Africa's Ecological Footprint:

Human Well-Being and Biological Capital

Swiss Agency for Development and Cooperation
Global Footprint Network

FACTBOOK

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Global Footprint Network
Advancing the Science of Sustainability

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Swiss Agency for Development and Cooperation

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The Swiss Agency for Development and Cooperation (SDC) is Switzerland's international cooperation agency within the Swiss Foreign Ministry. Together with other federal offices, the SDC is responsible for overall coordination of development activities and cooperation with Eastern Europe, as well as humanitarian aid.The SDC carries out its activities in Switzerland and abroad, with an annual budget of CHF 1.3 billion (2005). The agency undertakes direct actions, supports the programmes of multilateral organisations, and helps to finance programmes run by Swiss and international aid organisations.

Global Footprint Network

www.footprintnetwork.org

The Global Footprint Network is committed to fostering a world where all people have the opportunity to live satisfying lives within the means of Earth's ecological capacity. We are dedicated to advancing the scientific rigor and practical application of the Ecological Footprint, a tool that quantifies human demand on nature, and nature's capacity to meet these demands.

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To access a PDF version of this document and questionnaire, please visit:

http://www.footprintnetwork.org/Africa

Table of Contents

Figures and Tables

Appendices

1. Purpose of this Factbook

This factbook on human well-being and ecological assets in Africa is the result of a joint project between the Swiss Agency for Development and Cooperation (SDC) and Global Footprint Network. It is a collection of key indicators on human development and ecological performance derived from UN statistics. What is new is the attempt to show a link between human development and ecological performance.

The purpose of the factbook is to open a conversation with you, the reader, and get your frank input. As a partner of SDC, Global Footprint Network, or an active organization in your region, you have been selected to participate in this collaborative effort. We value your expertise in African development, and we ask for your honest reactions and critical assessment of the presented information: Is this information valid? Does it capture the reality in your country? Does the discussion framework make sense to you?

Your uninhibited and open feedback will be crucial for the project. Our goal is twofold:

- Provide more consistent and accessible information on ecological limits and sustainability; and
- Make this information relevant to existing debates on development and long-term human prosperity in the region.

This factbook provides a starting point for this discussion for the many people involved. It offers data to compare various countries' development, as well as their supply and demand of biological capital – the ultimate resource upon which all human well-being depends.

Africa's significant natural wealth in some areas, and ecological scarcity in others, suggest that a debate informed by ecological realities could lead to more successful human development strategies. If overuse of ecological resources continues, we expect biological capital—not just human, human-made and financial capital—to play an increasingly dominant role in economic, social, and policy planning everywhere—not only in Africa. Yet Africa hosts many countries that are already facing ecological bottlenecks. This makes, we believe, the debates suggested by this factbook particularly pertinent for Africa. At this stage the available data allows discussion on a national level. However, the debate must continue at a more local scale, especially as one takes into account growth in urbanization that some African countries are experiencing.

This factbook builds on a simple tenet: Effective management strategy for biological capital requires accounting tools that track availability and use of this capital. Ecological Footprint accounting, presented here, is one tool for exactly this purpose. This factbook shows forty-year time trends of ecological assets for twenty-five countries. The feedback from the attached questionnaire will inform four stakeholder workshops in Africa, which in turn will provide key input into the final report on "Ecological Assets and Human Well-Being" to be released and distributed internationally.

We invite your organization to participate in this process by responding to the attached questionnaire, and possibly by participating in one of the four workshops to be held in the later part of 2006. Considering the overuse of resources and accumulation of waste in the rest of the world, Africa is and will increasingly face serious human development and environmental challenges. By bringing the experience and analysis of your organization into an international arena, and informing local and regional work with a global- and country-specific perspective on biological capacity, we are hopeful that together we can create tools to help development professionals face the 21st century challenges more effectively.

Martin Sommer, Head of Environment Division
Swiss Agency for Development and Cooperation

Mathis Wackernagel, Executive Director
Global Footprint Network

2. Africa and Ecological Limits

Humanity is living beyond the planet's ecological means. Although the global economy and population continue to grow, our planet remains the same size. Despite repeated calls for "sustainable development," humanity has now entered into a state of global overshoot with demand for resources exceeding the Earth's regenerative capacity by more than twenty percent. The global biosphere now takes nearly one year and three months to regenerate what humanity uses each year (see Section 4).

