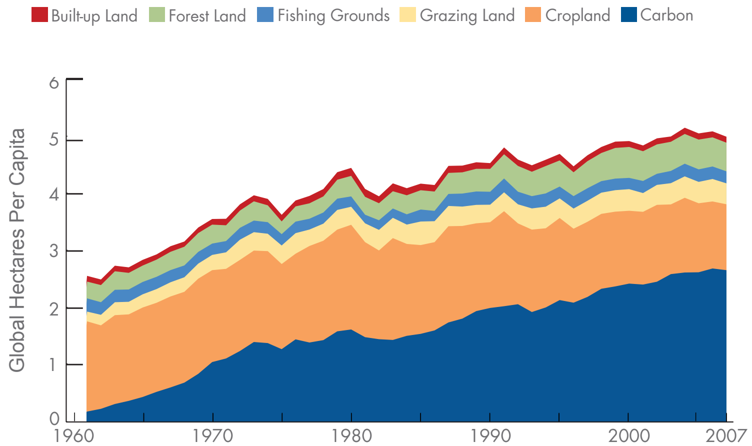


Figure ITA-1: Ecological Footprint per capita in Italy by component, 1961-2007

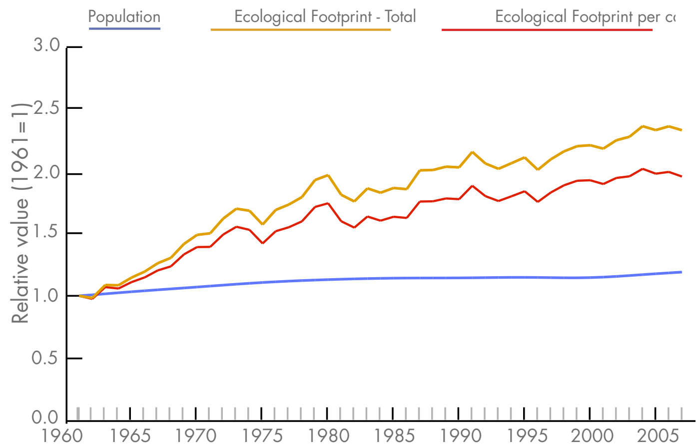


Figure ITA-2: Contributing drivers of Italy's Ecological Footprint, 1961-2007

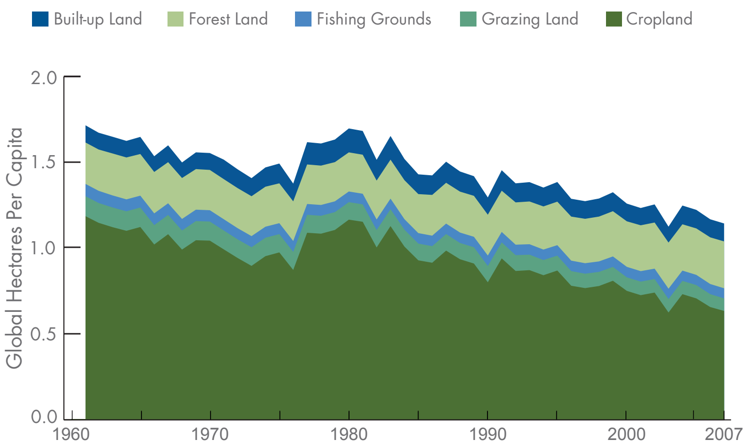


Figure ITA-3: Biocapacity per capita in Italy by component 1961-2007

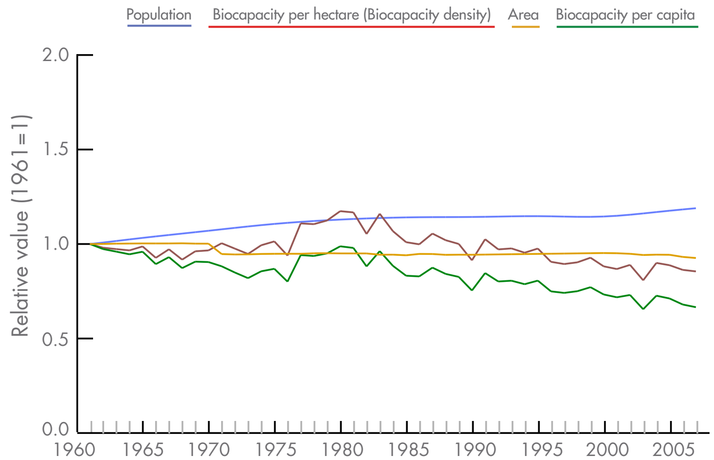


Figure ITA-4: Contributing drivers of Italy's biocapacity, 1961-2007

While the total biocapacity of Italy has remained relatively constant with a slight jump in biocapacity per hectare around 1980, since then the available biocapacity per capita has decreased gradually due to population growth and a reduction in biocapacioty density .

Primarily due to the growth in Ecological Footprint, Italy's biocapacity deficit has increased to about 4 global hectares per person, predominantly comprised of demand for global forest resources for CO_2 sequestration. However, Italy has had a significant portion of its biocapacity deficit comprised of all other land types, suggesting that, in particular, Italy is depending heavily on imported food resources. This dependency on foreign resources may hurt Italian residents well-being should worldwide constraints on resource supply worsen.

Italy's population plateaued in the 1980s, but has since resumed growth, in part due to immigration. This growth has predominantly been in the older demographic, suggesting that this growth will not continue. However, the aging population may start to burden economic growth in the future.

GDP growth has been led by all three components, though investment has been increasing its share significantly in the last 15 years. Investment usually relates to long-term changes in efficiency, through the development of infrastructure, and it remains to be seen whether the investments that have taken place constrain the Ecological Footprint trajectories in the future.

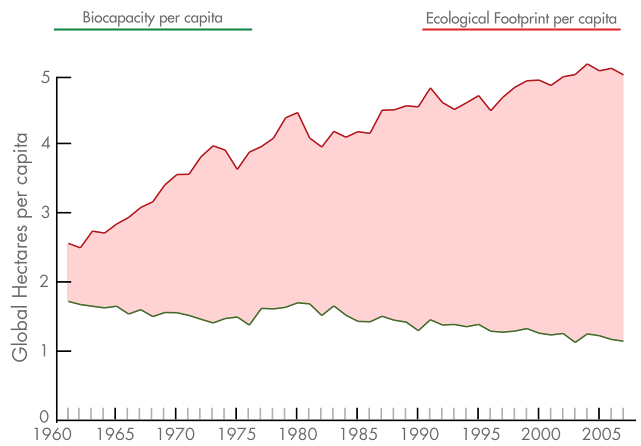


Figure ITA-5: Italy's per capita biocapacity deficit, 1961-2007

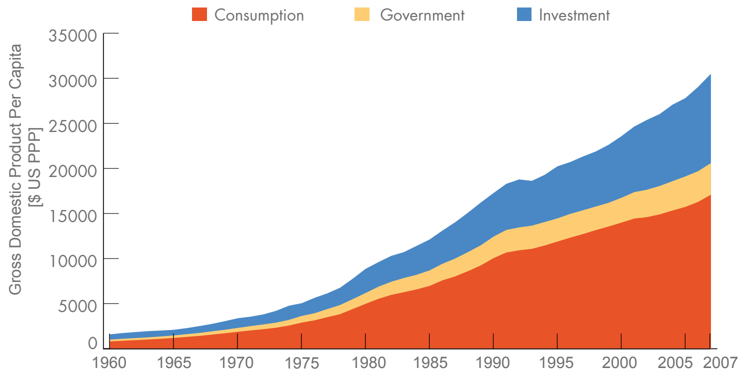


Figure ITA-7: Italy's GDP by component, 1961-2007

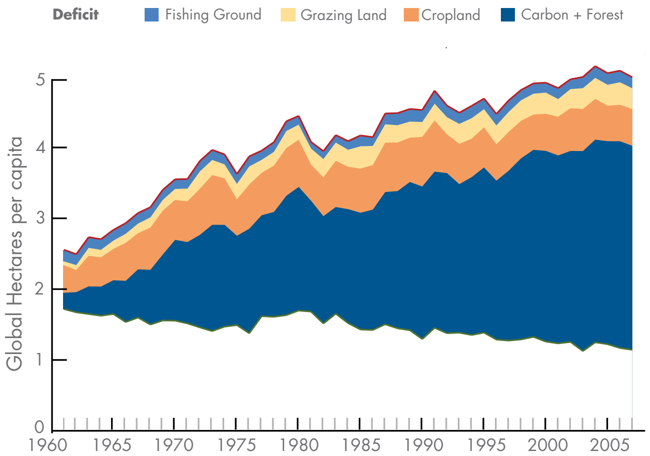


Figure ITA-6: Italy's per capita biocapacity deficit by contributing land-use type, 1961-2007

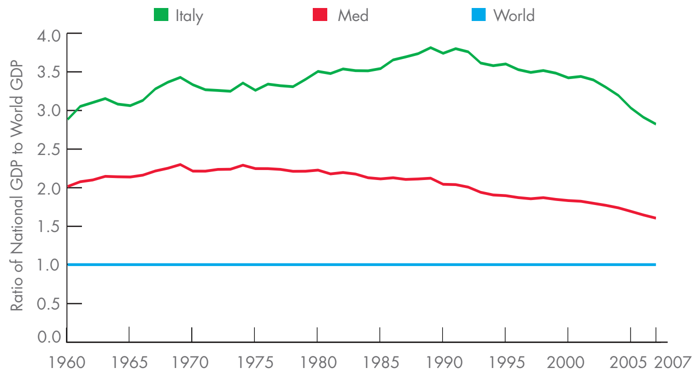


Figure ITA-8: Comparison of ratio of world GDP to Italy and the Mediterranean region, 1961-2007

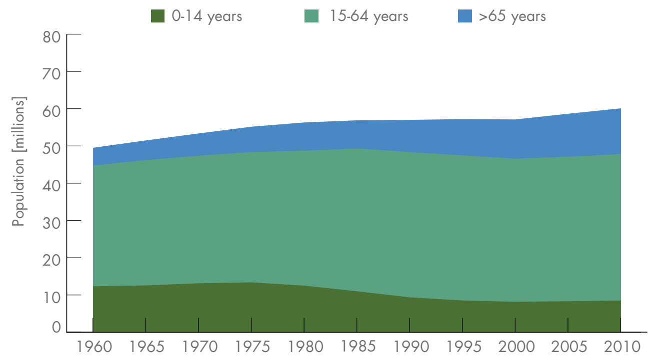


Figure ITA-9: Italy's population by age group, 1961-2010

JORDAN

Jordan achieved independence from the British Empire in 1946, two years before the creation of Israel greatly increased military tensions in the region. In the Six Day War in 1967, Israel

occupied the West Bank and East Jerusalem from Jordan. Continued conflict over these regions led to the October War of 1973; Jordan finally relinquished its claim to the West Bank in 1988. Accused of not supporting the US-led 1990-1991 Gulf War against Iraq, Jordan suffered dual blows of restrictions in monetary aid and an influx of Iraqi refugees, who added to the millions of Palestinian refugess who had fled to Jordan over the previous decades. Since 1996, Jordan has pursued economic integration with Israel, which has been very successful and led to the maintenance of good diplomatic relations; access to the resources of the River Jordan is a key component of this agreement.

Jordan appeared to have a large drop in both Ecological Footprint and biocapacity around 1965. This may be due to the Six Day War, but it is likely a result of poor statistical records during the period. Following the October War, Jordan's economic output increased greatly, and this was associated with a general increase in Ecological Footprint per capita. This increase combined with population growth led to a large increase in total Ecological Footprint. Only slightly interrupted by the 1990-1991 Gulf War.

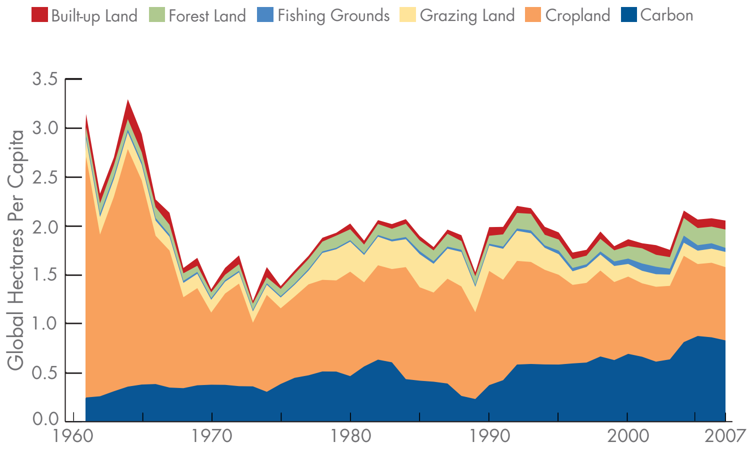


Figure JOR-1: Ecological Footprint per capita in Jordan by component, 1961-2007

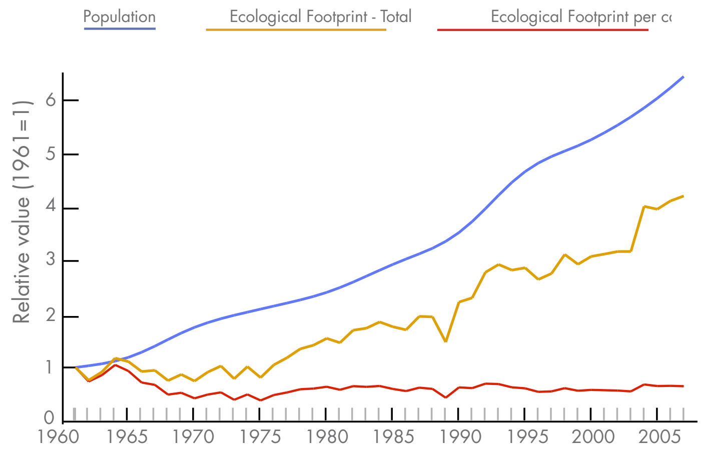


Figure JOR-2: Contributing drivers of Jordan's Ecological Footprint, 1961-2007

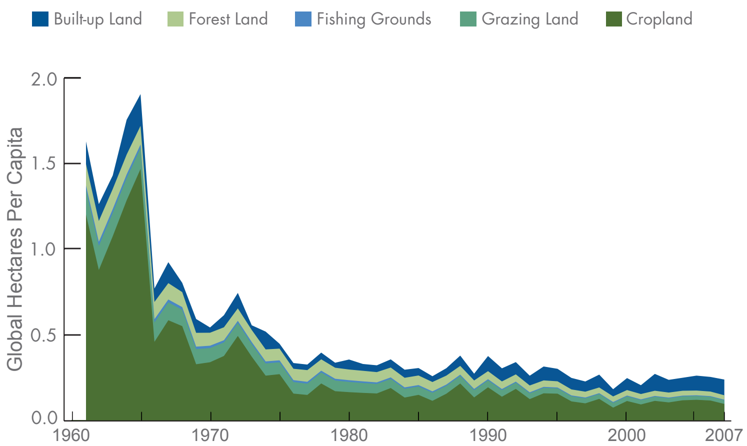


Figure JOR-3: Biocapacity per capita in Jordan by component 1961-2007

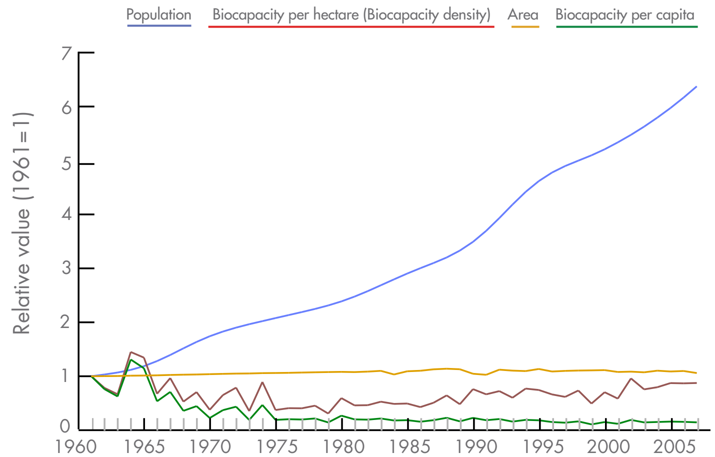


Figure JOR-4: Contributing drivers of Jordan's biocapacity, 1961-2007

Jordan's total bioproductive area stayed relatively constant over the past 46 years, with a small dip in the late 1980s possibly related to the relinquishing of control of the West Bank.

Biocapacity per hectare decreased through 1980, since when it has slowly regained ground. As a consequence, total biocapacity decreased, and this, combined with rapid population growth, has caused biocapacity per capita to greatly diminish to just over 0.2 global hectares in 2007. As a result, Jordan's biocapacity deficit has grown. A large part of this is due to cropland-based resources and indicates that Jordan will be particularly susceptible to crop shortages.

Like Israel, Jordan's population and economic output are tightly linked to immigration, although in Jordan's case this usually takes the form of refugees. Refugees often lose the social support structures that voluntary migration leaves intact, and this can lead to decreased economic activity by these groups. Consequently, refugees can often place a strain on economic expansion, while simultaneously placing additional demand on natural resources. Additionally, Jordan is also extremely dependent upon petroleum imports, and shortages and price volatility are likely to have severe impacts on Jordan's development.

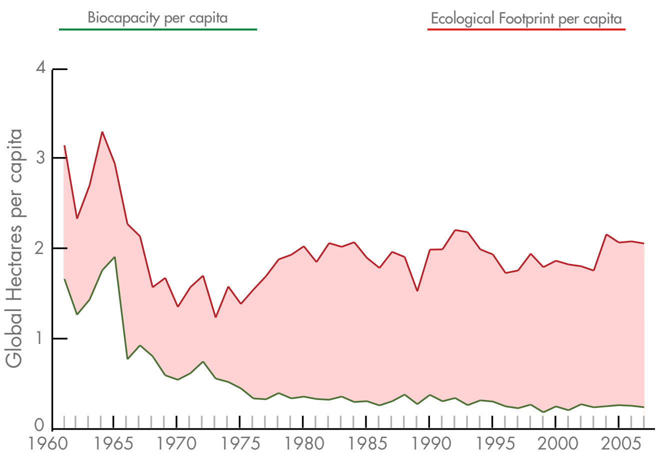


Figure JOR-5: Jordan's per capita biocapacity deficit, 1961-2007

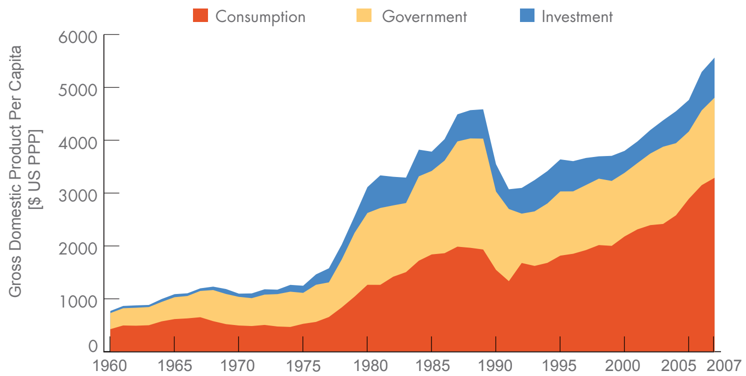


Figure JOR-7: Jordan's GDP by component, 1961-2007

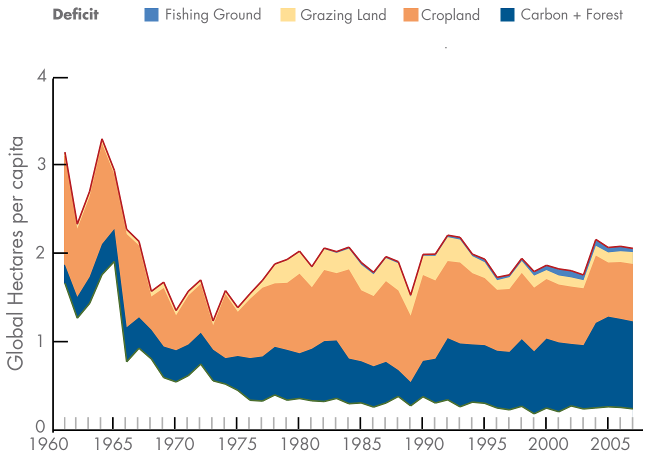


Figure JOR-6: Jordan's per capita biocapacity deficit by contributing land-use type, 1961-2007

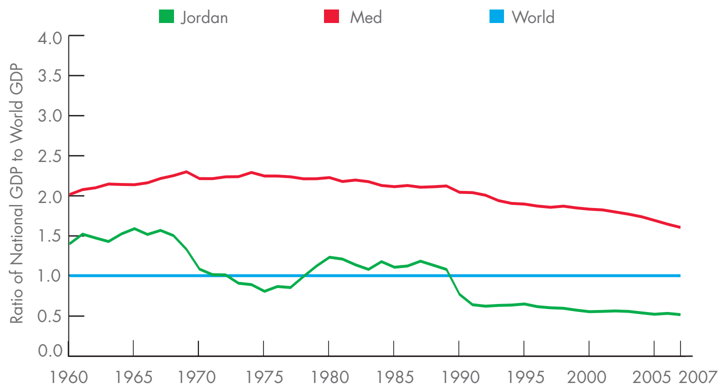


Figure JOR-8: Comparison of ratio of world GDP to Jordan and the Mediterranean region, 1961-2007

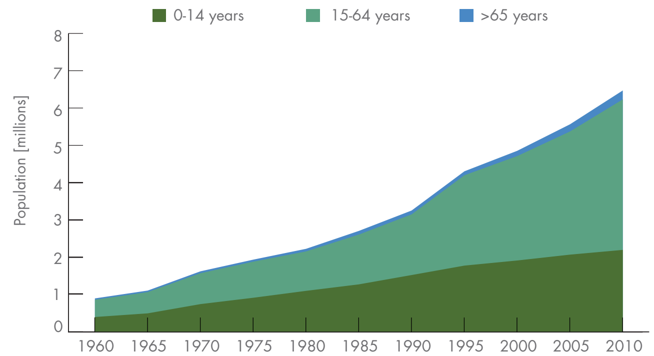


Figure JOR-9: Jordan's population by age group, 1961-2010

LEBANON

Lebanon achieved independence from France in 1943, five years before the creation of Israel greatly increased military tensions in the region. Lebanon did not take part in the Six Day War with

Israel, but received many Palestinitan refugees over the coming decades, including key members of the Palestinian Liberation Organization. Lebanon thus became a base for Palestinian attacks on Israel. Moreover, as a result of the huge influx of refugees, civil war broke out in 1975, lasting until 1995. This period saw the formation of the Hezbollah militia; the resulting hostilities led to repeated invasions of Lebanon by Israeli forces.