This is the essence of overshoot: demand on nature exceeds supply, resulting in over harvesting of resources and accumulation of wastes. It inevitably leads to the degradation of the natural assets that society depends on. What are the consequences for human well-being of using up resources faster than nature can renew them?

Feedback interactions between the planet and human society are not immediate. The resource demand of economies and societies can continue to grow while the biosphere is degraded. This state is possible only for a limited time, however, and the faster we can recognize and begin to reverse this over-use, the better chance we will have to succeed with human development and create a sustainable and prosperous future for all people.

Within the context of global overshoot, different regions show vastly different levels of consumption and ecosystem capacity. Africans, on average, use less biological capacity than people in any other region of the world. This demand on biological capital can be measured with the Ecological Footprint (see Section 4).

Calculations by Global Footprint Network show that while the average world inhabitant has an Ecological Footprint of 2.2 global hectares, the African average is at 1.1 global hectares per capita. In comparison, Africa's biocapacity is 1.3 global hectares per person, slightly more than what Africans use. Yet, Africa's biocapacity is 28 percent lower than the world-average of 1.8 global hectares per person.

Limited access to biocapacity can affect a society's well-being. Residents of countries with severe biocapacity constraints are often among the countries with the largest human development challenges. There are a number of historical reasons for which countries got into this situation.

The assessment presented in this factbook documents where the countries chosen for this report are today, not the mechanisms that led them to their situation. In other words, we offer a description of the current state, not an analysis of the causes.

Many of the challenges and opportunities facing the African continent are linked to biological capital. These include rapid demographic growth, food security and persistent malnutrition, violent conflict, political instability, human rights abuses, and inequitable access to resources.

Coupled with other challenges, such as the HIV/AIDS epidemic, these problems can make it more difficult for a region to manage its own ecological assets and advance human well-being. Healthy, productive ecosystems are the source of the materials and services that satisfy human needs. Accounting and management of biological capital will be critical to any attempt to meet human development challenges.

In a world with rapidly growing resource demand, largely driven by high-income countries as well as emerging economies like China and India, African development and biocapacity constraints can no longer be seen in isolation. Managing biological assets becomes hence not only more critical, but also more challenging.

Considering both the necessary and desired human development in Africa and Africa's biocapacity constraints, leads to the following questions: How can nations with low biocapacity devote sufficient resources – both financial and ecological – to meet their development goals? And how much biocapacity is necessary to meet the needs of each and every person? How can we make sure sufficient biocapacity is available for those who need to increase their resource demand in order to meet basic material needs?

Further, a number of African countries are endowed with biological capacity that exceeds their own resource consumption. For these ecologically wealthy countries, there is a third question: How can these nations enhance their own resource security, both optimising the yield from their natural capital reserves and ensuring the future viability of these critical assets?

3. Measuring Human Development

The goal of development is to create satisfying lives for all. How do we know we are achieving this goal, when human well-being is such a subjective concept?

There is growing recognition that existing economic indicators such as GDP (or Gross Domestic Product) are insufficient as metrics of human well-being and development. Richard Layard, a leading British economist and respected government advisor, explores this issue in his latest book Happiness: Lessons from a New Science. As Layard indicates, a science of human happiness is emerging, and the parameters of happiness include much more than just income.

The complexity of "happiness" notwithstanding, there is broad consensus that some bottom-line conditions are essential for a happy, healthy society. These include basic material security, longevity, and access to education. Recognizing this, the United Nations Development Programme created the Human Development Index (HDI). Published annually in the Human Development Report series, the HDI goes beyond the GDP in reflecting the extent to which these three conditions have been achieved in any given nation.

The HDI is an average of three sub-indices, each normalized on a scale of zero to one. These sub-indices are life expectancy at birth, education (combined gross enrollment and adult literacy rate) and GDP per capita (expressed in US dollars and adjusted for parity in purchasing power (PPP).

While the HDI is a more reliable measure of well-being than per capita income or GDP, it still has limitations. These include the narrowness of the parameters it captures, the somewhat arbitrary weighting for aggregating its component indices, and its underlying mechanistic concept of well-being. The HDI is measured at a national scale and thereby reduces what would otherwise be large differences between rural and urban populations. Nevertheless, it is one of the few standardized and globally available well-being measures, allowing direct comparisons of different countries, and it is possibly the most cited measure of human development. For these reasons we have chosen to use HDI as the main measure of human development in this report.