Lebanon's Ecological Footprint per capita saw a general slow increase from 1961 to 1990, despite huge volatility in economic output due to the civil war. For the following 5 years, the Ecological Footprint increased more rapidly, possibly due to the ending of the civil war and attempts at regional peace agreements. Shortly before 2000, the Ecological Footprint per capita started to decrease, reaching 1990 levels by 2007, perhaps due to the again

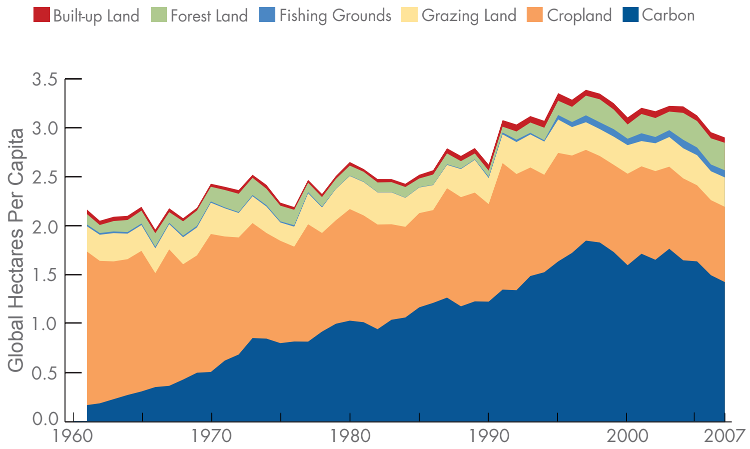


Figure LBN-1: Ecological Footprint per capita in Lebanon by component, 1961-2007

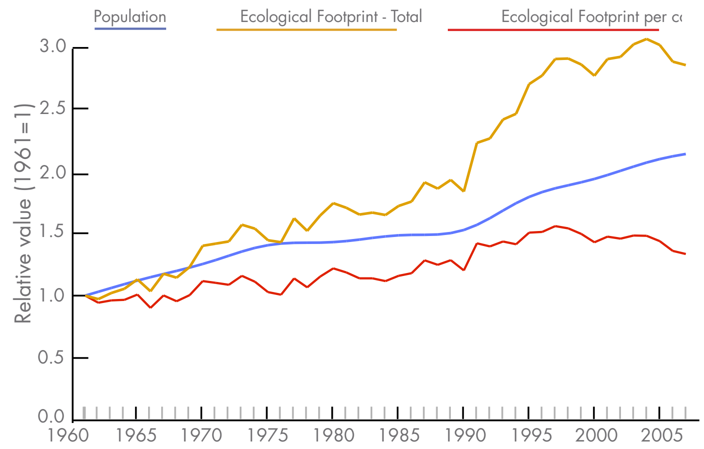


Figure LBN-2: Contributing drivers of Lebanon's Ecological Footprint, 1961-2007

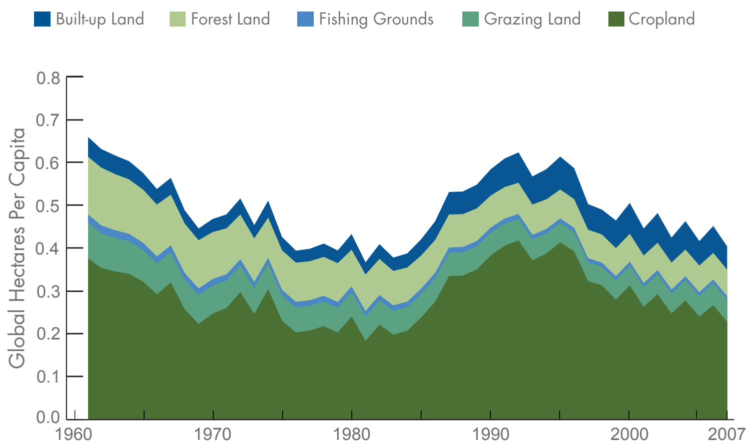


Figure LBN-3: Biocapacity per capita in Lebanon by component 1961-2007

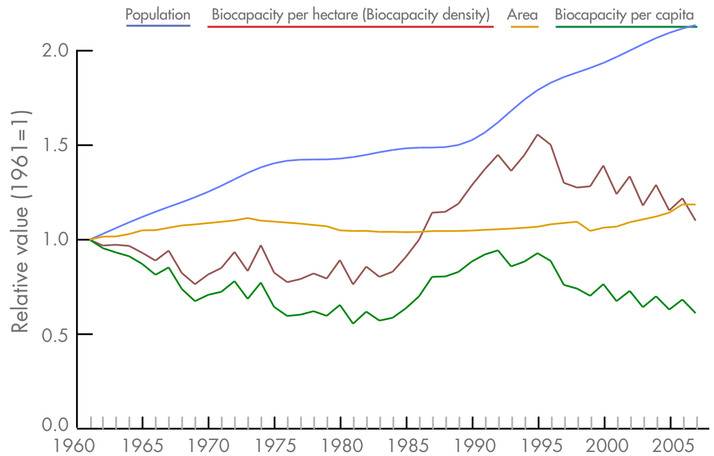


Figure LBN-4: Contributing drivers of Lebanon's biocapacity, 1961-2007

increasing tensions with Israel. Waves of immigration, especially in the 1990s, caused a huge runup in the total Ecological Footprint during the period.

Lebanon experienced a large drop in biocapacity per hectare from 1961 to 1985, then a dramatic increase for the next 15 years, followed by a slow decline. During these 15 years, consumption of fertilizers increased nearly three-fold (FAO), perhaps related to the increased stability of the economy associated with the tail-end of the civil war.

Lebanon's biocapacity has been significantly less than its Ecological Footprint since 1961, and the large influx of refugees and immigrants has exacerbated this trend. By 2007, the biocapacity deficit was 2.5 global hectares per capita.

The composition of the deficit has changed over time, though Lebanon remains highly dependent upon imports of resources based on cropland and grazing land. Demand for the use of forests for direct resources and carbon sequestration has increased significantly. Lebanon, similarly to many of its neighbors, is highly susceptible to changes in renewable and non-renewable natural resource prices and availability.

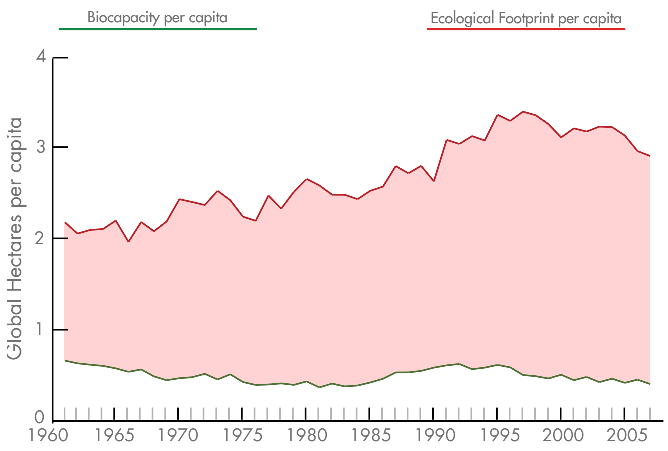


Figure LBN-5: Lebanon's per capita biocapacity deficit, 1961-2007

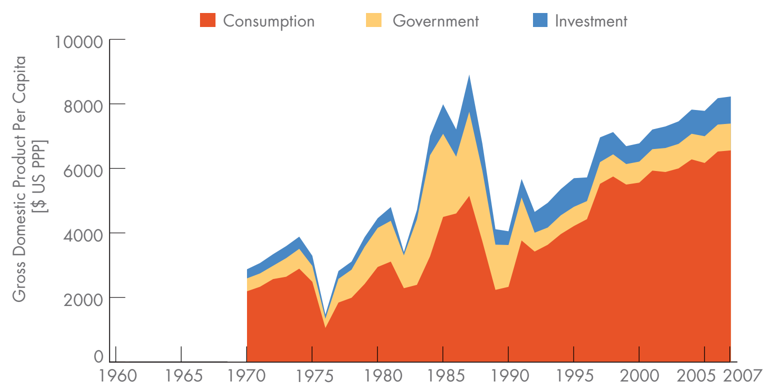


Figure LBN-7: Lebanon's GDP by component, 1961-2007

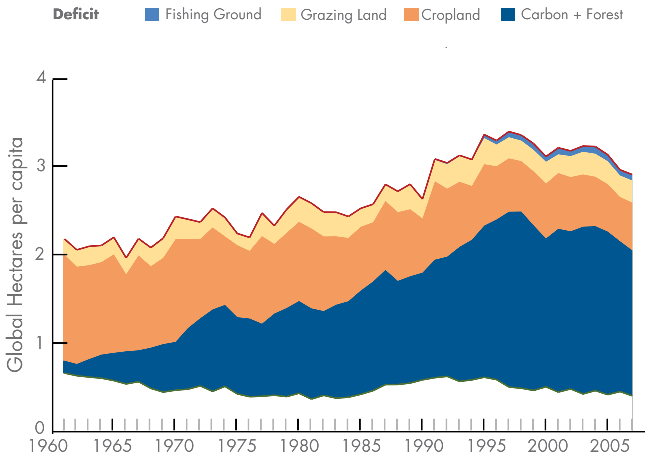


Figure LBN-6: Lebanon's per capita biocapacity deficit by contributing land-use type, 1961-2007

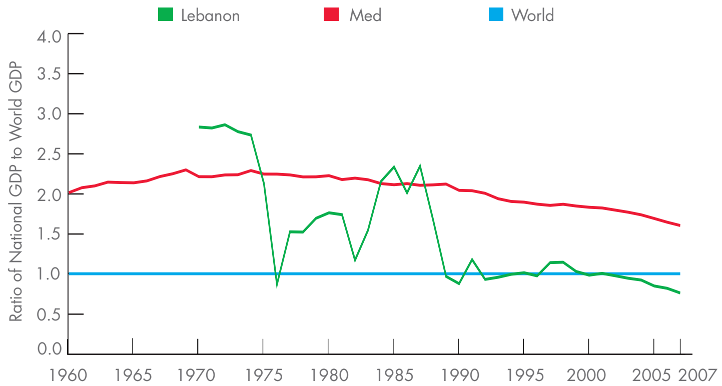


Figure LBN-8: Comparison of ratio of world GDP to Lebanon and the Mediterranean region, 1961-2007

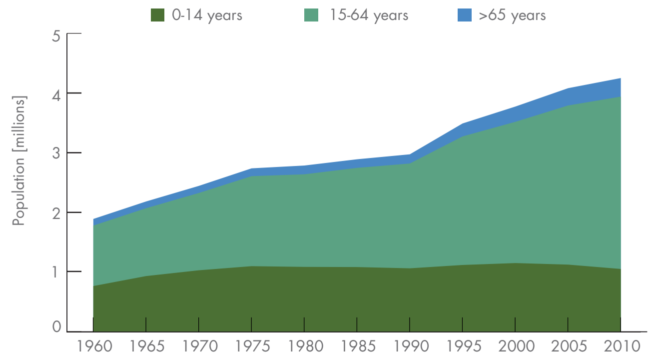


Figure LBN-9: Lebanon's population by age group, 1961-2010

LIBYA

Libya gained independence from Italy in 1951. In 1959, significant oil reserves were discovered, which produced a huge influx of revenue to the country, which predominanly flowed to the

country's elite. Discontent grew over the increasing inequality and concentration of oil wealth, and in 1969 a military coup led by Mu'ammar Abu Minyar al-Qadhafi established the Great Socialist People's Libyan Arab Jamahiriya, which combined Islam with socialism. For most of the 1990s, Libya was placed under far-reaching econoimc sanctions and political isolation. In 2003 Libya started to re-engage with the world, complying with the requirements of the UN sanctions and announcing plans to get rid of its weapons of mass destruction.

The recent popular uprising is creating much uncertainty on future development paths, but if democratization and civil participation get rooted, this increases the possibility of public participation in Ecological Footprint reduction strategies.

Libya's Ecological Footprint per capita has grown modestly since 1961, despite the huge influx of oil wealth. This is likely to be due to the extreme inequality seen there, with spending by the elite often linked to luxury goods which have a low Footprint to price ratio. However, when combined with the quadrupling of Libya's population, Libya has seen a seven-fold increase in total Ecological Footprint.

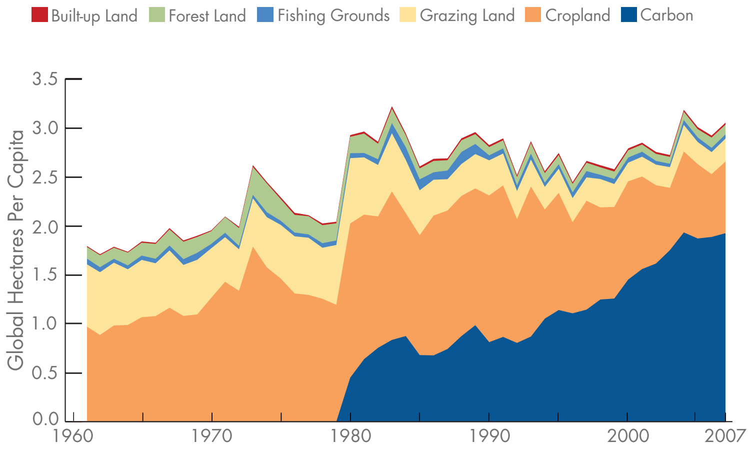


Figure LBY-1: Ecological Footprint per capita in Libya by component, 1961-2007

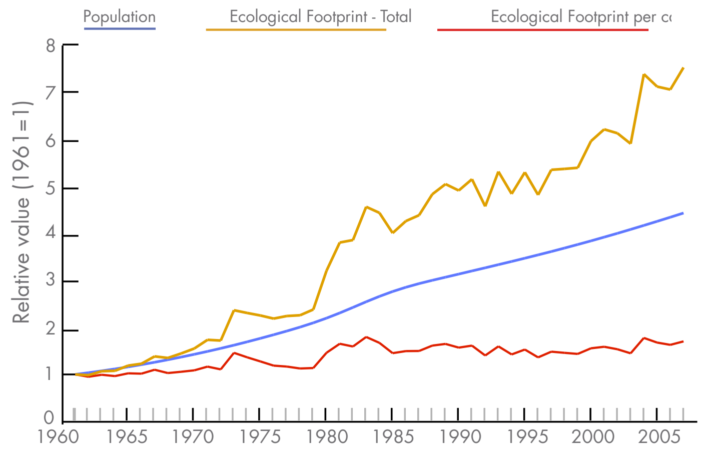


Figure LBY-2: Contributing drivers of Libya's Ecological Footprint, 1961-2007

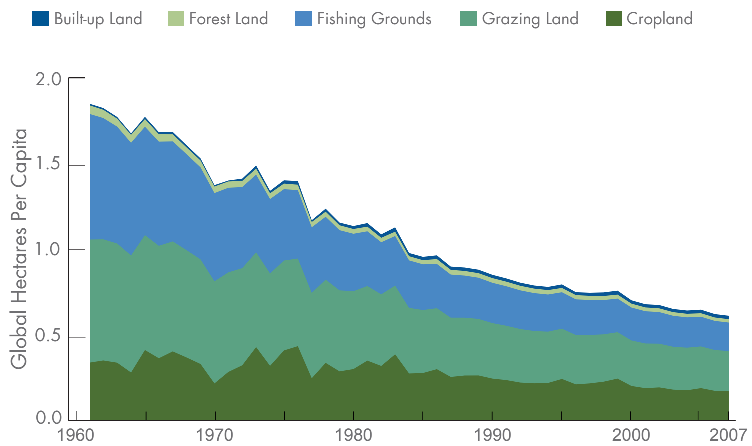


Figure LBY-3: Biocapacity per capita in Libya by component 1961-2007

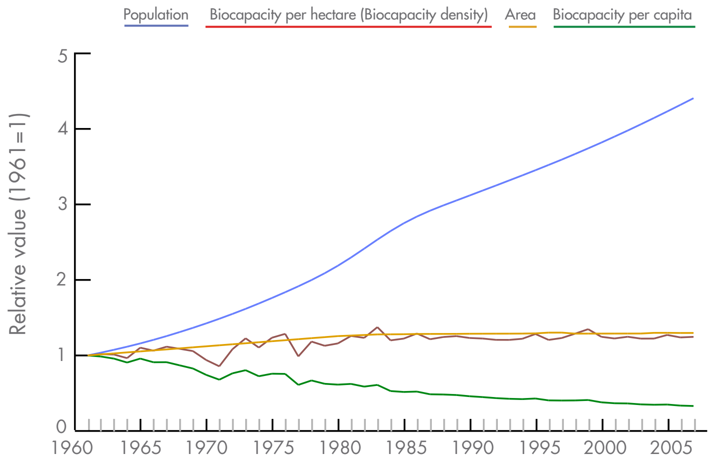


Figure LBY-4: Contributing drivers of Libya's biocapacity, 1961-2007

1960 | 1980 | 2000

1959 Oil reserves discovered

1969 Coup

1986 & 1988 US then UN economic sanctions

2003 Re-engagement with the West

Libya's total biocapacity has remained relatively constant, with a slight increase as a result of an increase in the area of productive land, likely due to expansion of irrigation. Population increase has, of course, significantly eroded the available biocapacity per capita.

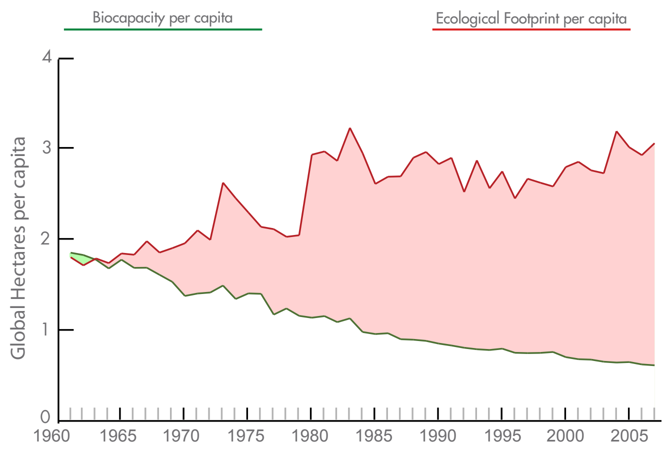


Figure LBY-5: Libya's per capita biocapacity deficit, 1961-2007

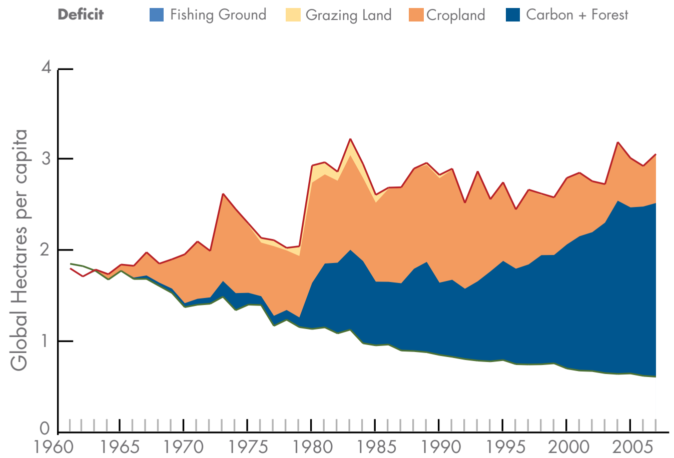


Figure LBY-6: Libya's per capita biocapacity deficit by contributing land-use type, 1961-2007

Consequently, Libya has lost the small biocapacity surplus it had in 1961 and expanded its biocapacity deficit to nearly 2.5 gha per capita in 2007. This deficit is comprised of imported cropland resources and demand for global forest sequestration of carbon dioxide.

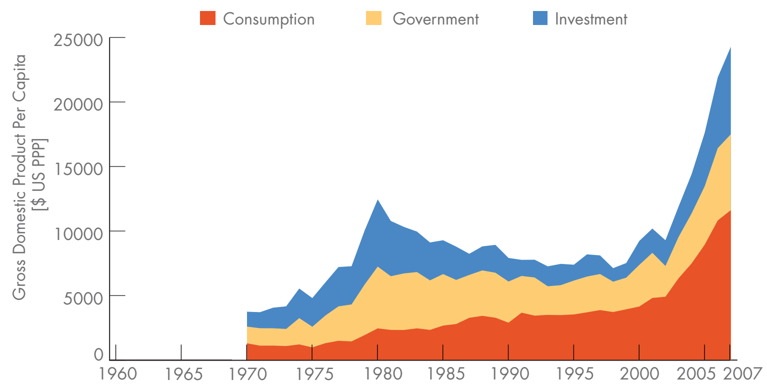


Figure LBY-7: Libya's GDP by component, 1961-2007

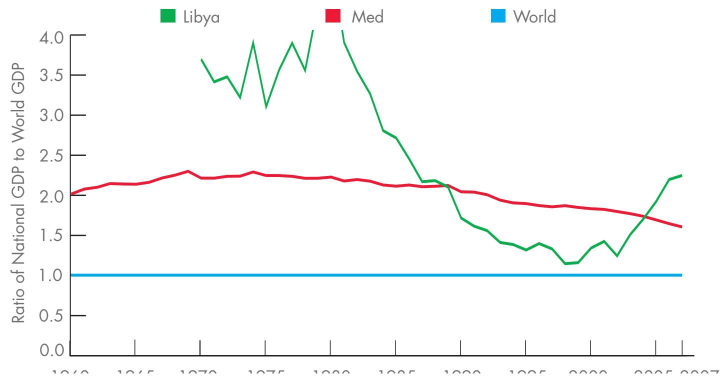


Figure LBY-8: Comparison of ratio of world GDP to Libya and the Mediterranean region, 1961-2007

Libya's population has greatly increased over the past 50 years. Despite a decline in the population under 15 during the years of the UN sanctions, population increased again following the 2003 ending of sanctions. This suggests that Libya's population has significant inertia and is likely to continue expanding in the foreseeable future.

Libya's economy increased rapidly from 1970 to 1980 due to oil revenues. However, the combination of high inflation, economic sanctions, and limited wealth redistribution contracted the per capita output from 1980 to 2000. Since then, largely in response to a huge run-up in oil prices, economic output per capita has more than doubled. Handling such rapid changes in wealth is a significant challenge for the country, as is redistributing wealth in order to build a post-oil economy.

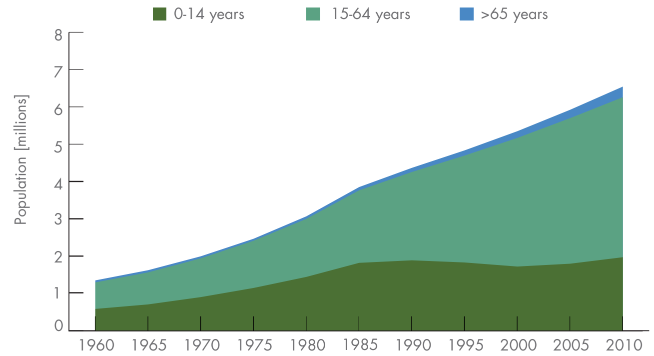
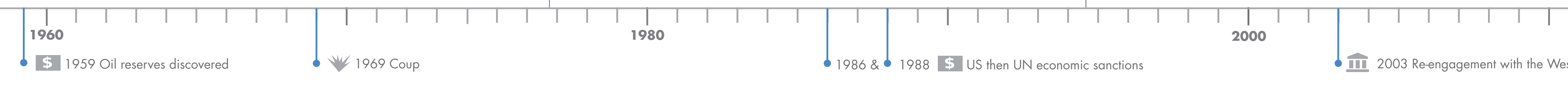


Figure LBY-9: Libya's population by age group, 1961-2010



THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA

Macedonia declared independence from the Socialist Federal Republic of Yugoslavia in 1991 and was the only region of former Yugoslavia to do so without ethnic conflict or bloodshed.

However, conflict in the other former republics reduced Macedonia's trading opportunities. In 2001, ethnically driven violence erupted and led to an insurgency from the Albanian minority. Conflict did not last long, and with facilitation from the EU and US the Macedonian government negotiated a ceasefire and expanded the coalition government to include more opposition parties. Macedonia's economy was disrupted by the 2001 outbreak of violence, but economic growth picked up soon after. Macedonia was able to attract significant Foreign Direct Investment due to its relative stability, and joined the World Trade Organization in 2003.

Macedonia's Ecological Footprint per capita remained relatively stable throughout the 1990s, with the Balkan conflicts limiting economic opportunities. The 2001 insurgency caused a decline in the Ecological Footprint which was short-lived; the following economic expansion doubled the Ecological Footprint per capita within 5 years. Due to a stable population, Macedonia's total Ecological Footprint followed a similar trajectory to that of the per capita.

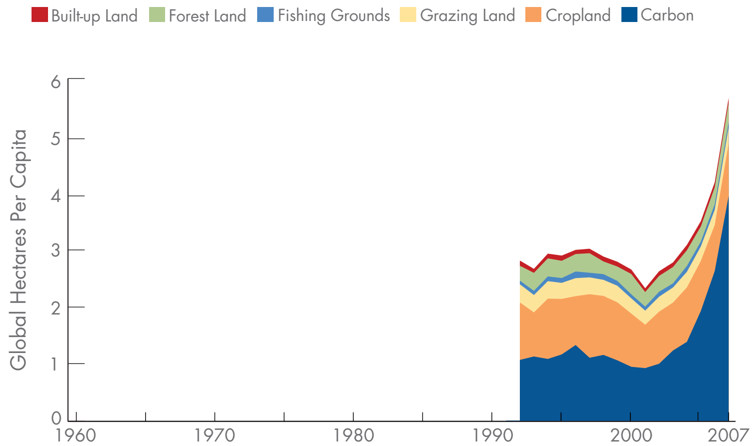


Figure MKD-1: Ecological Footprint per capita in Macedonia by component, 1961-2007

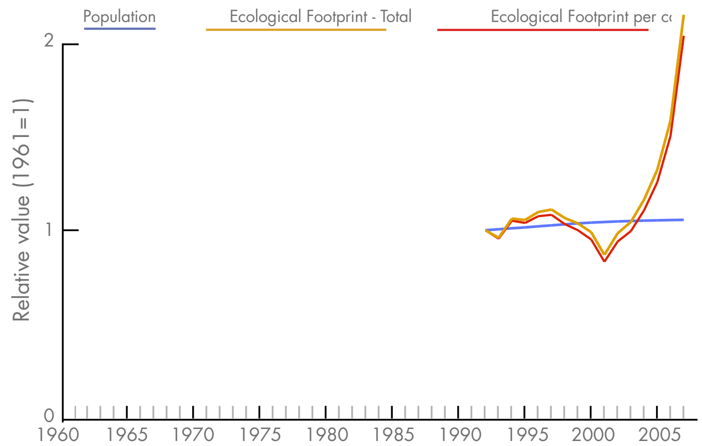


Figure MKD-2: Contributing drivers of Macedonia's Ecological Footprint, 1961-2007

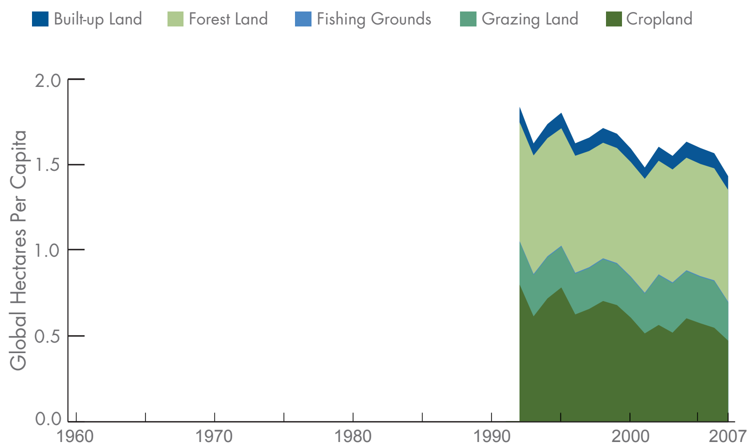


Figure MKD-3: Biocapacity per capita in Macedonia by component 1961-2007

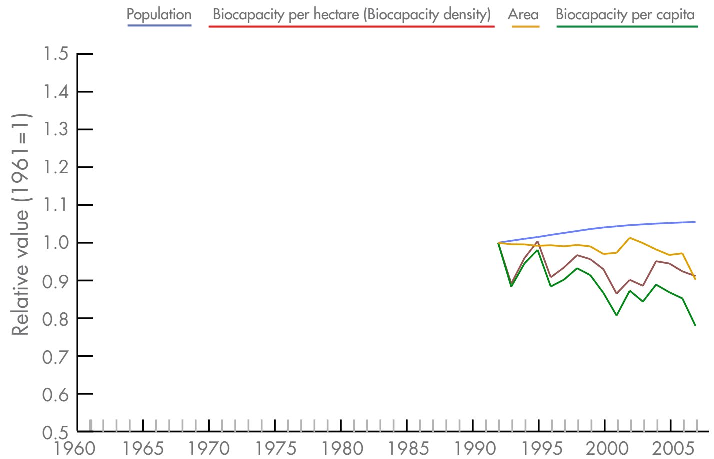
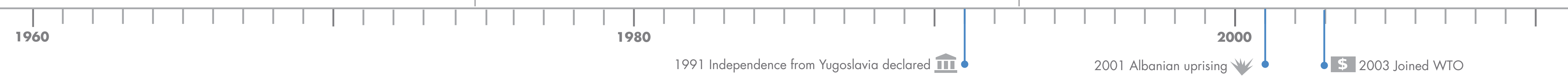


Figure MKD-4: Contributing drivers of Macedonia's biocapacity, 1961-2007



Total biocapacity decreased slightly in the period since independence, due to a slight decline in the biocapacity per hectare. The Macedonian Republic likely had relatively intensive farming techniques prior to independence; biocapacity density may have suffered due to resulting degradation and inability to increase compensating agricultural inputs.

Driven, therefore, largely by changes in the Ecological Footprint, Macedonia saw its biocapacity deficity jump significantly in the 2002-2007 period. This deficit was comprised of both demand for imported cropland resources, as well as demand for global forest sequestration of carbon dioxide. The huge increase in carbon emissions in recent years also suggests an increasing structural dependence on fossil fuels, even during a period of increasing oil prices.

Macedonia's population size is likely to peak in the next few years, and with an aging population is unlikely to begin increasing again unless significant immigration takes place. This will remove one driver of increasing demand on ecological resources.

Reflecting its relative stability, Macedonia has kept a relatively fixed amount of investment per capita since independence - the increase in economic output has come almost entirely from household consumption. This suggests that the recent huge increase in Ecological Footprint per capita is not structural and could be reduced relatively quickly.

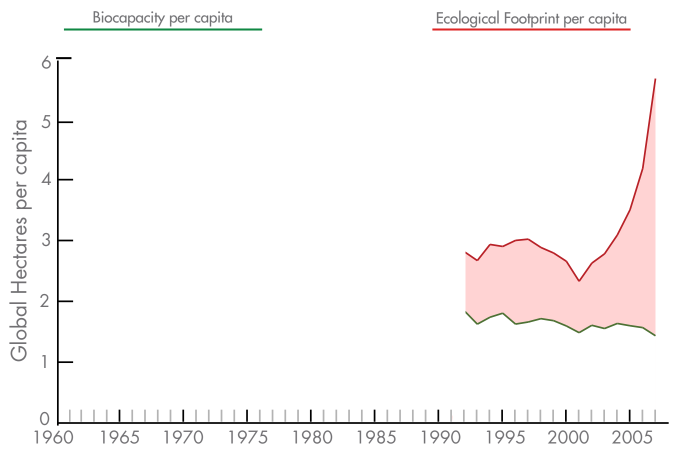


Figure MKD-5: Macedonia's per capita biocapacity deficit, 1961-2007

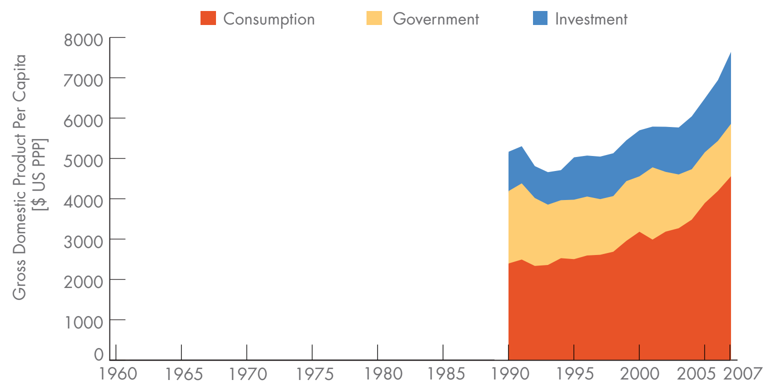


Figure MKD-7: Macedonia's GDP by component, 1961-2007

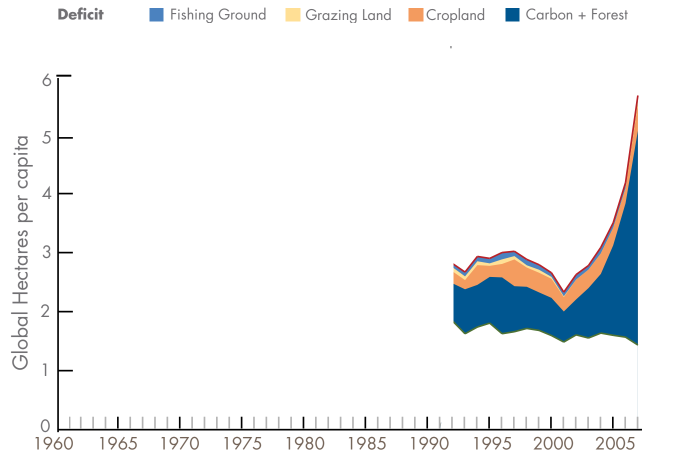


Figure MKD-6: Macedonia's per capita biocapacity deficit by contributing land-use type, 1961-2007

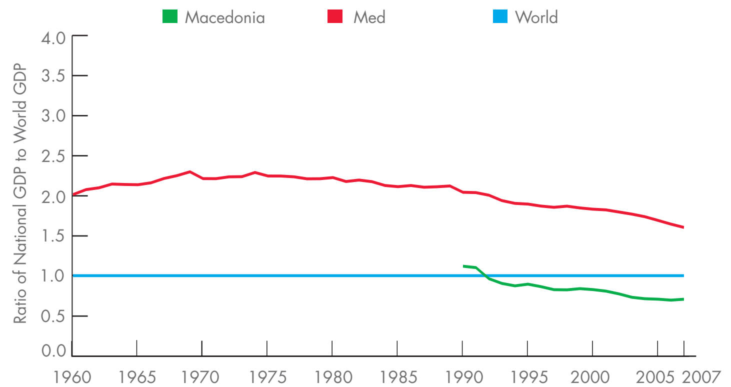


Figure MKD-8: Comparison of ratio of world GDP to Macedonia and the Mediterranean region, 1961-2007

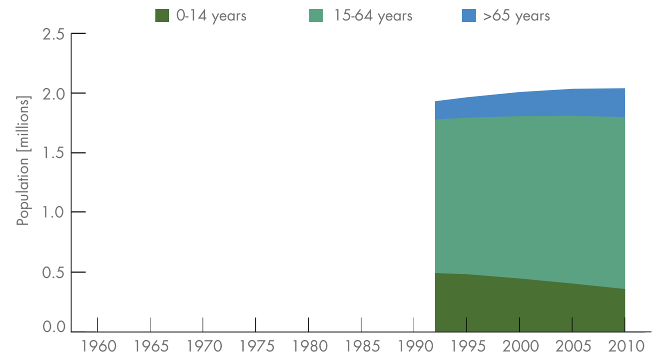
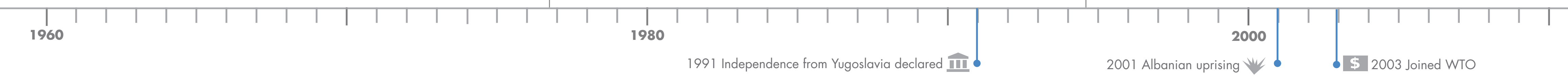


Figure MKD-9: Macedonia's population by age group, 1961-2010



MALTA

Malta voluntarily remained part of the British Empire until 1964,when it gained independence. The Republic was formed in 1974, with accession to the EU occurring in 2004 and adoption of the Euro in 2008. Malta is critically dependent upon imported resources: 80 percent of its food is imported and Malta has limited freshwater and energy resources. Malta's economy is also highly export-oriented, with the financial services, electronic and pharmaceutical manufacturing and tourism as its main sectors. Malta adopted a policy of neutrality in 1980, and played host to the U.S. and Soviet leaders during the negotiations which marked the end of the Cold War.

Malta's Ecological Footprint per capita increased between 1961 and 1975, when the Republic was formed. Since then it has remained relatively constant at a level consistent with other developed economies. In contrast, population size remained constant until the 1970s, after which it began to increase at a modest rate. Consequently, Malta's total Ecological Footprint has exhibited a general upward trend throughout the 1961-2007 period.

Malta's biocapacity availabile per capita is vastly lower than most countries with similar Ecological Footprints. While the total biocapacity has remained stable, the per capita availability has decreased from 0.7 to 0.5 global hectares per capita.

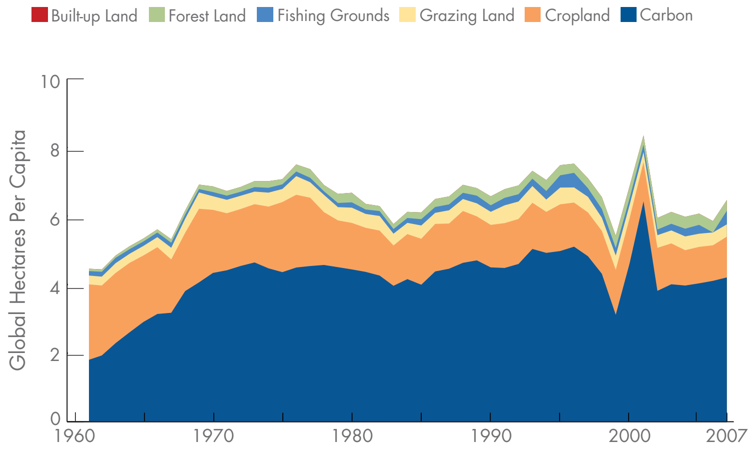


Figure MLT-1: Ecological Footprint per capita in Malta by component, 1961-2007

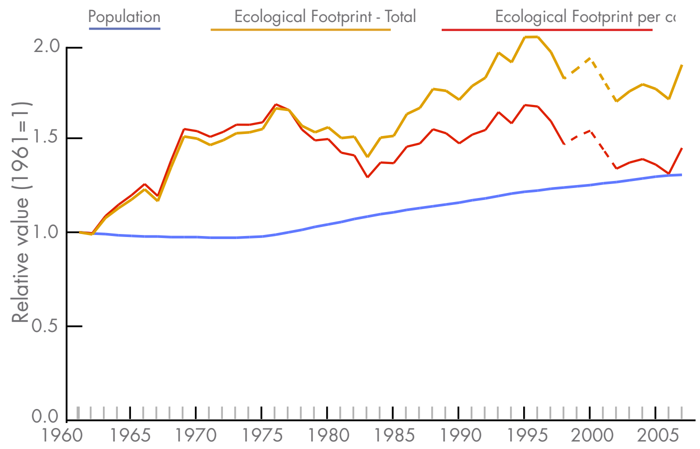


Figure MLT-2: Contributing drivers of Malta's Ecological Footprint, 1961-2007

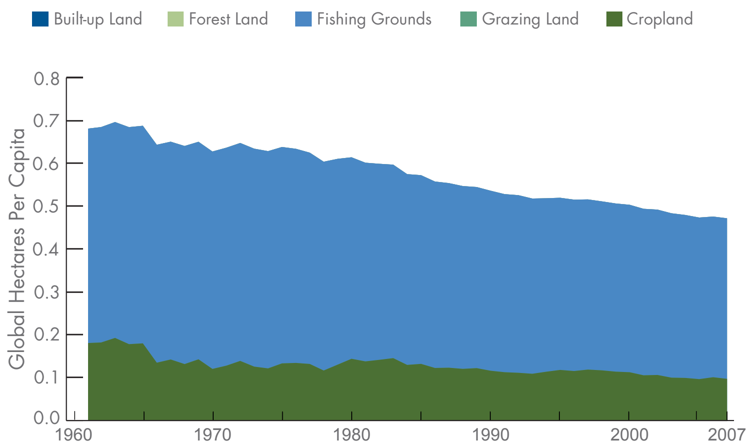


Figure MLT-3: Biocapacity per capita in Malta by component 1961-2007

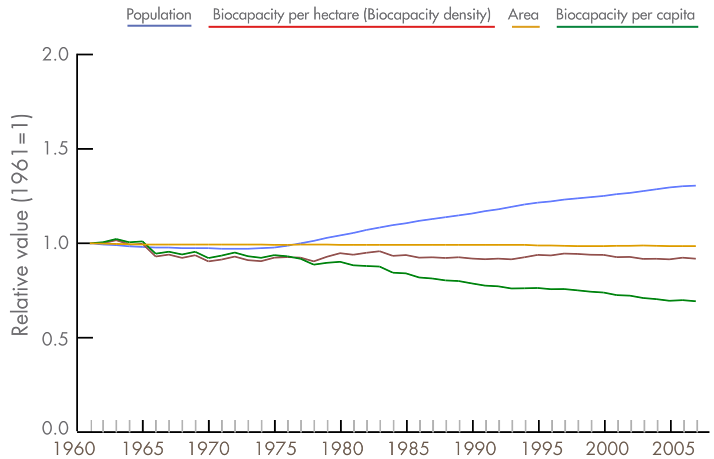
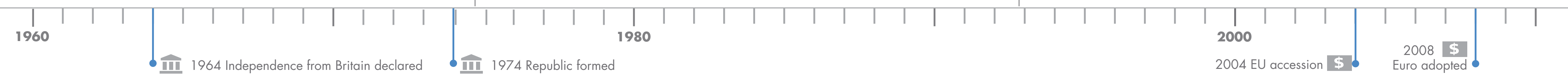


Figure MLT-4: Contributing drivers of Malta's biocapacity, 1961-2007



Malta has, therefore, an extreme imbalance between its Ecological Footprint and biocapacity: the biocapacity deficit has fluctuated between 4.0 and 6.0 global hectares per person over the entire period examined.

Since Malta is able to produce little of its resources, the deficit is comprised of all land-use types except fishing grounds.

Malta's population is likely to reach another peak relatively soon as expansion in recent years has been almost entirely from the 65+ year old population. Due to the large biocapacity deficit, however, this is unlikely to reduce resource dependence.

Malta's economy is highly dependent upon the import of resources, especially fossil fuels. While Malta has seen high growth in economic output in the past, resource constraints may well limit this in the future.