4. Ecological Footprint

The Ecological Footprint is an accounting tool that measures a population's demand on nature. The Footprint of a country, for example, is the total area required to produce the food, fibre and timber that the nation consumes, absorb its waste, and provide space for its infrastructure. Since a nation consumes resources and ecological services that come from all over the world, its Footprint is the sum of these areas, wherever they are located on the planet. In 2002, the global Ecological Footprint was 13.5 billion global hectares, or 2.2 global hectares per person.

This demand on nature can be compared with the Earth's biocapacity, a measure of nature's ability to produce resources from its biologically productive area. In 2002, the Earth's biocapacity was 11.2 billion global hectares, a quarter of the planet's surface, or, given a global population of 6.2 billion people, 1.8 global hectares per person.

In 2002, humanity's Ecological Footprint exceeded global biocapacity by 0.4 global hectares per person, or twenty-three per cent. This global overshoot began in the 1980s and has been growing ever since (see Figure 4.2). In overshoot, nature's capital is being spent faster than it is being regenerated. Continued overshoot can permanently reduce ecological capacity.

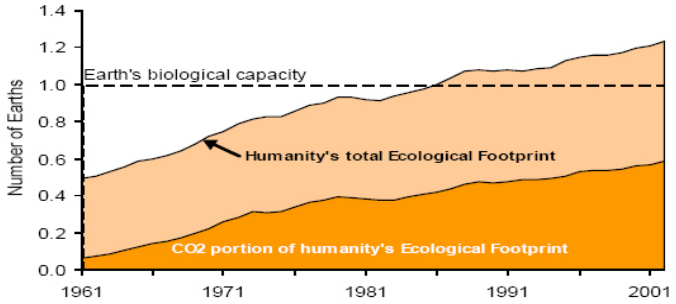


Figure 4.2 Humanity's Ecological Footprint

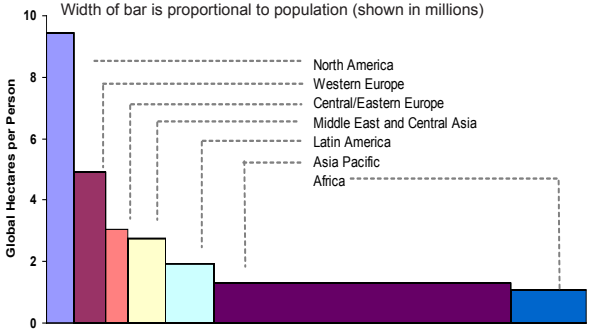


Figure 4.3 Ecological Footprint by Region, 2002

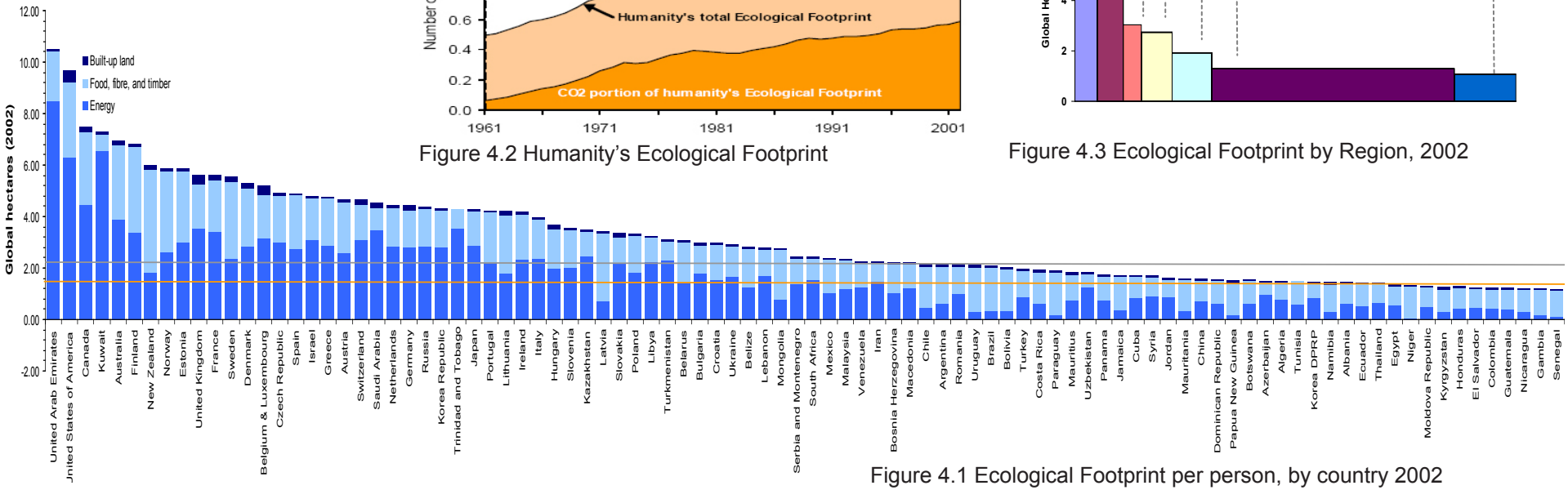


Figure 4.1 Ecological Footprint per person, by country 2002

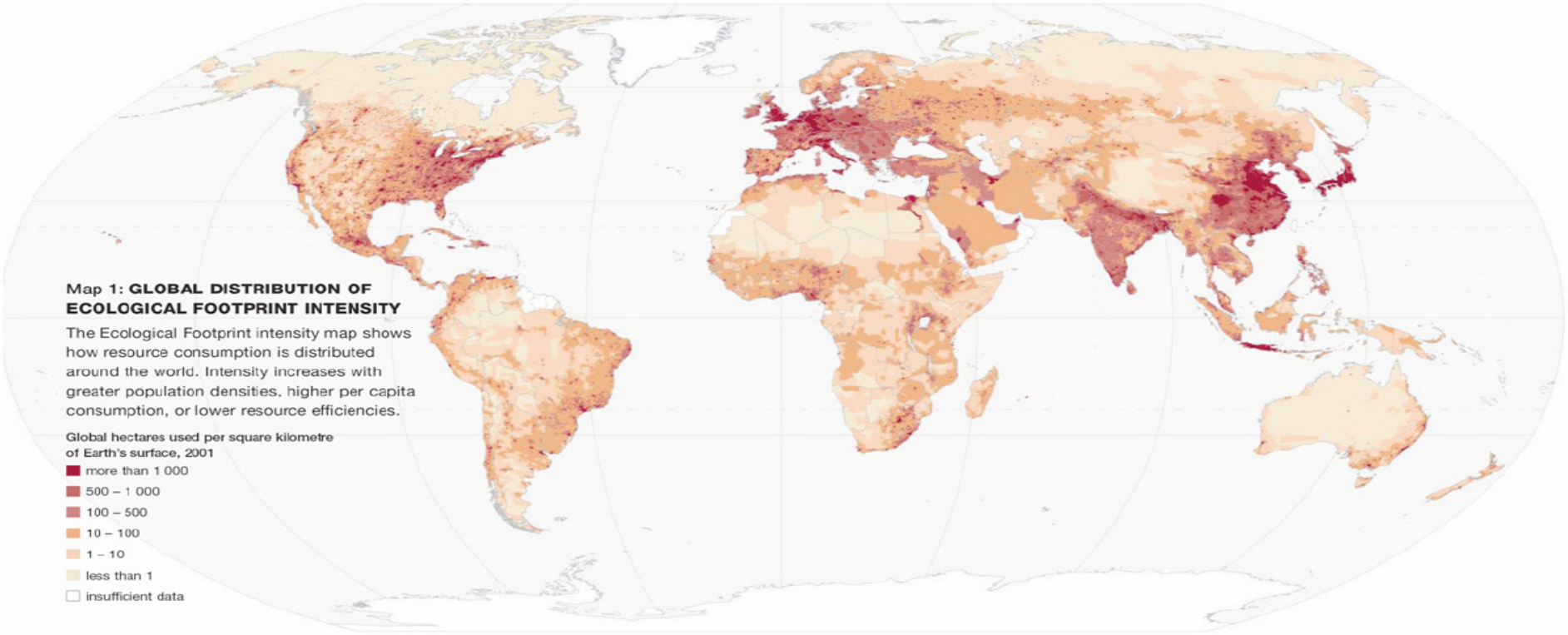
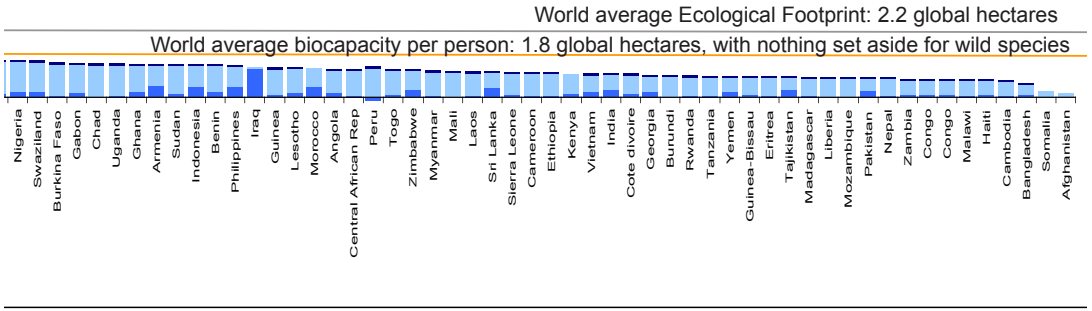