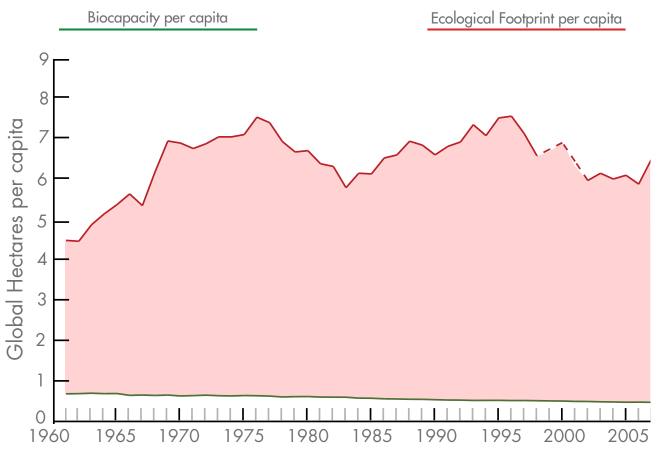


Figure MLT-5: Malta's per capita biocapacity deficit, 1961-2007

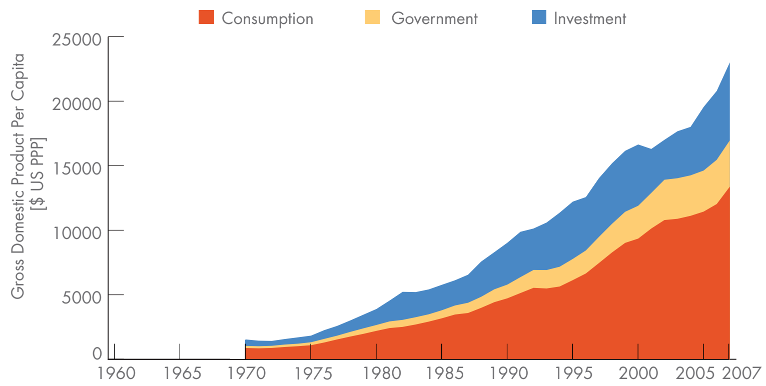


Figure MLT-7: Malta's GDP by component, 1961-2007

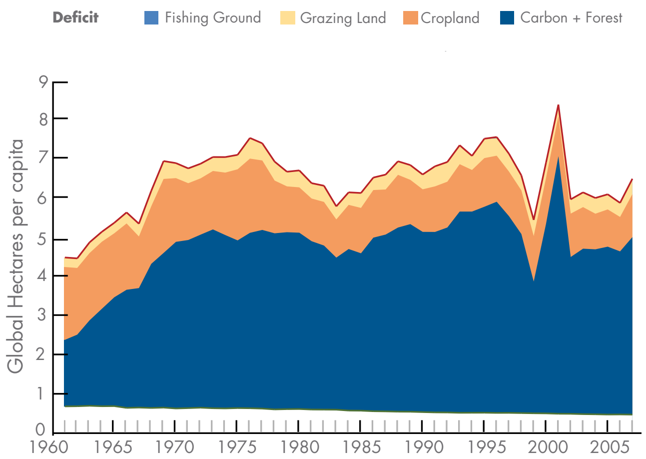


Figure MLT-6: Malta's per capita biocapacity deficit by contributing land-use type, 1961-2007

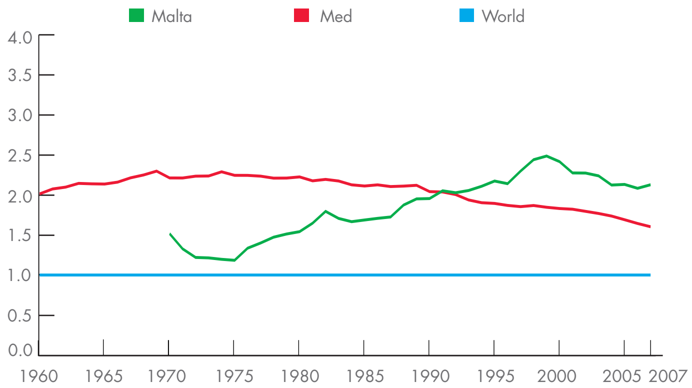


Figure MLT-8: Comparison of ratio of world GDP to Malta and the Mediterranean region, 1961-2007

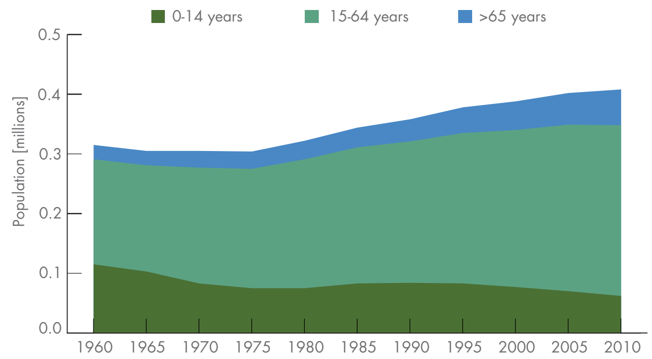
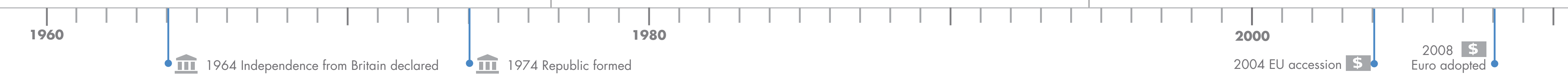


Figure MLT-9: Malta's population by age group, 1961-2010



MONTENEGRO

Montenegro existed as a Yugoslav republic, but when Slovenia, Croatia, Bosnia and Herzegovina and Macedonia all seceded and became independent nations, Montenegro was

incorporated into Serbia. Montenegro obtained independence from Serbia in 2006 through a referendum vote. Montenegro possesses adequate water supplies and natural resources (bauxite), and is a desirable site for both tourism and agriculture, which are promising for future economic growth. Montenegro has also created a business-friendly environment and adopted the Euro in 2002 to help spur economic growth. However, Montenegro's economy is still young and is recovering from the impact of the breakup of Yugoslavia and the international sanctions imposed upon Serbia during the Kosovo War (1998-1999).

Montenegro has existed as an independent nation too short a time to be able to assess trends in its natural resource accounts. However, as of 2007, Montenegro appears to have an Ecological Footprint far below its available biocapacity. However, the lack of apparent carbon dioxide emissions is likely to be due to an omission from international data sets, rather than a true zero value. If we assume a similar value to Bosnia-Herzegovina for

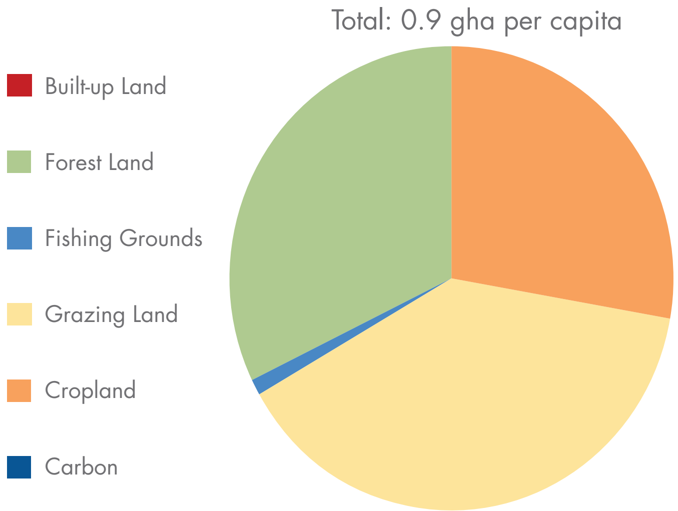


Figure MNE-1: Ecological Footprint per capita in Montenegro by component, 2007

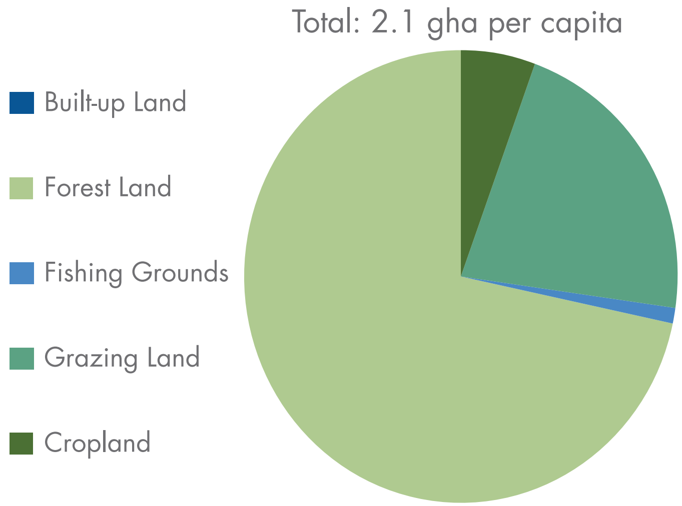


Figure MNE-2: Biocapacity per capita in Montenegro by component, 2007

the carbon component (~1.0 global hectares per capita), then Montenegro's Ecological Footprint comes close to its biocapacity.

Without adjustment, Montenegro's biocapacity surplus is predominantly composed of grazing lands. This land may, therefore, become valuable for increasing production should resources from this land-type be constrained in the future.

Montenegro's population appeared to reach a peak around the year 2000, and, although population decline halted in 2005-2007, it is likely to commence contraction again due to the expansion of the elderly population and a decreasing youth population.

Montenegro's economy has fluctuated widely throughout the breakup of the former Yugoslavia and the sanctions against Serbia. However, as of 2006 it regained its pre-breakup level of output per capita and resource constraints do not appear likely to hinder this increase in the near future. Longer-term, as with all countries, global resource constraints will place economic and political pressures on Montenegro, and these constraints should be incorporated into current policy decisions.

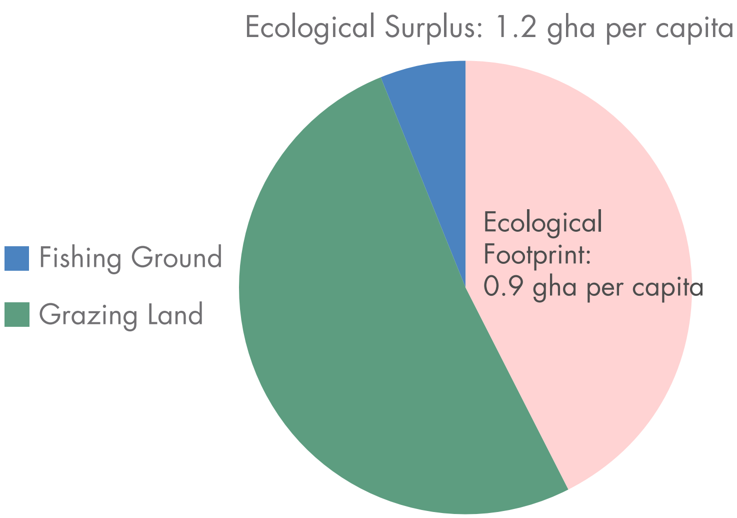


Figure MNE-3. Montenegro's biocapacity surplus by contributing land-use type, 2007

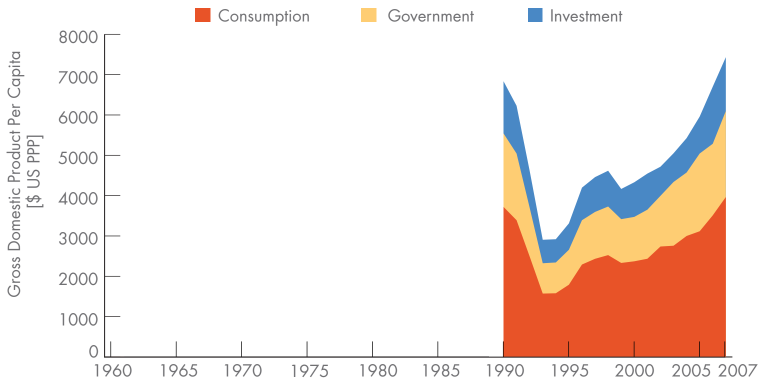


Figure MNE-4. Montenegro's GDP by component, 1961-2007

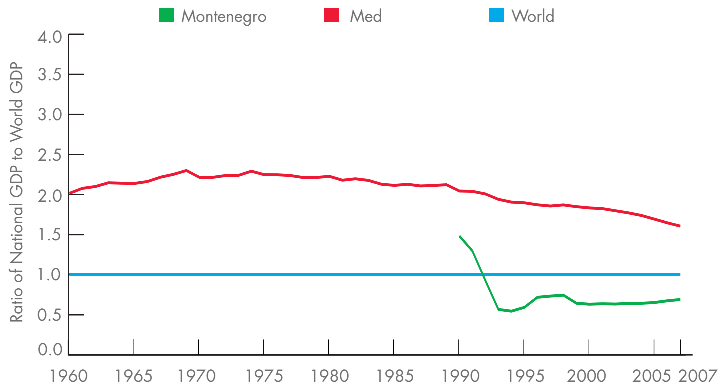


Figure MNE-5: Comparison of ratio of world GDP to Montenegro and the Mediterranean region, 1961-2007

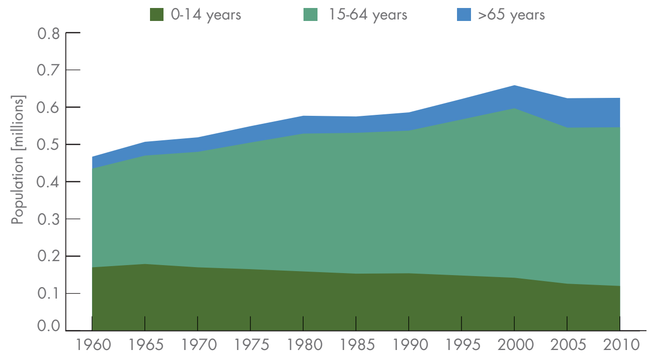
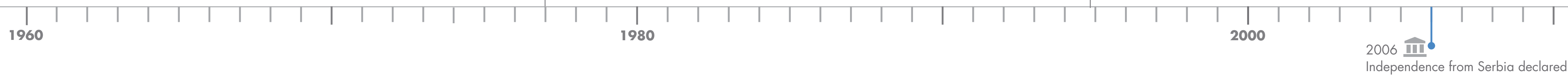


Figure MNE-6: Montenegro's population by age group, 1961-2010



MOROCCO

Morocco, a constitutional monarchy, achieved independence from France in 1956. The Moroccan economy is highly dependent on Europe, which is the primary destination of most of its imports as

well as the principal source of tourism revenues. Morocco faces long-term economic challenges from high illiteracy rates, high unemployment rates and external energy dependence (Morocco imports about 95 percent of its energy needs). In 2006 Morocco signed a FTA (Free Trade Agreement) with the United States that eliminates tariffs and resulted in a 147 percent increase in bilateral trade since its inception. Morocco is considered to be a stable, moderate Arab nation with strong ties to Arab nations, the African Union and the West, which has likely contributed to its relative political and economic stability.

Morocco's Ecological Footprint per capita has remained generally stable throughout the period examined, with significant noise likely due to statistical measurement errors.

Morocco's population has grown relatively quickly, increasing by 150 percent from 1961-2007. This has thus increased the total Ecological Footprint by a similar amount.

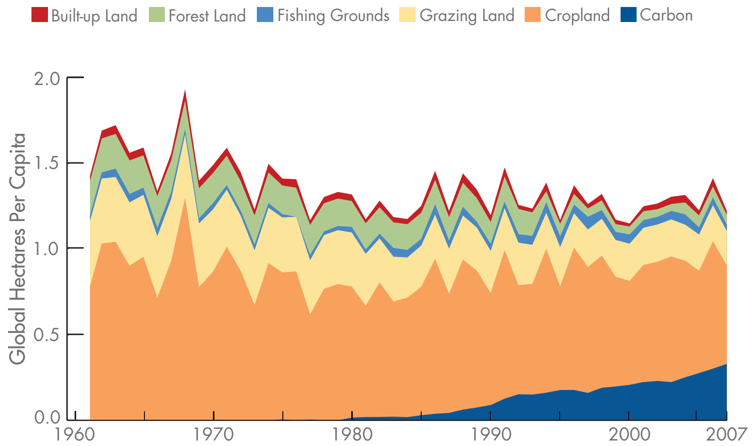


Figure MAR-1: Ecological Footprint per capita in Morocco by component, 1961-2007

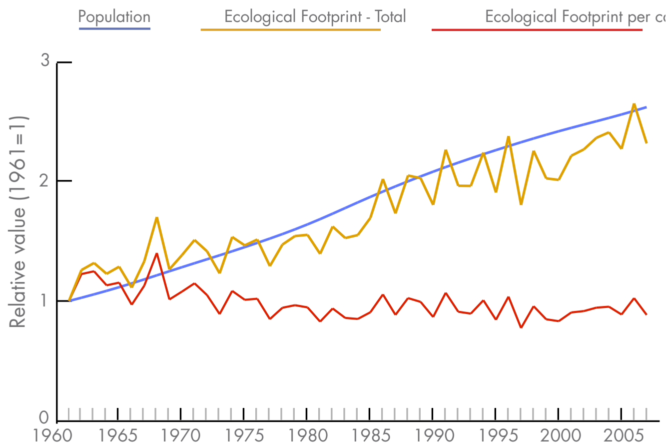


Figure MAR-2: Contributing drivers of Morocco's Ecological Footprint, 1961-2007

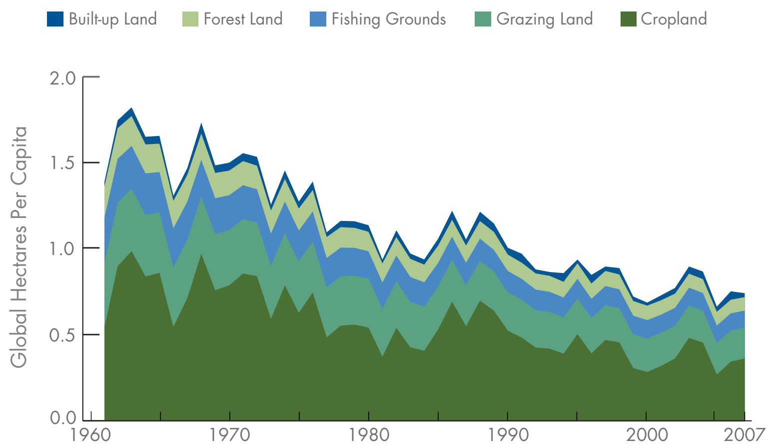


Figure MAR-3: Biocapacity per capita in Morocco by component 1961-2007

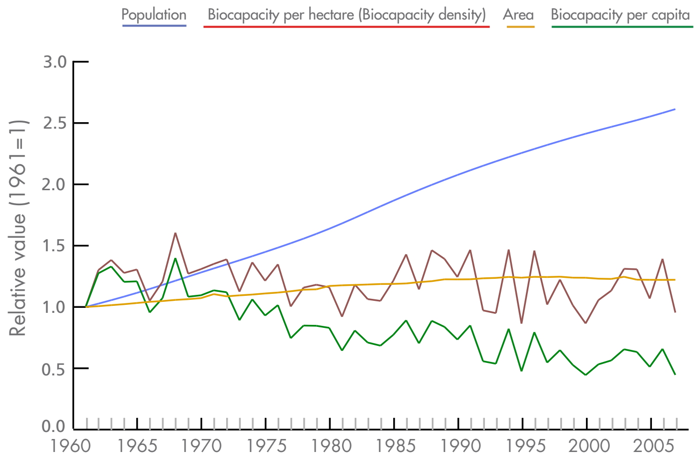


Figure MAR-4: Contributing drivers of Morocco's biocapacity, 1961-2007

1960 | 1965 First General Elections | 1973 Conflict with Polisario | 1975 Green March | 1980 | 2000 | 2003 Casablanca terrorist attacks | 2004 Free trade agreement with USA

Morocco's total biocapacity has not changed much in the period either, with a slight increase in total bioproductive area similar to other North African states. Population increase has, therefore, been the sole factor driving down per capita availability of biocapacity. Due to the relatively low level of Morocco's Ecological Footprint, there existed very little in the way of biocapacity deficit until 1980, driven by cropland imports. Demand for global carbon dioxide sequestration more than offset Morocco's reduced demand for forest products, and from 1990 the biocapacity deficit began increasing more significantly.

Morocco has significant inertia behind population growth, and its aboslute size is likely to continue to expand for a number of years. However, the growth rate has been slowing since 1990, and the youth population peaked around 1995.

Economic growth has been relatively constant throughout the period, though the runup in oil prices after 2007 will place additional constraints on increasing the output of the Moroccan economy.

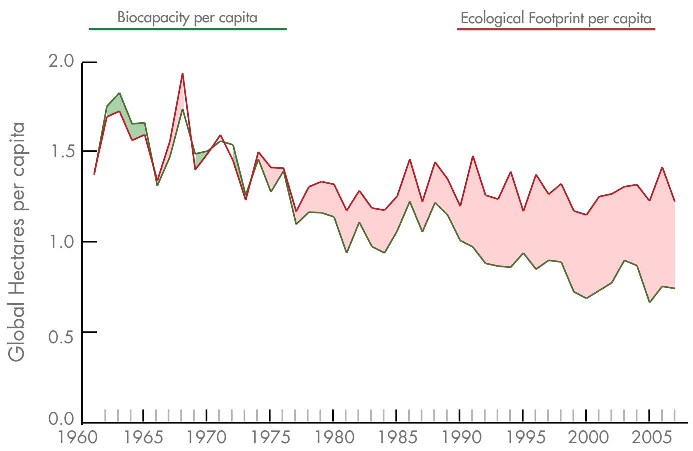


Figure MAR-5: Morocco's per capita biocapacity deficit, 1961-2007

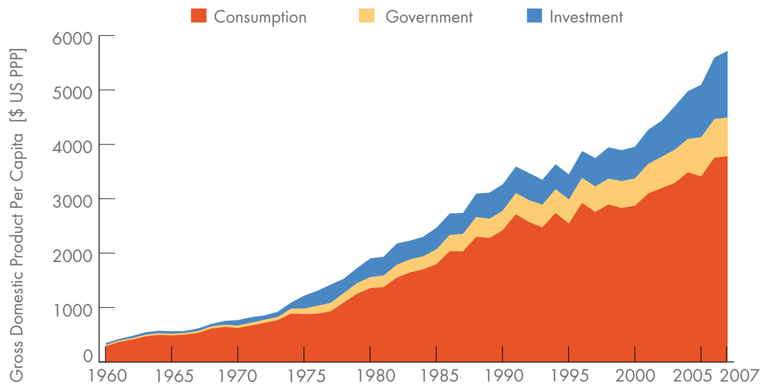


Figure MAR-7: Morocco's GDP by component, 1961-2007

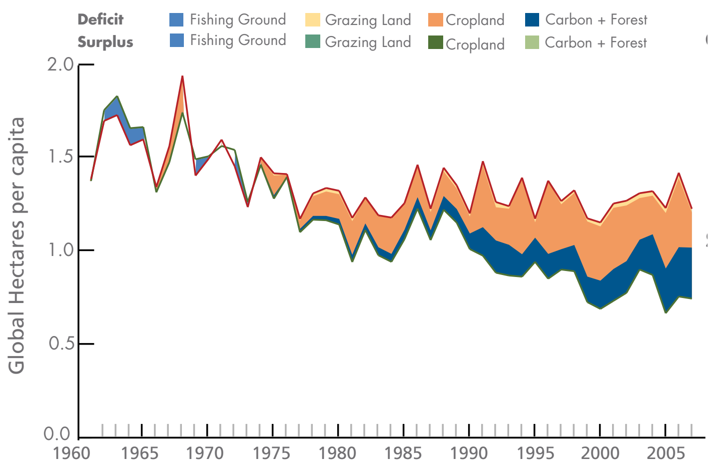


Figure MAR-6: Morocco's per capita biocapacity deficit by contributing land-use type, 1961-2007

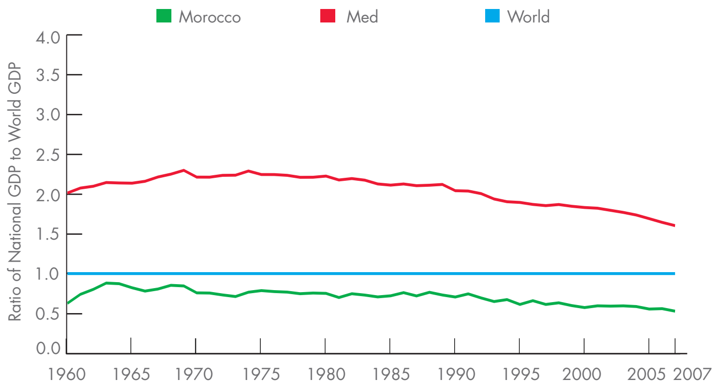


Figure MAR-8: Comparison of ratio of world GDP to Morocco and the Mediterranean region, 1961-2007

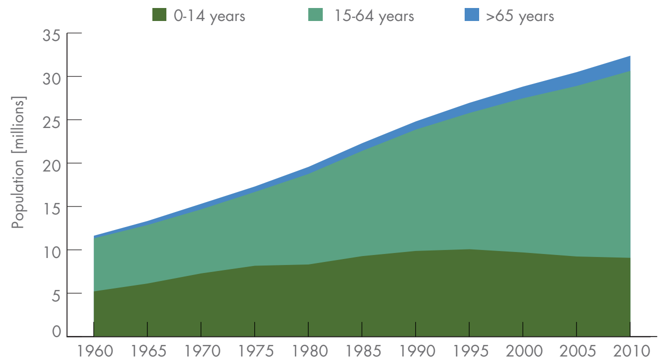


Figure MAR-9: Morocco's population by age group, 1961-2010

PORTUGAL

Historically, Portugal has always been a society rooted to the ocean, for trade, exploration, and food. This dominant ocean presence has led Portugal to have a great influence on the Mediterranean, despite not actually bordering the sea itself. Despite the wave of post-WWII decolonization, Portugal's rulers at the time refused to grant independence to its colonies (which included Mozambique, Angola, and Guinea-Bissau, amongst others). In 1974 almost half the Portuguese economic output was devoted to fighting in order to retain its African colonies. Public resentment of this strain on resources helped contribute to a 1974 leftist military coup (know as the Carnation Revolution), which was followed by several years of instability under the hurried nationalization policies of the Movement of the Armed Forces (MFA). However, independence of all Portuguese colonies and withdrawal of Portuguese forces was set in place. In 1976, elections and industrial privatization restored economic stability, and accession to the EEC in 1986 and adoption of the Euro in 2002 spurred growth in output. However, Portugal faces strong economic headwinds due to high unemployment and public debt.

Portugal's Ecological Footprint per capita mirrors its economic and political changes well: under authoritarian rule it grew slowly, predominanly as a result of the commencement of use of fossil fuels and constrained

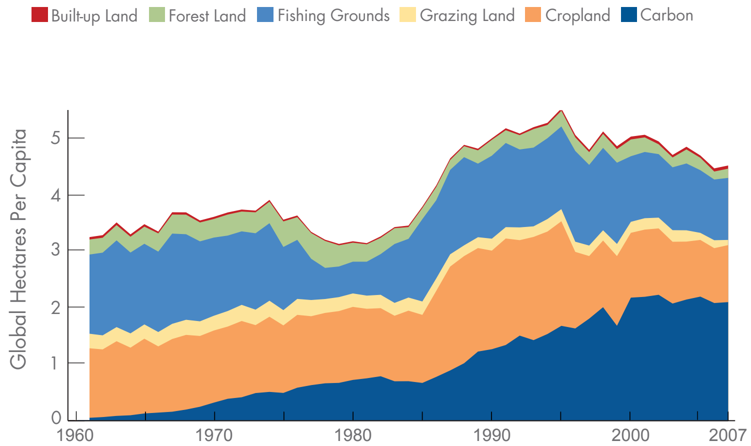


Figure PRT-1: Ecological Footprint per capita in Portugal by component, 1961-2007

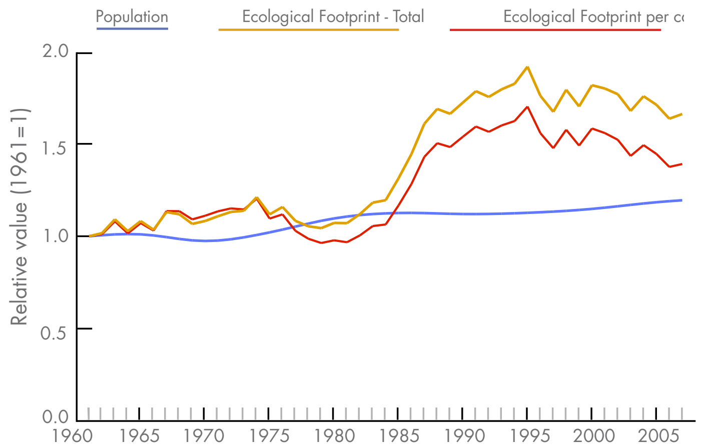


Figure PRT-2: Contributing drivers of Portugal's Ecological Footprint, 1961-2007

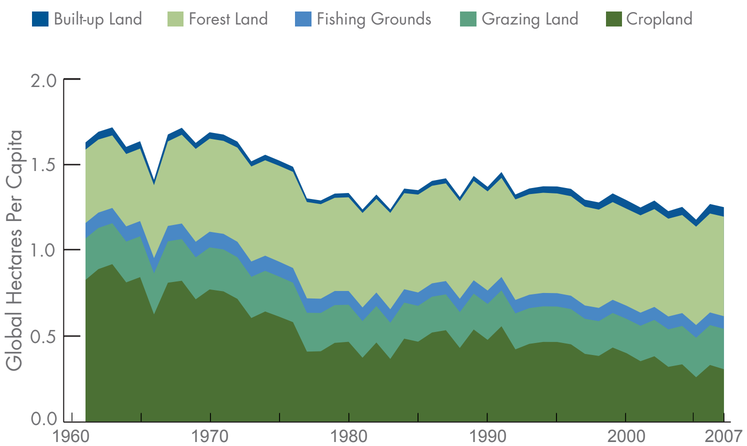


Figure PRT-3: Biocapacity per capita in Portugal by component 1961-2007

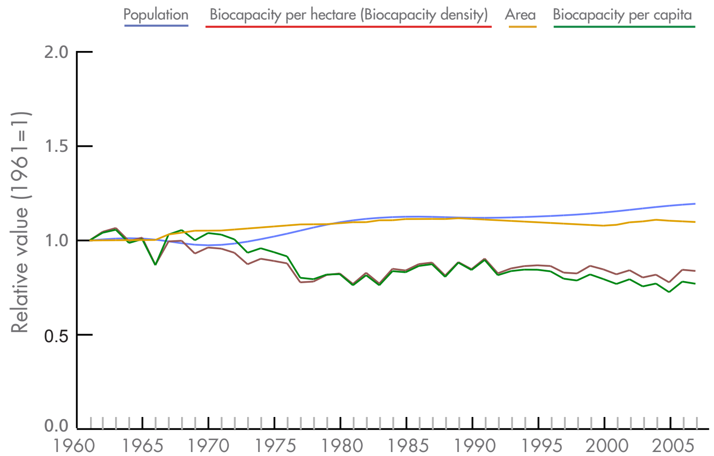
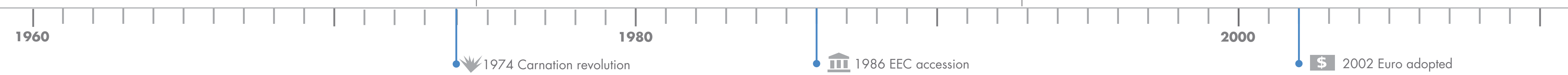


Figure PRT-4: Contributing drivers of Portugal's biocapacity, 1961-2007



by the large military expenditures. The 1974 coup and subsequent economic collapse led to a decrease in Ecological Footprint per capita until growth, rapid at first, resumed in the early 1980s. Since the late 1990s, the Ecological Footprint per capita has been declining slightly.

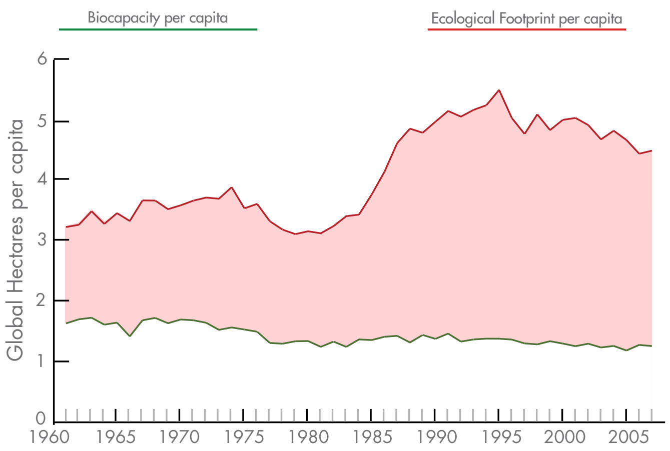


Figure PRT-5: Portugal's per capita biocapacity deficit, 1961-2007

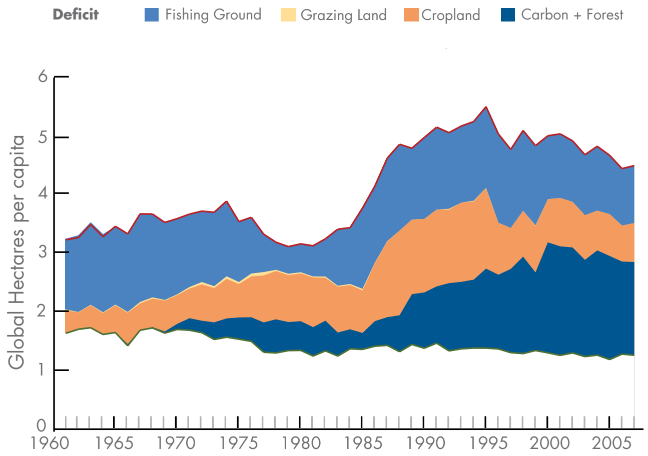


Figure PRT-6: Portugal's per capita biocapacity deficit by contributing land-use type, 1961-2007

Total biocapacity has not changed much, a decrease in biocapacity per hectare offsetting an increase in total productive land area. Population growth has fluctuated but has not been extreme. This has led to a slow decline in per capita availabilty of biocapacity.

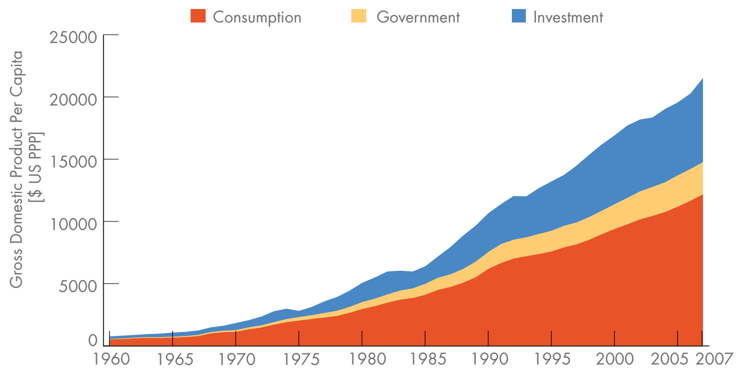


Figure PRT-7: Portugal's GDP by component, 1961-2007

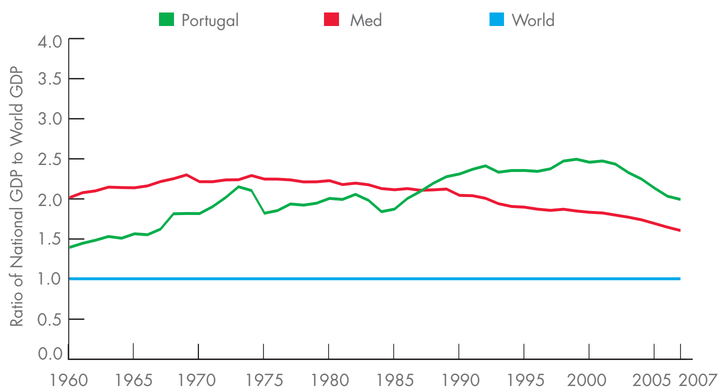


Figure PRT-8: Comparison of ratio of world GDP to Portugal and the Mediterranean region, 1961-2007

As a result of the run-up in Ecological Footprint from the 1980s, Portugal's biocapacity deficit jumped from about 2.0 global hectares per capita pre-1974 and 1.5 during the economic crisis to about 4.0 global hectares per capita. Unlike other countries in the region, fish consumption plays a large part in Portugal's deficit, indicating that Portugal may be placing significant pressure on its fishing grounds. Cropland resource imports and demand for global sequestration of carbon dioxide are also factors that may pose risks to Portuguese society.

It appears that Portugal will maintain slow population growth in the short-term due to an expanding working-age cohort, which will enhance exposure to resource constraints. Furthermore, a large portion of the increase in Portuguese output has been a result of investment expenditure, suggesting that there may be infrastructure constraints to modification of Portugal's Ecological Footprint trajectory.

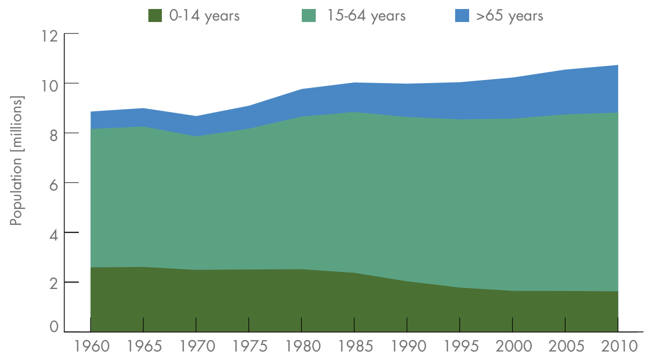
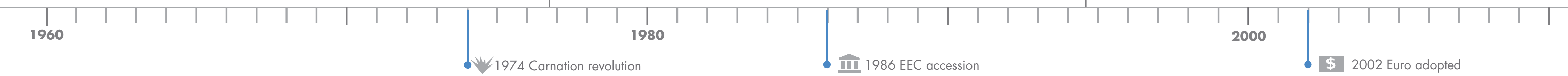


Figure PRT-9: Portugal's population by age group, 1961-2010



SLOVENIA

Slovenia was the most prosperous republic within the Socialist Republic of Yugoslavia probably due to the relative autonomy it received from the government (this probably also explains why its

Ecological Footprint in 1992 is so much larger than that of the other post-Yugoslav nations). During the 1980s as the influence of Communism was waning and in response to separatist movements in Serbia, Croatia and Bosnia, Slovenia also developed a nationalist movement. In 1989 the Yugoslav government adopted an amendment to its constitution that allowed Slovenia the right to secede. In 1990, a popular referendum voted in favor of independence. A brief conflict with the Serbian military occurred in 1991, however Slovenia escaped the violence that enveloped the other Balkan nations for much of the 1990s. Slovenia instituted a stable multi-party democracy and has pursued a political-economic agenda aimed at aligning itself with Western Europe.

Slovenia successfully privatized many industries after its independence, without much instability. Slovenia joined both NATO and the EU (and adopted the Euro) in 2004 and has the highest per capita GDP of any Central European country.

Slovenia's prosperity prior to independence accounts for its high Ecological Footprint per capita in 1992 relative to other Balkan nations. Continued growth illustrates Slovenia's stability and increased economic output through to 2007. Slovenia's population has grown only slowly

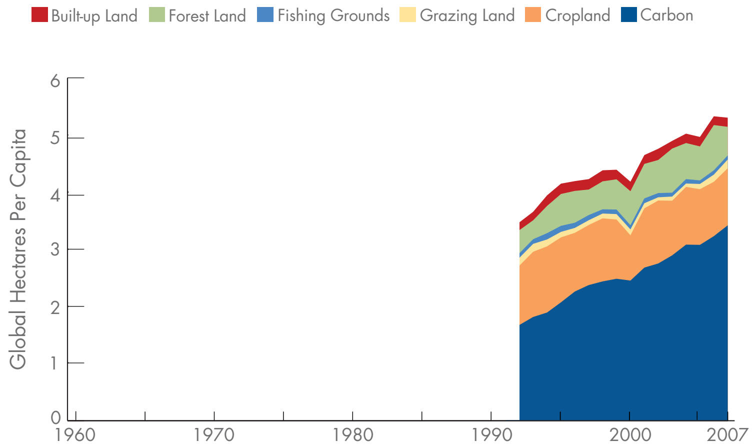


Figure SVN-1: Ecological Footprint per capita in Slovenia by component, 1961-2007

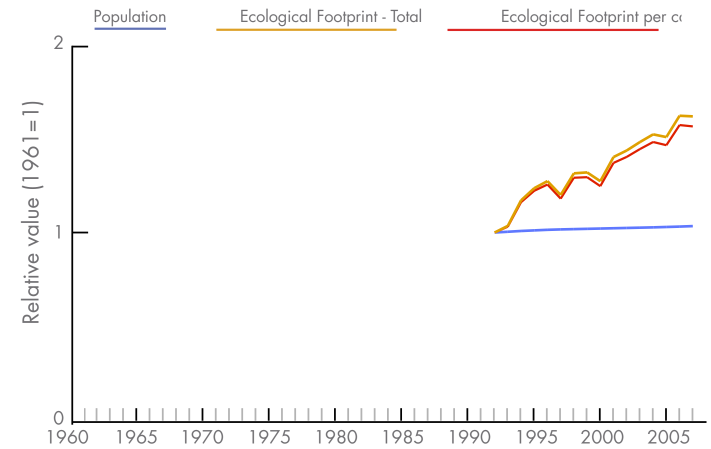


Figure SVN-2: Contributing drivers of Slovenia's Ecological Footprint, 1961-2007

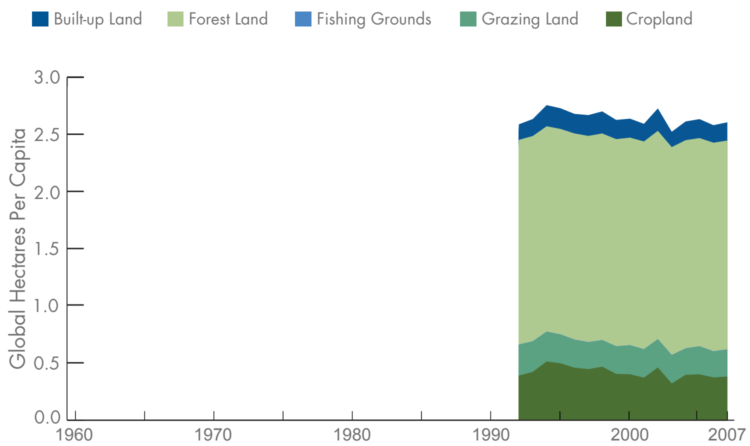


Figure SVN-3: Biocapacity per capita in Slovenia by component 1961-2007

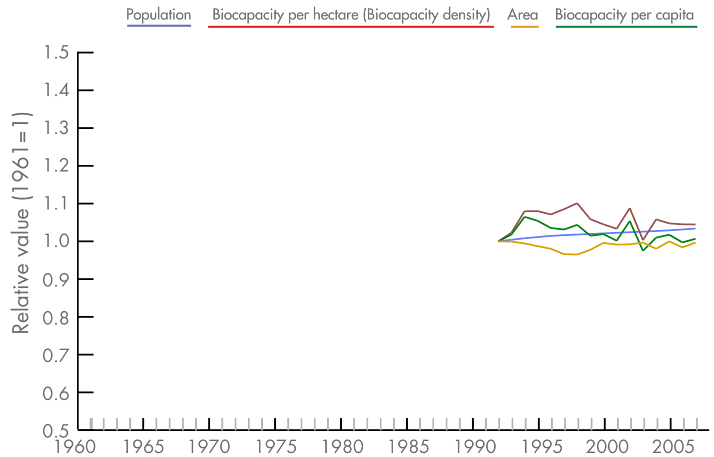


Figure SVN-4: Contributing drivers of Slovenia's biocapacity, 1961-2007

since independence and has not contributed significantly to the increase in the total Ecological Footprint. Similarly, Slovenia's total and per capita biocapacity have not changed much since independence.

Slovenia's prosperity and growth in Ecological Footprint have been responsible for increasing the biocapacity deficit from under 1.0 global hectare per capita in 1992 to about 2.5 global hectares per capita in 2007. Demand for cropland resources above what it can supply domestically have remained a significant part of the deficit, while demand for carbon dioxide sequestration and forest resources above what it can supply domestically has grown dramatically.

Slovenia's youth population continues to decrease, and recent population expansion is almost entirely due to an increase in the 65-plus age group. This suggests that Slovenia's population will soon plateau and start decreasing, partly reducing pressure on the biocapacity deficit and exposure to resource constrains.

Slovenia's increased economic output has largely been due to extremely rapid growth in investment, which contributed nearly 40 percent of output in 2007. This suggests that current infrastructure investment may constrain Slovenia's Ecological Footprint trajectory over the coming years.