Figure 4.4 Global Distribution of Ecological Footprint Intensity, 2001

Source: WWF Asia-Pacific Report, 2005



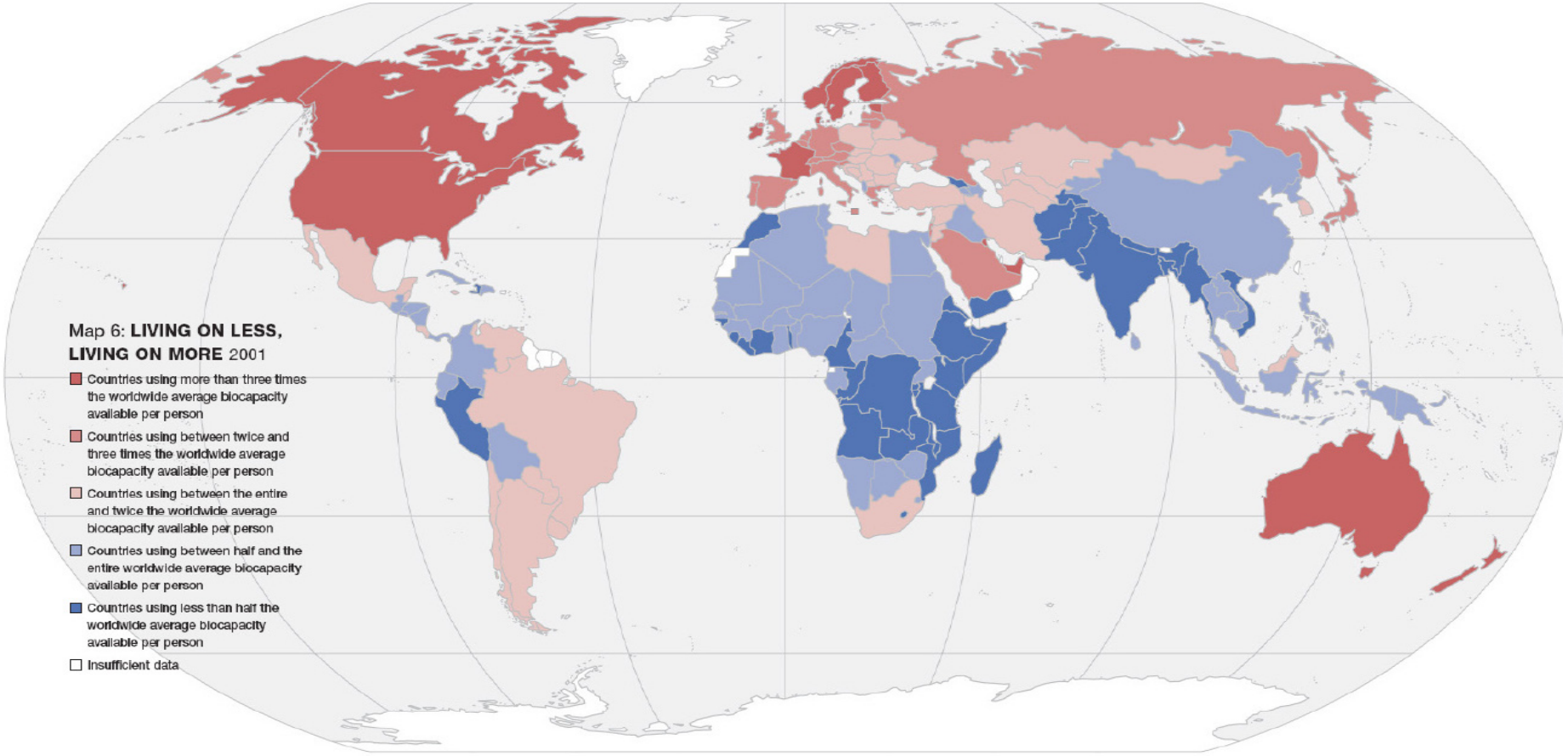


Figure 4.5 Living on Less, Living on More, 2001

Source: WWF Asia-Pacific Report, 2005

In the global context, Footprints in Africa are some of the lowest in the world. Low Footprints can place material constraints on meeting human development objectives.