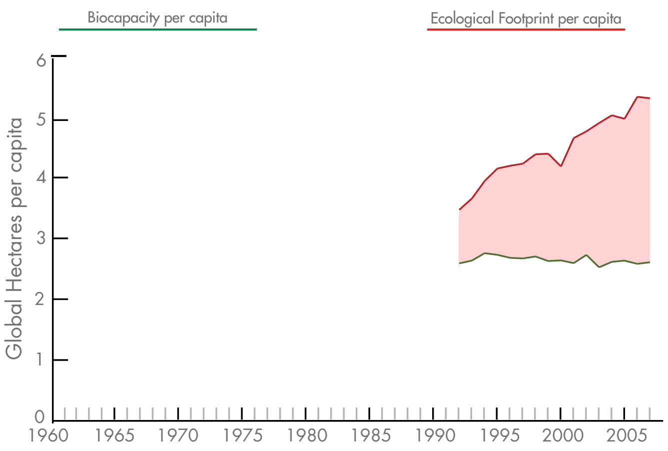


Figure SVN-5: Slovenia's per capita biocapacity deficit, 1961-2007

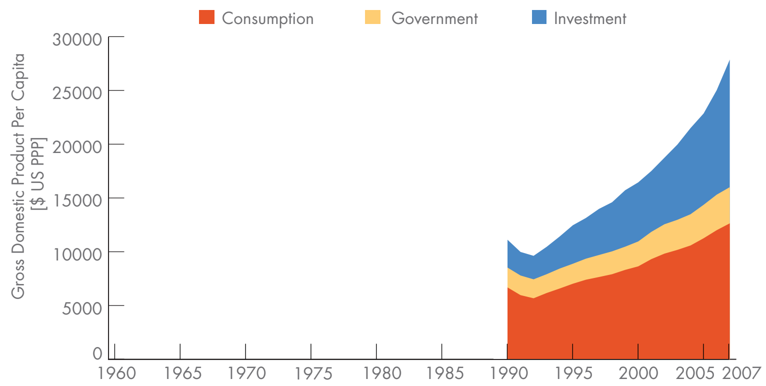


Figure SVN-7: Slovenia's GDP by component, 1961-2007

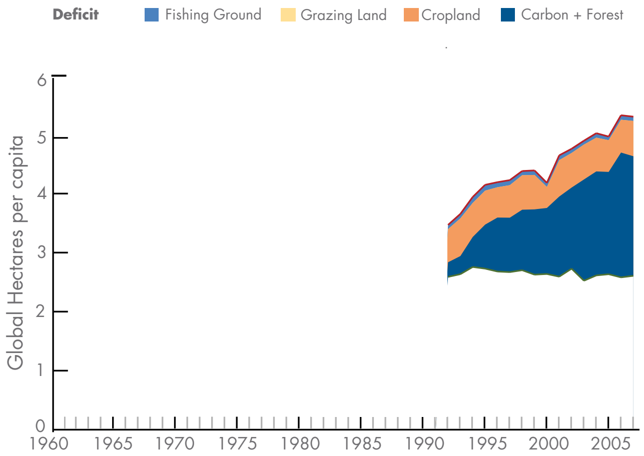


Figure SVN-6: Slovenia's per capita biocapacity deficit by contributing land-use type, 1961-2007

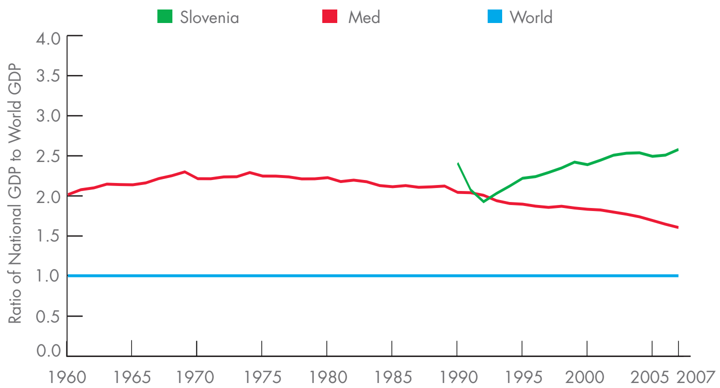


Figure SVN-8: Comparison of ratio of world GDP to Slovenia and the Mediterranean region, 1961-2007

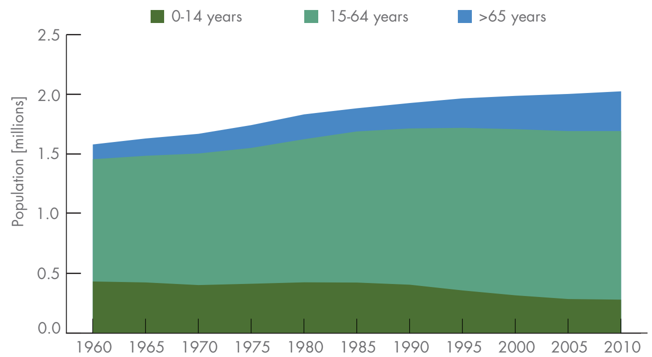
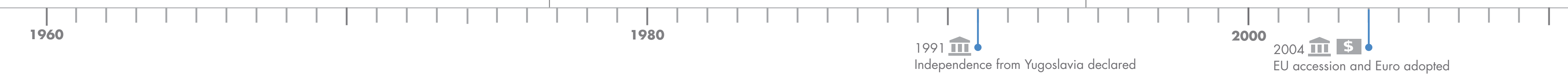


Figure SVN-9: Slovenia's population by age group, 1961-2010



SPAIN

Spain's Civil War from 1936 to1939 left General Francisco Franco in power until 1975, after his successful defeat of the Republican government. After remaining largely closed to international

community and trade, Spain began opening up in the late 1950s and adopted economic reforms (pushed for by the International Monetary Fund) that called for state investment in infrastructure development. This incited a period of economic growth from 1959-1973. The OPEC-induced oil crisis in 1973 coincided with a steady decline in Franco's health, and after Franco's death in 1975, power passed to the King of Spain. In 1978 Spain was officially reconstituted as a democracy under the Constitution of 1978. The transition to democracy was characterized by turbulence and instability, including the dissolution of Parliament in 1982. The Spanish Socialist Workers Party won the election of 1982, which ushered in a long period of political stability. Spain joined the EEC in 1986 and implemented significant economic reforms, which promoted economic growth over the next two decades.

Spain's Ecological Footprint per capita grew at a steady rate between 1961 and 2000, interrupted only during the economic instability in the 1980s prior to joining the EEC. In the 2000s, Spain's growth in the Ecological Footprint was less. Credit-fueled infrastructure investment

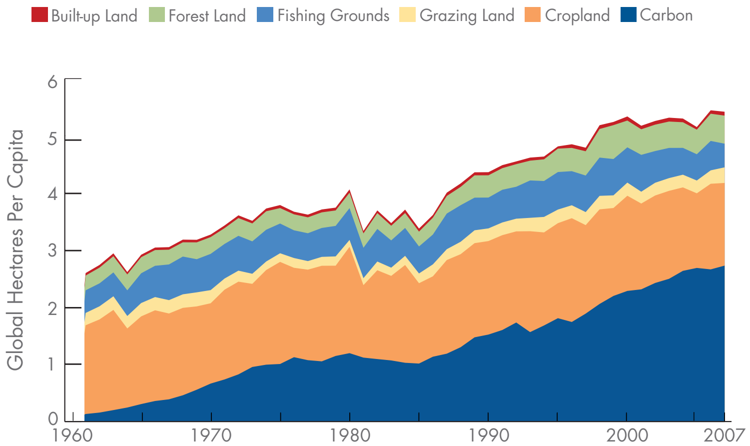


Figure ESP-1: Ecological Footprint per capita in Spain by component, 1961-2007

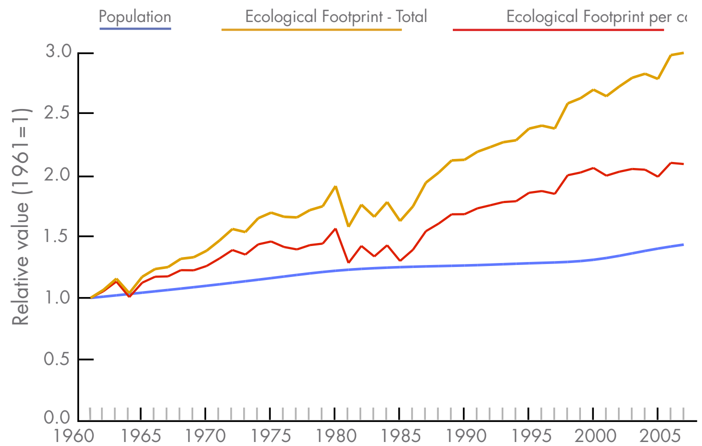


Figure ESP-2: Contributing drivers of Spain's Ecological Footprint, 1961-2007

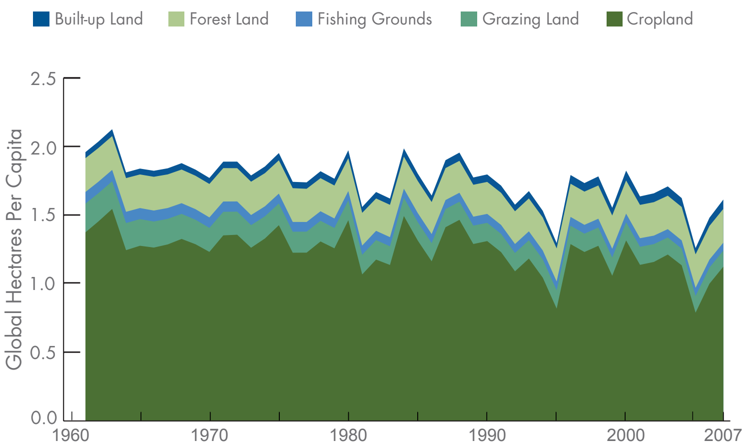


Figure ESP-3: Biocapacity per capita in Spain by component, 1961-2007

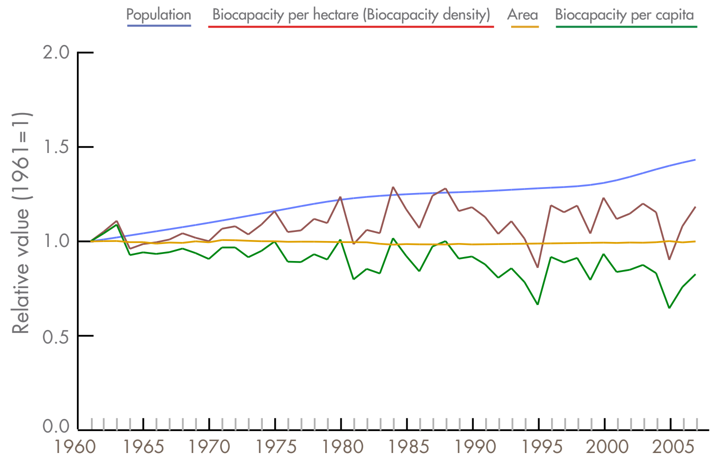
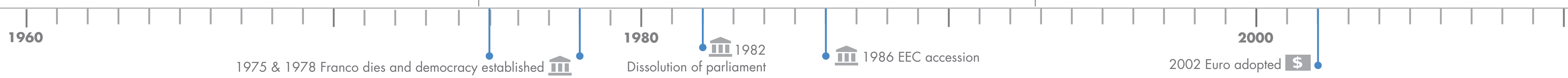


Figure ESP-4: Contributing drivers of Spain's biocapacity, 1961-2007



was driving economic growth rather than underlying consumption. Population growth leveled off between 1980 and 2000, but has since begun to increase again, exacerbating increases in the per capita Ecological Footprint.

Spain's total biocapacity has increased slightly over the period as a result of increased biocapacity per hectare. However, population growth has offset this and led to a slow decline in per capita availability of biocapacity.

Consequently, Spain's biocapacity deficit has grown steadily – from well under 1.0 global hectare per capita in 1961 to about 3.5 global hectares per capita in 2007. This deficit is comprised predominantly of demand for global forest sequestration of carbon dioxide emissions, though dependency on cropland imports and possible over-harvesting of fish stocks also play a role.

Spain's youth population has increased slightly since 2000, and this will likely lead to slight total population growth over the coming decade. As with Portugal, however, the huge increase in investment's contribution to GDP suggests that Spain's Ecological Footprint trajectory might be somewhat locked in and will be difficult to change.

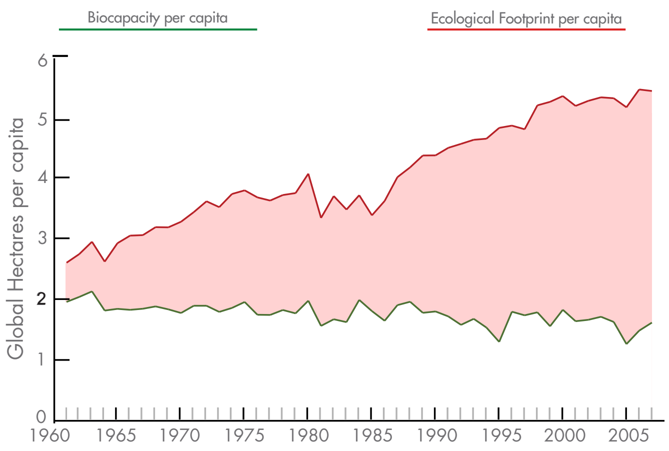


Figure ESP-5: Spain's per capita biocapacity deficit, 1961-2007

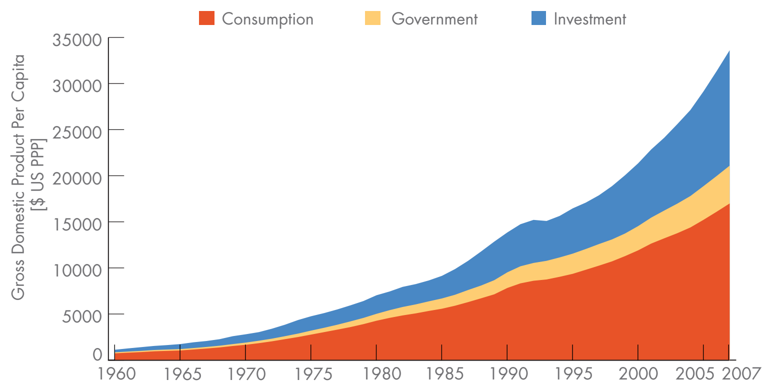


Figure ESP-7: Spain's GDP by component, 1961-2007

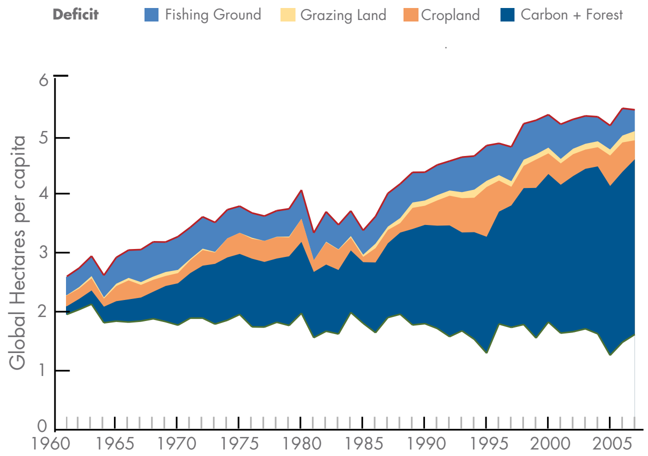


Figure ESP-6: Spain's per capita biocapacity deficit by contributing land-use type, 1961-2007

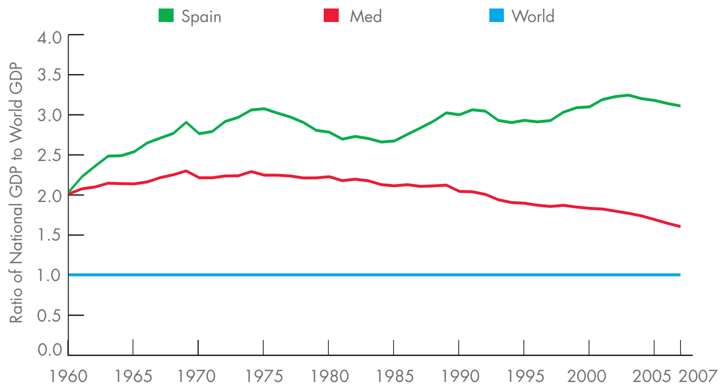


Figure ESP-8: Comparison of ratio of world GDP to Spain and the Mediterranean region, 1961-2007

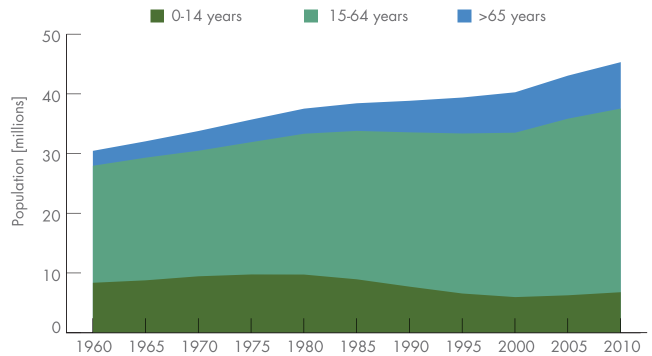
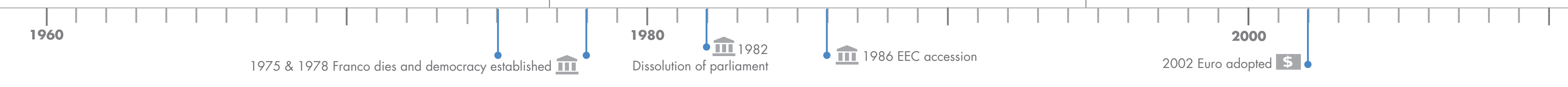


Figure ESP-9: Spain's population by age group, 1961-2010



SYRIAN ARAB REPUBLIC

Syria obtained independence from France in 1946, though Syrian politics remained in a state of upheaval, characterized by repeated coups (1949, 1951, 1954, 1961, 1963, 1966). The

succession of coups ended in 1970, when a bloodless coup established a Ba'ath (secular Arab Socialist Resurrection Party) dominated republic. Syria was involved in the Six Day War (1967) against Israel, which resulted in the occupation of the Golan Heights by Israel and a large influx of Palestinian refugees. In 1990, Syria's role in the US-led Gulf War was the starting point of better relations with the West. Syria's economy is entirely dependent on agriculture and oil production, which account for about half of its GDP, making the economy extremely vulnerable to declining oil production. A key concern is that the Syrian economy is not able to grow at a pace that will keep up with population growth, resulting in lower wages and higher unemployment. In 2004, the US president imposed economic sanctions against Syria for a supposed role in the destabilization of Lebanon and Iraq.

Syria's Ecological Footprint per capita grew between 1970 and 1981, as a result of the increased stability following the establishment of the Ba'ath party's rule. Since population grew four-fold between 1961 and 2007, the total Ecological Footprint has also increased rapidly.

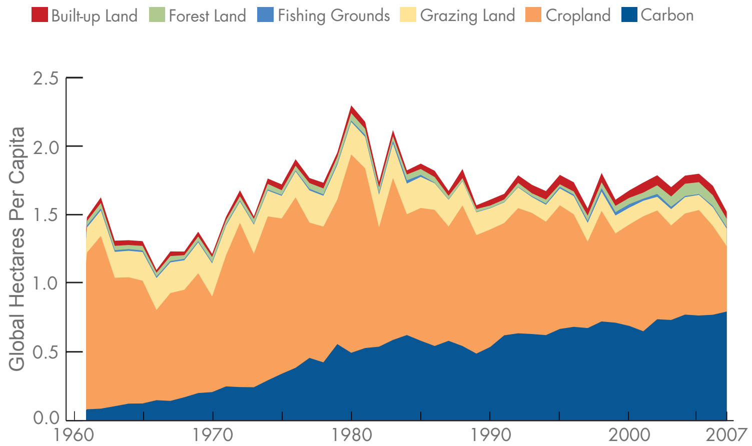


Figure SYR-1: Ecological Footprint per capita in Syria by component, 1961-2007

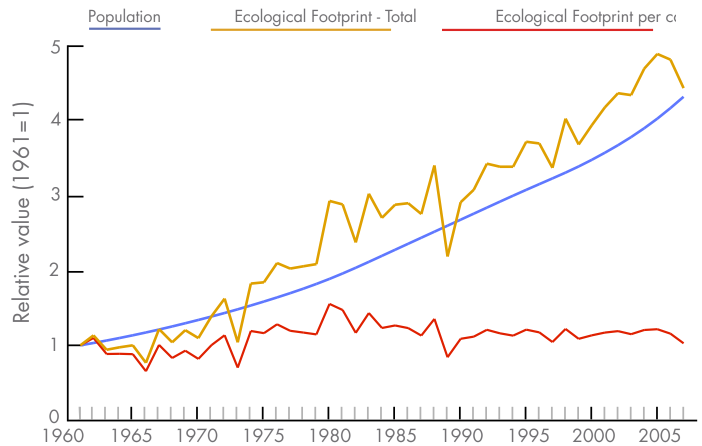


Figure SYR-2: Contributing drivers of Syria's Ecological Footprint, 1961-2007

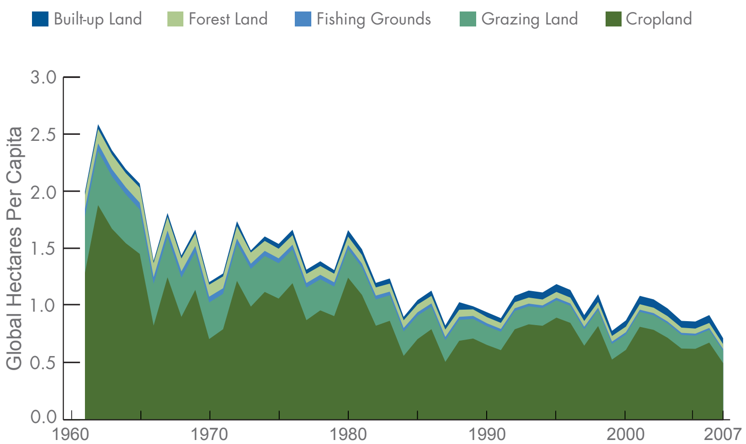


Figure SYR-3: Biocapacity per capita in Syria by component, 1961-2007

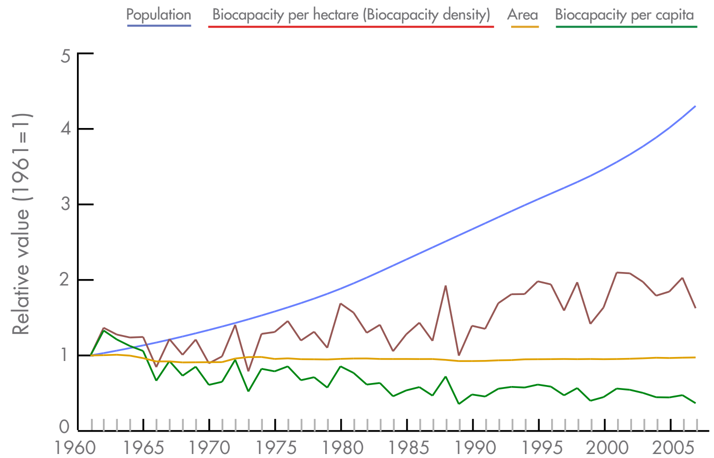


Figure SYR-4: Contributing drivers of Syria's biocapacity, 1961-2007

Syria's productive land area has decreased slightly over the period examined, partly due to the loss of the Golan Heights. However, this was more than offset by increases in the biocapacity per hectare. Total biocapacity, therefore, increased over ther period.