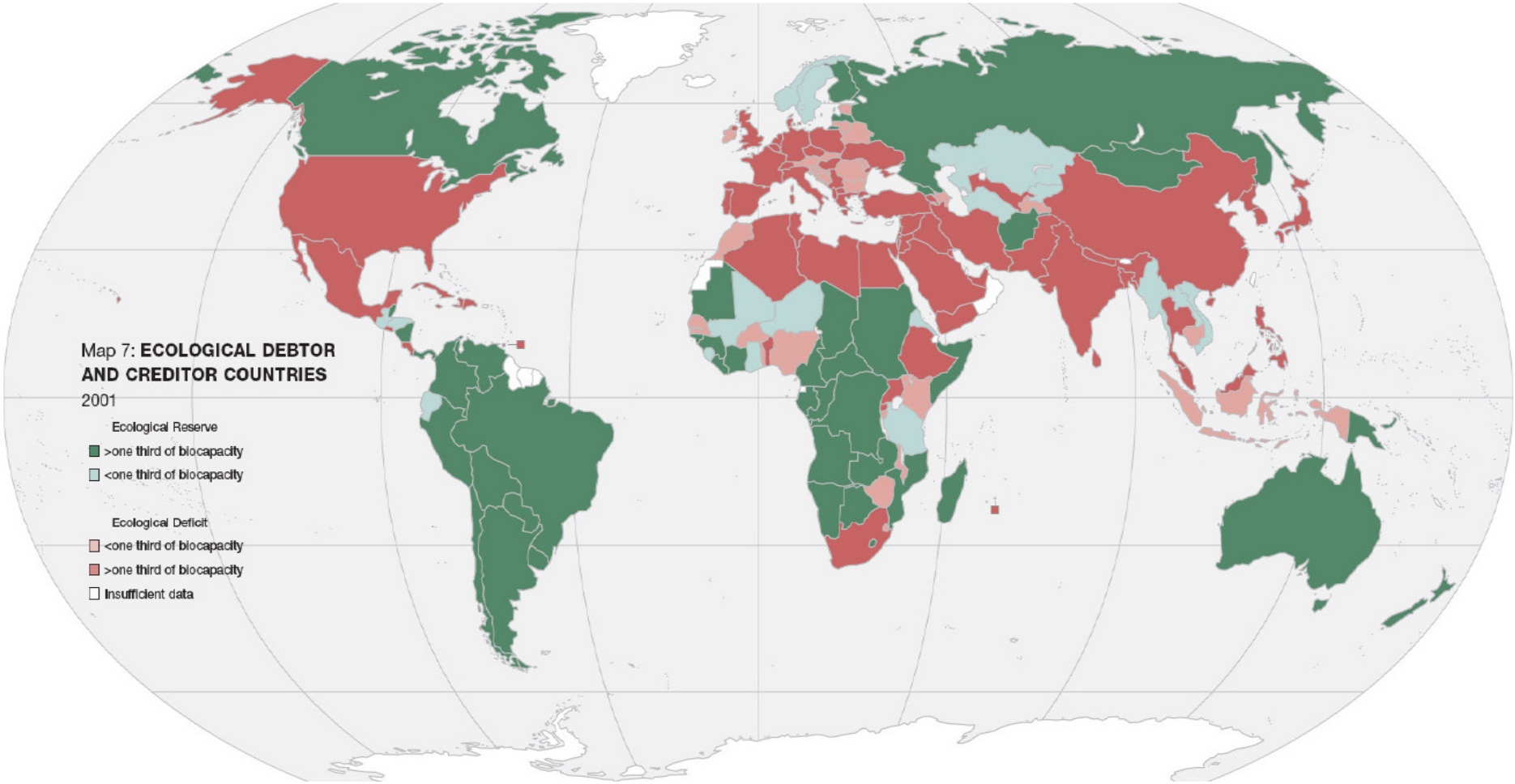


Figure 4.6 Ecological Debtor and Creditor Countries (2001 data). Note: Given the refined footprint accounts for 2002, Niger is now an ecological debtor – this map will be updated for the final report.

Source: WWF Asia-Pacific Report, 2005

Countries with ecological reserves have biological capacity that exceeds their own consumption. Countries with ecological deficits consume more than the ecosystems within their borders can provide. Deficits are compensated by imports or liquidation of domestic ecological assets. While South Africa and much of northern Africa are currently running ecological deficits, many African nations have biocapacity beyond what they consume. These reserves can be used for biodiversity protection, for increased consumption by their own residents, or for export to other nations. Managing these assets for the benefit of a country's residents and recognizing increasing pressures from the global economy will require robust accounting and planning tools.

5. Human Development and Ecological Limits