Primarily as a consequence of increased population, Syria moved from a situation of significant biocapacity surplus to a biocapacity deficit of just under 1.0 global hectare per capita by 2007 – almost the entire deficit is related to the demand for global forest services for carbon dioxide sequestration.

Syria continues to see its population increase rapidly, and the growing youth population will ensure that this continues into the future, while the small elderly population suggests that there is additional potential for population growth if life expectancy is increased.

The US economic sanctions in 2004 did not seem to impact the economic output as of 2007. Investment expenditure is relatively low, suggesting that with appropariately directed infrastructure building, Syria could mitigate its future ecological pressure.

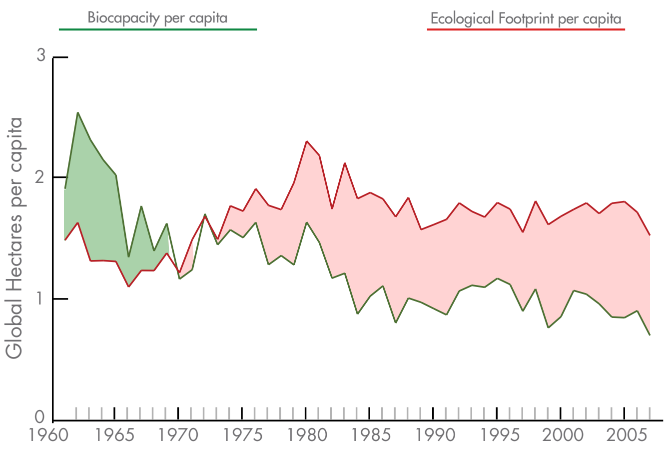


Figure SYR-5: Syria's per capita biocapacity deficit, 1961-2007

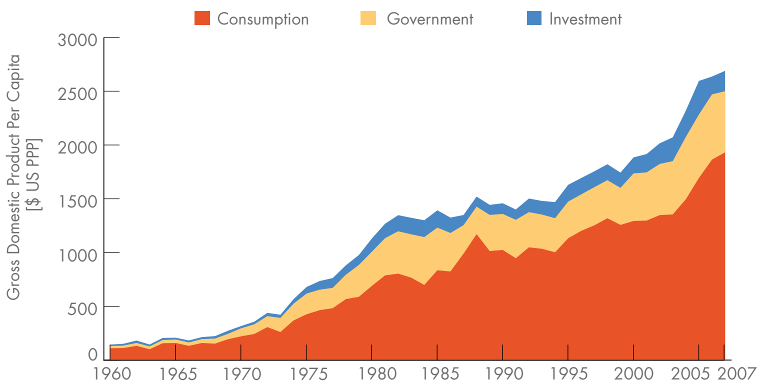


Figure SYR-7: Syria's GDP by component, 1961-2007

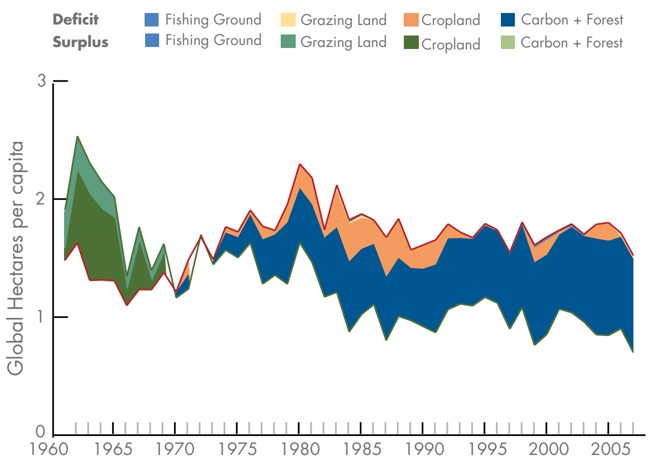


Figure SYR-6: Syria's per capita biocapacity deficit by contributing land-use type, 1961-2007

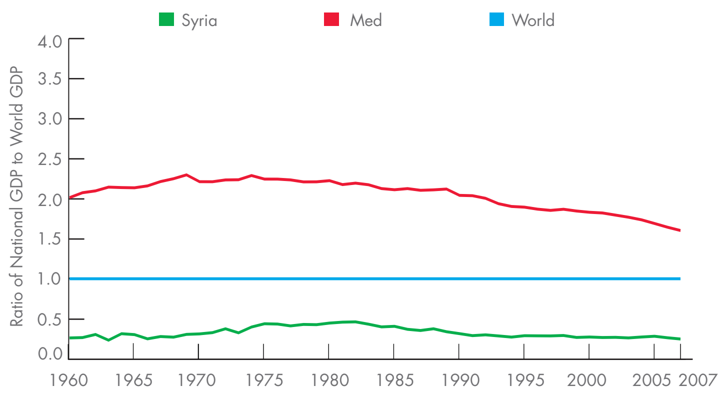


Figure SYR-8: Comparison of ratio of world GDP to Syria and the Mediterranean region, 1961-2007

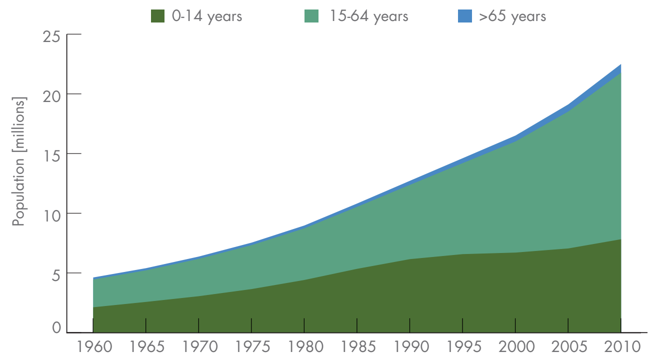
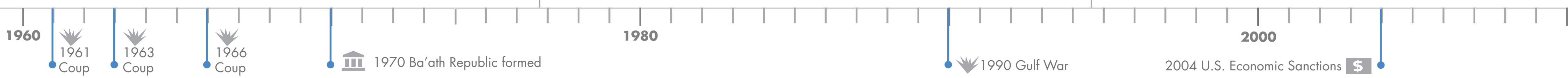


Figure SYR-9: Syria's population by age group, 1961-2010



TUNISIA

Tunisia gained independence from France in 1956 and adopted a constitution in 1959. An economic and social development plan was immediately enacted that laid the foundation

for a relatively well-educated population, low population growth, extensive women's rights and low poverty rate compared to other Arab nations. Limited oil reserves were discovered in the 1970s; Tunisia remains a net oil importer. In the 1980s, Tunisia's extensive social spending and a recession in its major export partners began to weigh on the economy, and austerity measures proposed by the IMF were adopted. Tunisia has since maintained healthy economic growth, based on a diverse economy with light industry, agriculture, mining and tourism comprising the most important sectors. Tunisia was a founding member of the WTO, joining in 1995, and maintains close ties with both the West (specifically EU) and Arab nations.

The recent popular uprising is creating much uncertainty on future development paths, but if democratization and civil participation get rooted, this increases the possibility of public participation in Ecological Footprint reduction strategies.

Tunisia, in keeping with its relatively stable socio-economic condition, has seen a slowly increasing Ecological Footprint per capita since the 1960s. Due to population growth, this increase has been multiplied into a three-fold

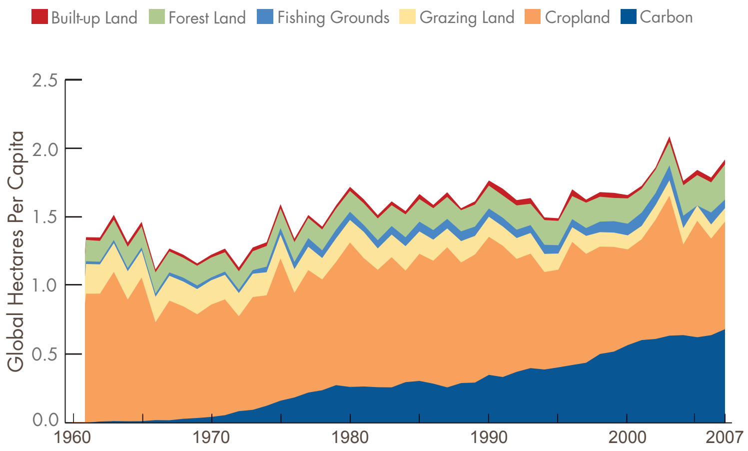


Figure TUN-1: Ecological Footprint per capita in Tunisia by component, 1961-2007

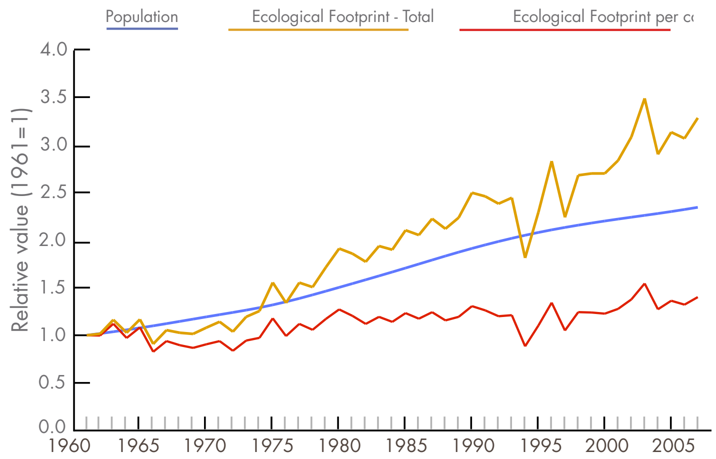


Figure TUN-2: Contributing drivers of Tunisia's Ecological Footprint, 1961-2007

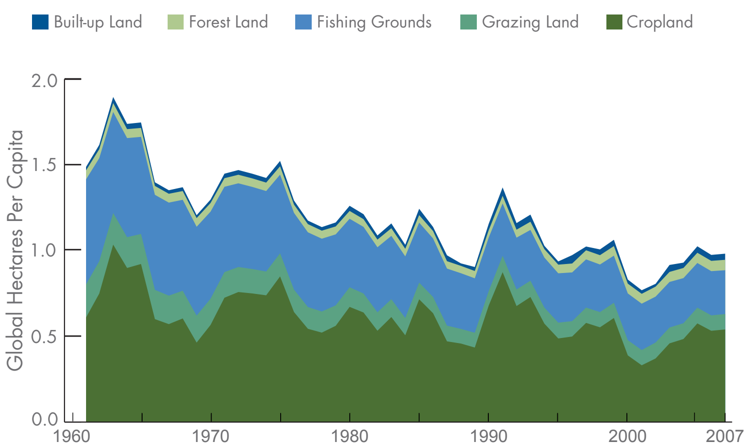


Figure TUN-3: Biocapacity per capita in Tunisia by component 1961-2007

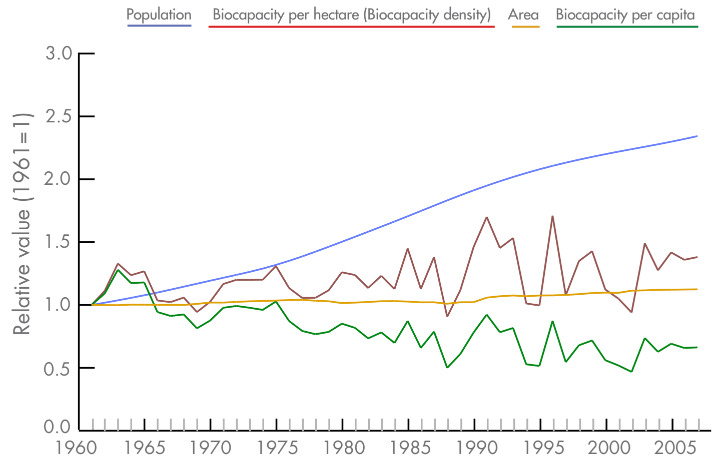
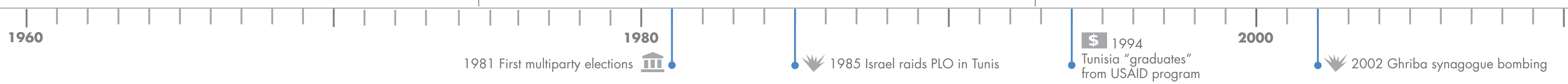


Figure TUN-4: Contributing drivers of Tunisia's biocapacity, 1961-2007



increase in the total Ecological Footprint.

Tunisia has seen a slight increase in its available productive land area, and a fluctuating, though relatively level biocapacity per hectare, leading to a slightly increasing total biocapacity. Population growth, however, has been much more significant and has decreased the available biocapacity per capita by around 30 percent.

Tunisia was able to maintain a biocapacity surplus until the mid-1970s, since then it has increased its biocapacity deficit to around 1.0 global hectare per capita. This deficit comes largely in the form of a demand for global forest resources, primarily for the sequestration of carbon, but also in the import of cropland resources.

Since the 1990s, Tunisia has seen a rapidly declining youth population, suggesting that total population growth will start to plateau in the coming decades, even while the life expectancy continues to increase. This may reduce Tunisia's pressure on its domestic environment and dependency on imports and allow alternative development strategies to proceed.

Tunisia's economic output per person has increased steadily, almost exactly in line with the world average ouptut. Investment, while not negligible, suggests that existing infrastructure may not be so developed that it constrains future ecological trajectories.

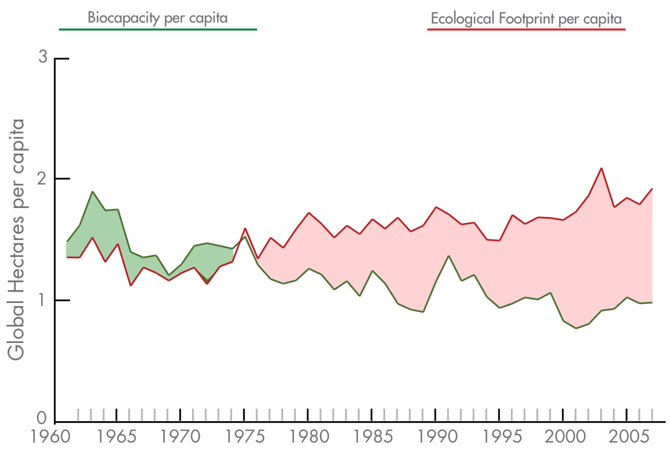


Figure TUN-5: Tunisia's per capita biocapacity deficit, 1961-2007

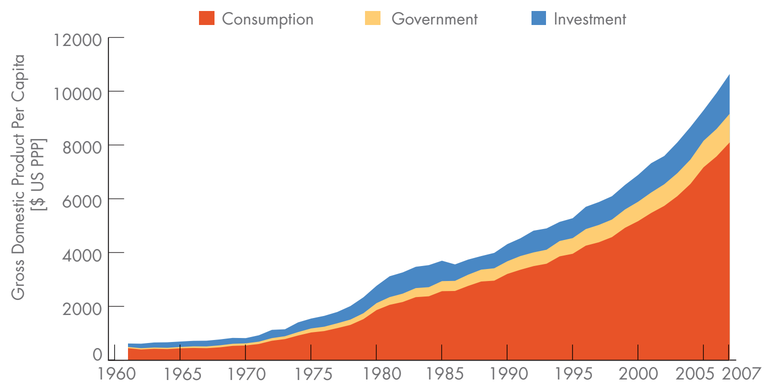


Figure TUN-7: Tunisia's GDP by component, 1961-2007

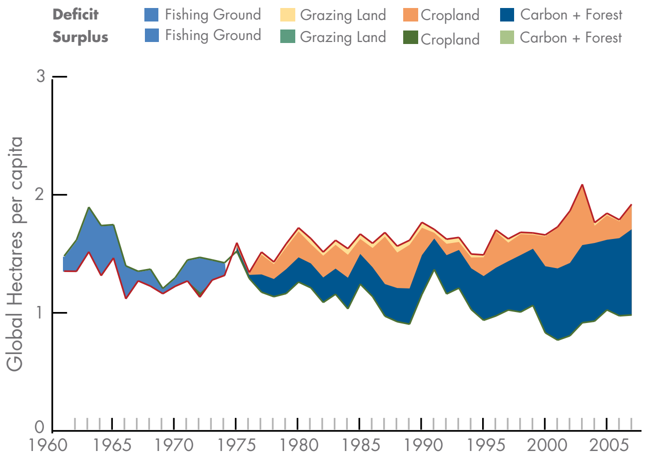


Figure TUN-6: Tunisia's per capita biocapacity deficit by contributing land-use type, 1961-2007

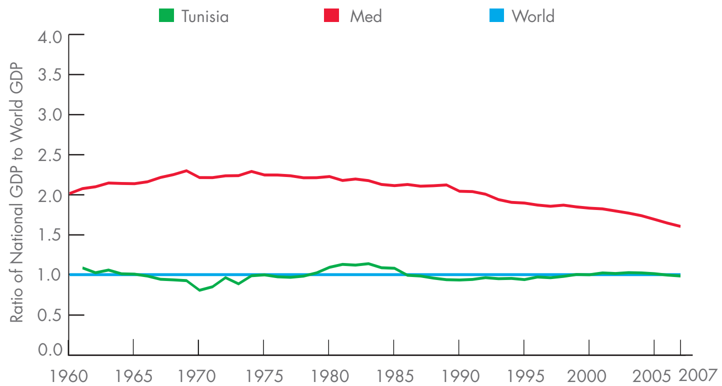


Figure TUN-8: Comparison of ratio of world GDP to Tunisia and the Mediterranean region, 1961-2007

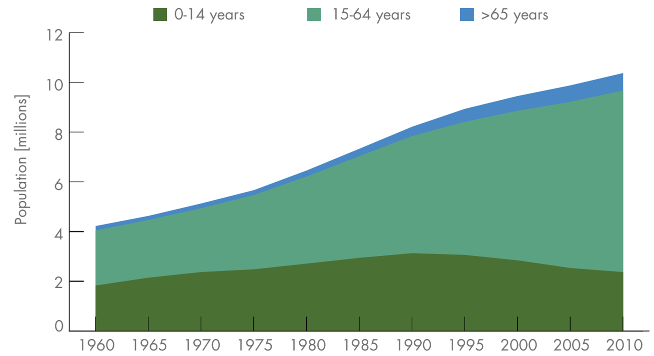
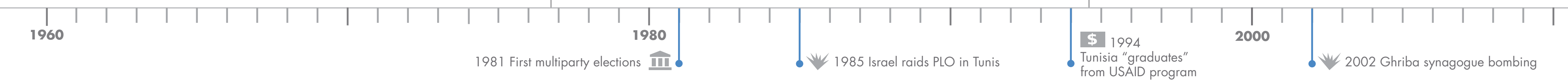


Figure TUN-9: Tunisia's population by age group, 1961-2010



TURKEY

The Republic of Turkey was founded in 1923 after the First World War. From 1960 onwards, a period of political instability ensued, characterized by repeated coups. Turkey adopted a constitution in

1982 that proclaims Turkey a secular, democratic state, and internal politics have been stable since its adoption. An Associate Member of the EEC since 1963, Turkey applied for full EU membership in 1987, wherefore many of its policies are centred on a harmonization with EU standards. Turkey's transition from a largely state-dominated economy to a more liberalized one triggered economic growth. In the 1990s, Turkey's political and economic system was plagued by weak coalition governments, whose cyclical nature and poor economic policies resulted in a banking crisis and recession in 2001, leading to the successful adoption of IMF and World Bank recommended structural adjustments.

Turkey's Ecological Footprint per capita has remained almost level from 1961 to 2007, suggesting remarkable stability in consumption of natural resources. Population growth of around 150 percent has led to a similar increase in the total Ecological Footprint.

Total biocapacity, likewise, has remained remarkably stable. Losses of productive land have been minimal and the biocapacity per hectare has also remained fixed.