The health and well-being of human society is intricately linked to to the health of the biological capital on which it depends. Recognizing and accounting for biological capacity available to, and used by a society can help identify opportunities and challenges in meeting human development goals.

The loss in human well-being due to ecological degradation often comes with a significant time delay (e.g. overfishing can occur for many years before catches start to plummet) yet such degradation is often difficult to reverse. In the short term, it is far less costly to save human lives by conventional methods such as water purification, basic medicine, or electricity for hospitals. These strategies are essential in their own right.

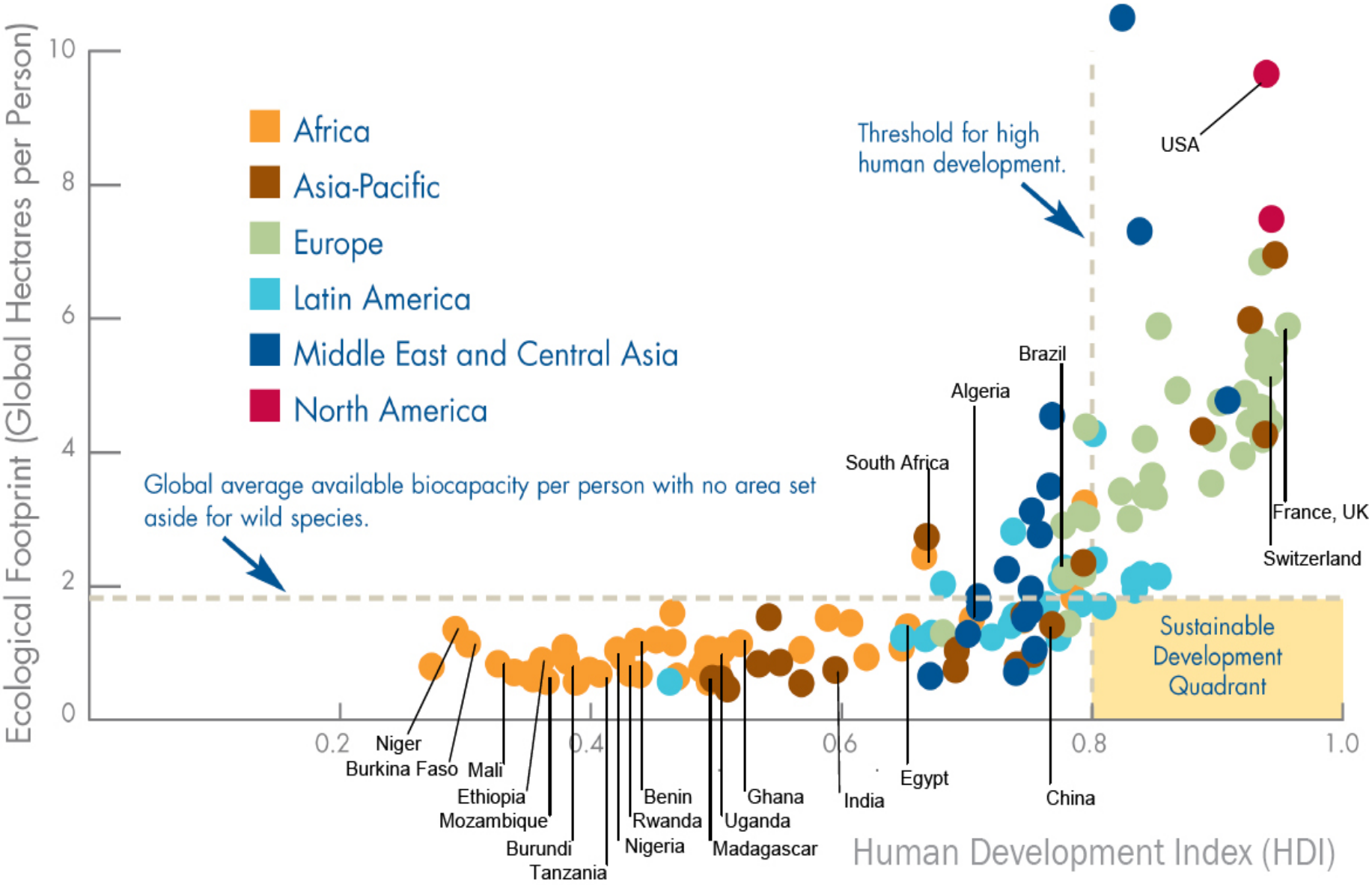
Unfortunately, these measures are not sufficient. This is not to question the importance of conventional methods that provide significant advances in human health. Rather, it argues that short term interventions need to be complemented by effective resource management. Short-term interventions can neither address nor reverse the cumulative ecological degradation that results from continued overshoot. Failing to address the causes of overshoot leads to resource stress, an insecure future, and a trap from which it is increasingly difficult to escape.