Population growth has, therefore, been the sole driver

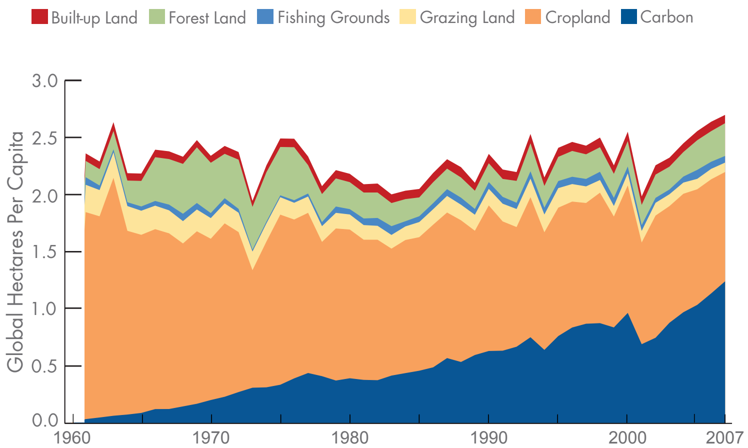


Figure TUR-1: Ecological Footprint per capita in Turkey by component, 1961-2007

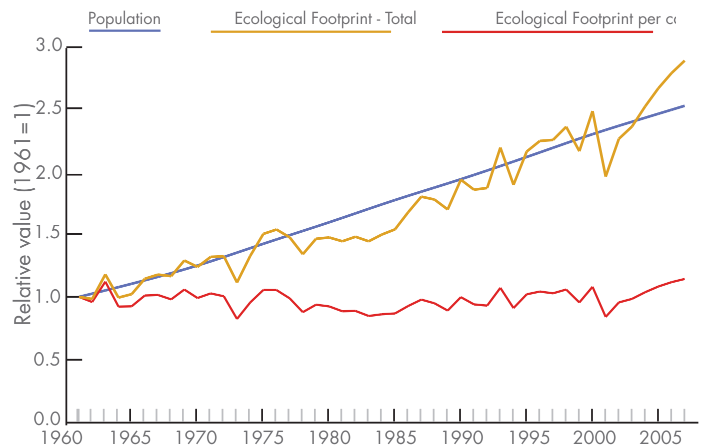


Figure TUR-2: Contributing drivers of Turkey's Ecological Footprint, 1961-2007

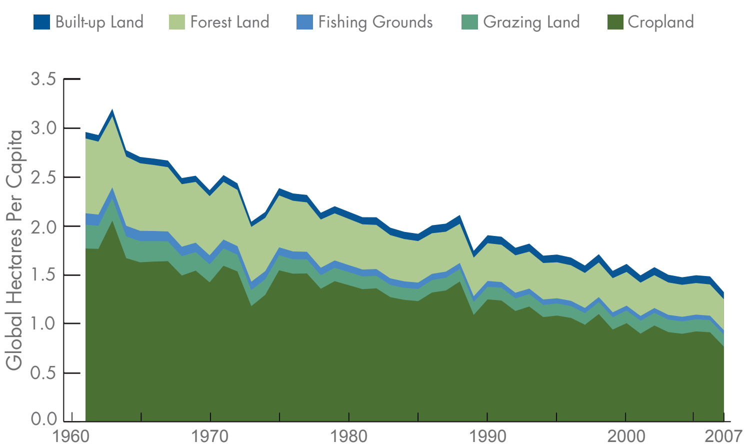


Figure TUR-3: Biocapacity per capita in Turkey by component 1961-2007

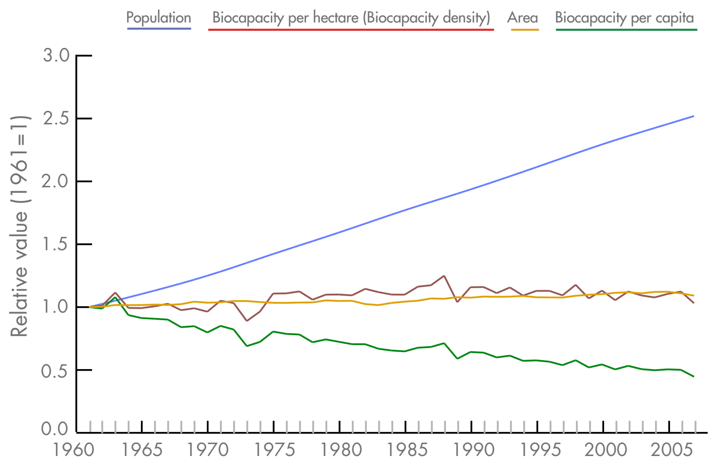
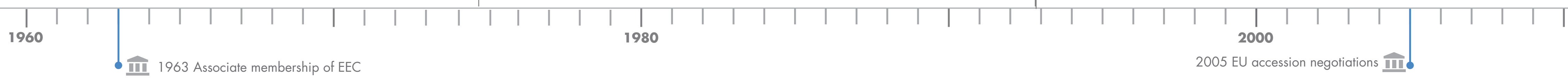


Figure TUR-4: Contributing drivers of Turkey's biocapacity, 1961-2007



in moving Turkey from a position of biocapacity surplus to one of biocapacity deficit. This deficit has come almost entirely in the form of demand for global forest sequestration of carbon dioxide. Turkey can meet its domestic requirements in almost all resources from other land-use types.

Turkey has started to see a decline in its youth population, even while the total population continues to expand quite rapidly. The coming decades will see a slowing of Turkey's population growth rate.

Investment constitutes a large piece of Turkey's growing output, and this suggests that infrastructure may have been put in place that constrains Turkey's ecological trajectories. Included in this infrastructure development are projects in public transport, which are likely to help maintain a low Ecological Footprint per capita into the future.

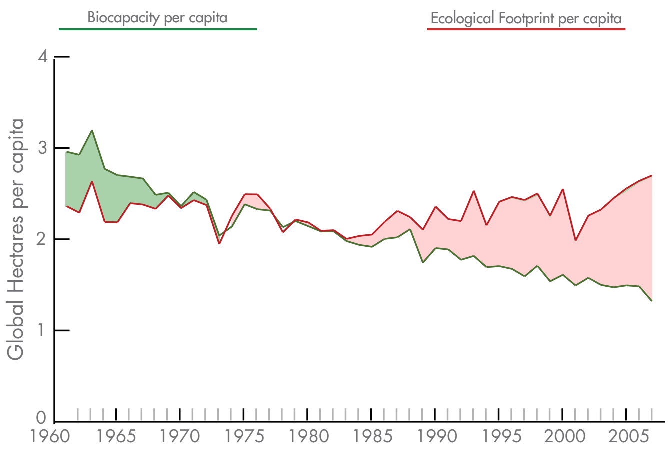


Figure TUR-5: Turkey's per capita biocapacity deficit, 1961-2007

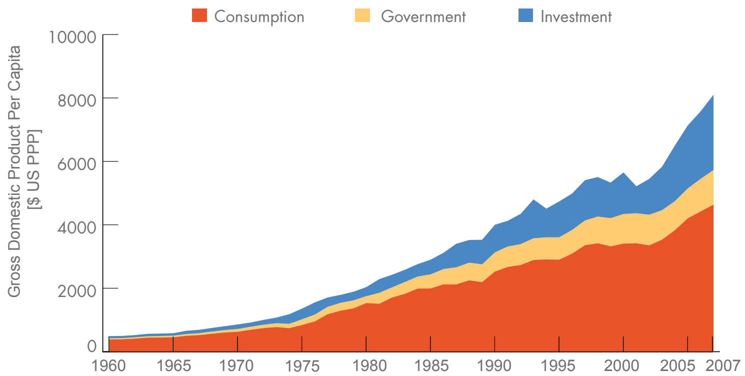


Figure TUR-7: Turkey's GDP by component, 1961-2007

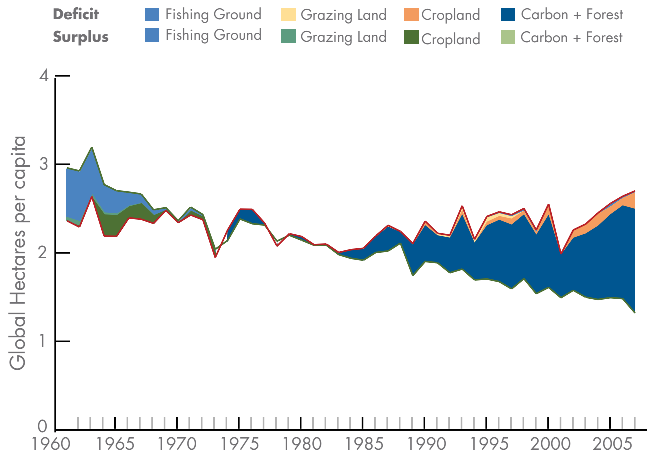


Figure TUR-6: Turkey's per capita biocapacity deficit by contributing land-use type, 1961-2007

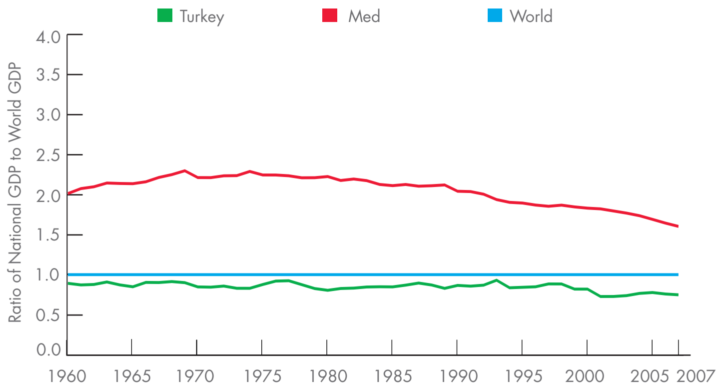


Figure TUR-8: Comparison of ratio of world GDP to Turkey and the Mediterranean region, 1961-2007

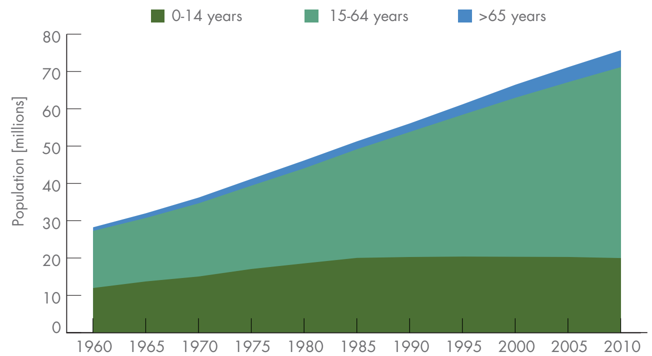
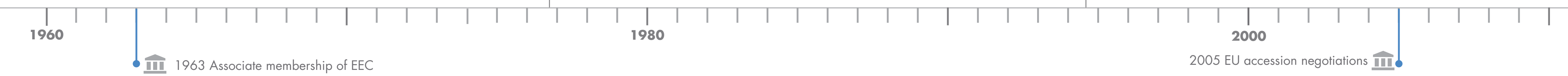


Figure TUR-9: Turkey's population by age group, 1961-2010



APPENDIX A: CALCULATING THE ECOLOGICAL FOOTPRINT

The National Footprint Accounts track countries' use of ecological services and resources as well as the biocapacity available in each country. As with any resource accounts, they are static, quantitative descriptions of outcomes, for any given year in the past for which data exist. The detailed calculation methodology of the most updated Accounts are described in Calculation Methodology for the National Footprint Accounts, 2010 Edition (Ewing et al. 2010). The implementation of the National Footprint Accounts through database-supported templates is described in the Guidebook to the National Footprint Accounts 2010 (Kitzes et al. 2010).

The National Footprint Accounts, 2010 Edition calculate the Ecological Footprint and biocapacity for 240 countries, territories, and regions, from 1961 to 2007. Of these 240 countries, territories, and regions, 153 were covered consistently by the UN statistical system and other source datasets.

ECOLOGICAL FOOTPRINT

The National Footprint Accounts, 2010 Edition track human demand for ecological services in terms of six major land use types (cropland, grazing land, forest land, carbon Footprint, fishing grounds, and built-up land). With the exception of built-up land and forest for carbon dioxide uptake, the Ecological Footprint of each major land use type is calculated by summing the contributions of a variety of specific products. Built-up land reflects the bioproductivity compromised by infrastructure and hydropower. Forest land for carbon dioxide uptake represents the carbon absorptive capacity of a world average hectare of forest needed to absorb human induced carbon dioxide emissions, after having considered the ocean sequestration capacity.

The Ecological Footprint calculates the combined demand for ecological resources wherever they are located and presents them as the global average area needed to support a specific human activity. This quantity is expressed in units of global hectares, defined as hectares of bioproductive area with world average bioproductivity. By expressing all results in a common unit, biocapacity and Footprints can be directly compared across land use types and countries.

Demand for resource production and waste assimilation are translated into global hectares by dividing the total amount of a resource consumed by the yield per hectare, or dividing the waste emitted by the absorptive capacity per hectare. Yields are calculated based on various international statistics, primarily those from the United Nations Food and Agriculture Organization (FAO ResourceSTAT Statistical Databases). Yields are mutually exclusive: If two crops are grown at the same time on the same hectare, one portion of the hectare is assigned to one crop, and the remainder to the other. This avoids double counting. This follows the same logic as measuring the size of a farm: Each hectare is only counted once, even though it might provide multiple services.

The Ecological Footprint, in its most basic form, is calculated by the following equation:

$$EF = \frac{D_{ANNUAL}}{Y_{ANNUAL}}$$

where D is the annual demand of a product and Y is the annual yield of the same product (Monfreda et al., 2004; Galli et al., 2007). Yield is expressed in global hectares. In practice, global hectares are estimated with the help of two factors: the yield factors (that compare national average yield per hectare to world average yield in the same land category) and the equivalence factors (which capture the relative productivity among the various land and sea area types).

Therefore, the formula of the Ecological Footprint becomes:

$$EF = \frac{P}{Y_N} \cdot YF \cdot EQF$$

where P is the amount of a product harvested or waste emitted (equal to D_{ANNUAL} above), Y_N is the national average yield for P, and YF and EQF are the yield factor and equivalence factor, respectively, for the country and land use type in question. The yield factor is the ratio of national-to world-average yields. It is calculated as the annual availability of usable products and varies by country and year. Equivalence factors translate the area supplied or demanded of a specific land use type (e.g. world average cropland, grazing land, etc.) into units of world average biologically productive area: global hectares and varies by land use type and year.

Annual demand for manufactured or derivative products (e.g. flour or wood pulp), is converted into primary product equivalents (e.g. wheat or roundwood) through the use of extraction rates. These quantities of primary product equivalents are then translated into an Ecological Footprint. The Ecological Footprint also embodies the energy required for the manufacturing process.

CONSUMPTION, PRODUCTION, AND TRADE

The National Footprint Accounts calculate the Footprint of a population from a number of perspectives. Most commonly reported is the Ecological Footprint of consumption of a population, typically just called Ecological Footprint. The Ecological Footprint of consumption for a given country measures the biocapacity demanded by the final consumption of all the residents of the country. This includes their household consumption as well as their collective consumption, such as schools, roads, fire brigades, etc., which serve the household, but may not be directly paid for by the households.

In contrast, a country's primary production Ecological Footprint is the sum of the Footprints for all resources harvested and all waste generated within the country's geographical borders. This includes all the area within a country necessary for supporting the actual harvest of primary products (cropland, grazing land, forest land, and fishing grounds), the country's infrastructure and hydropower (built-up land), and the area needed to absorb fossil fuel carbon dioxide emissions generated within the country (carbon Footprint).

The difference between the production and consumption Footprint is trade, shown by the following equation:

$$EF_C = EF_P + EF_I - EF_E$$

where EF_C is the Ecological Footprint of consumption, EF_P is the Ecological Footprint of production, and EF_I and EF_E are the Footprints of imported and exported commodity flows, respectively.

BIOCAPACITY

A national biocapacity calculation starts with the total amount of bioproductive land available. "Bioproductive" refers to land and water that supports significant photosynthetic activity and accumulation of biomass, ignoring barren areas of low, dispersed productivity. This is not to say that areas such as the Sahara Desert, Antarctica, or Alpine mountaintops do not support life; their production is simply too widespread to be directly harvestable by humans. Biocapacity is an aggregated measure of the amount of land available, weighted by the productivity of that land. It represents the ability of the biosphere to produce crops, livestock (pasture), timber products (forest), and fish, as well as to uptake carbon dioxide in forests. It also includes how much of this regenerative capacity is occupied by infrastructure (built-up land). In short, it measures the ability of available terrestrial and aquatic areas to provide ecological services. A country's biocapacity for any land use type is calculated as:

$$BC = A \cdot YF \cdot EQF$$

where BC is the biocapacity, A is the area available for a given land use type, and YF and EQF are the yield factor and equivalence factor, respectively, for the country land use type in question. The yield factor is the ratio of national to world average yields. It is calculated as the annual availability of usable products and varies by country and year. Equivalence factors translate the area supplied or demanded of a specific land use type (e.g. world average cropland, grazing land, etc.) into units of world average biologically productive area (global hectares) and varies by land use type and year.

SELECTED SOURCE DATA

Dataset	Source
Ecological Footprint	
Production of primary agricultural products	FAO ProdSTAT section of the FAOSTAT web-site: http://faostat.fao.org/site/567/default.aspx#ancor
Production of crop-based feeds used to feed animals	Feed from general marketed crops data is directly drawn from the SUA/FBS section of FAOSTAT : http://faostat.fao.org/site/354/default.aspx
Import and Export of primary agricultural and livestock products	FAO TradeSTAT section of the FAOSTAT web-site: http://faostat.fao.org/site/535/default.aspx#ancor
Livestock crop consumption	Calculated by Global Footprint Network based upon the following datasets: • FAO Production for Livestock primary. • Haberl, et al. 2007. Quantifying and mapping the human appropriation of net primary production in earth's terrestrial ecosystems. PNAS 104: 12
Production, import and export of primary forestry products	FAO ForeSTAT section of the FAOSTAT website: http://faostat.fao.org/site/630/default.aspx
Production, import and export of primary fishery products	FAO FishSTAT section of the FAOSTAT website: http://www.fao.org/fishery/statistics/en
Import and Export of commodities	Data available directly from the UN Commodity Trade Statistics Database. http://comtrade.un.org/.
Economic Trends	
Debt	World Bank data portal
Gross Domestic Product	Ian Heston, Robert Summers and Bettina Aten, Penn World Table Version 6.3, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania, August 2009.
Demographic Trends	
Population by age group	United Nations Department of Economic and Social Affairs. Population Division. World Population Prospects: The 2008 Revision. http://esa.un.org/unpp/index.asp

APPENDIX B: THE CARBON-PLUS APPROACH

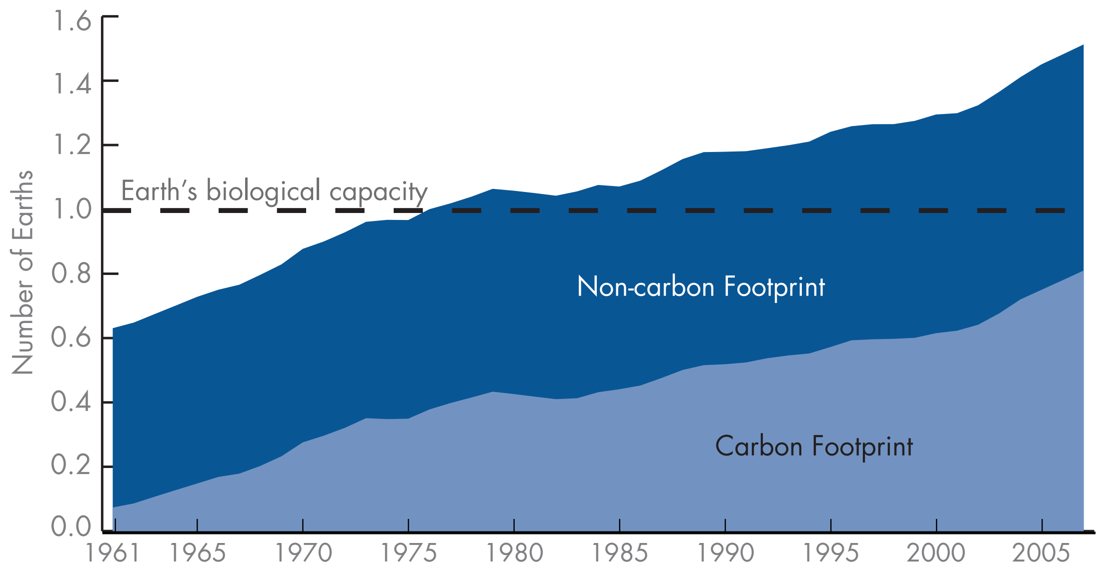
Trends in Figure 9 illustrate the rapid growth of human demand for ecological assets. As the figure shows, human demand is primarily made of, though not limited to, demand for the biosphere's capacity to sequester carbon. The Earth's natural carbon cycle is out of balance. CO_2 molecules are being released into the atmosphere faster than they can be sequestered, and a larger surface of photosynthetic lands is now required to eventually sequester the extra CO_2 responsible for this imbalance (Kitzes et al., 2009). Demand for carbon sequestration is growing unabated - as global population grows, standards of living improve and demand for energy and energy-intensive products increases (Krausmann et al, 2009).

Climate change is currently seen as the most impending environmental issue, preventing human societies from achieving sustainability. Unfortunately in the search for sustainability, decision-makers have approached sustainable development through the climate change lens (Robinson et al., 2006), overlooking the fact that the impact on the atmosphere is just one of multiple human-induced environmental impacts. Looking at carbon in isolation – as opposed to considering it a symptom of humanity's overall metabolism of resources – has made us blind to other dangers. While significant, carbon sequestration accounted for just over half of total world-average demand on the planet's ecological assets in 2006 (Ewing et al., 2009). The world's appetite for water, food, timber, marine and many other resources is also highly relevant to the overall health of the biosphere.

Solving the sustainability challenge therefore requires a new holistic approach to tackling multiple issues concurrently. This approach must help us avoid additional costs while also preventing a halt in progress on other environmental issues (Robinson et al., 2006; Turner, 2008). Without a way of measuring the status (and human rate of use) of our ecological assets, it is easy for policy-makers to ignore the impossibility of infinite growth and remain entangled in ideological debates over the "affordability of sustainability". Clear metrics are needed to change these ideological debates into discussions based on empirical facts, and the Ecological Footprint could be one of them. Understanding what the real risks are will then facilitate building consensus over the actions needed to address them (Ewing et al., 2009; Kitzes et al., 2009).

President Sarkozy's "Commission on the Measurement of Economic Performance and Social Progress" (also known as the "Stiglitz Commission") has emphasized the importance of complementing GDP with physical indicators for monitoring environmental sustainability. Their report highlighted the Ecological Footprint and one of its most significant components, the carbon Footprint.

While the Stiglitz Commission favored a focus on the carbon Footprint only - due to current carbon interest and the already established carbon accounting practices - for the reasons above Global Footprint Network argues that a "carbon plus" view is necessary to understand the significance of current environmental trends and to take a comprehensive, more effective approach that tackles the full palette of human demands on the biosphere's regenerative capacity.



Human demand on the biosphere broken down into carbon dioxide related and non-carbon dioxide related components

APPENDIX C: REFERENCES AND FURTHER READING

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Global Footprint Network is an international science and policy institute working to advance sustainability through use of the Ecological Footprint, a resource accounting tool that measures how much nature we have, how much we use, and who uses what. By making ecological limits central to decision making, we are working to end overshoot and create a society where all people can live well, within the means of our one planet. Global Footprint Network has offices in Oakland (California, USA), Brussels (Belgium), Zurich (Switzerland), Geneva (Switzerland), and Washington, DC (USA).

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