Human demand on ecosystems can exceed biocapacity for some time, by liquidating resource stocks, and allowing wastes, such as carbon dioxide, to accumulate in the biosphere. As overshoot continues, fisheries will collapse, surface water and groundwater will become scarce, and forest will disappear. A reduction in available resources will translate into enormous human suffering, which will first affect those who cannot immigrate to more plentiful regions, or afford to import increasingly expensive necessities.

The challenge of maintaining a high level of human well-being while preserving our resource base is illustrated on the global level in Figure 5.1 (Similar graphs can be generated for populations of any region or country).

Plotting HDI results against Ecological Footprint links resource consumption with human development. Some countries achieve high levels of development (as measured by HDI) with relatively small resource demand (as measured by average per-person Footprint). By taking an HDI of 0.8 as the boundary between medium and high development and 1.8 global hectares per person as the largest Footprint that could be replicated globally divides Figure 5.1 into four quadrants. Only countries located in the lower right quadrant meet the minimum requirements for sustainability: A high level of human development and a lifestyle that could be extended globally. Hardly any country has been able to meet this challenge.

Figure 5.1 also demonstrates the different challenges facing regions throughout the world. Higher-income countries in Europe and North America will need to find ways to reduce their Footprint without compromising quality-of-life for their citizens. Currently, the most commonly discussed strategy is to increase efficiency by reducing material throughput of the economy, however there is little evidence that this strategy alone produces significant enough resource savings. Four more factors influence the gap between human demand on biocapacity and the supply of biocapacity. Whether in Africa or the rest of the world, all of these factors need to be considered in order to successfully reduce the gap. The four additional factors are: Population size and per capita consumption on the demand side, and available area and its bioproductivity on the supply side (see Section 8 and Figures 8.1 and 8.2).



Development Index (HDI) as an indicator of socio-economic development, and the Ecological Footprint as a measure of human demand on the biosphere. The United Nations considers an HDI of over 0.8 to be "high human development." An Ecological Footprint less than 1.8 global hectares per person makes a country's resource demands globally replicable. Despite growing adoption of sustainable development as an explicit policy goal, most countries do not meet both minimum requirements.

6. Human Development and Biocapacity in Africa

Between 1990 and 2003, twelve African countries (out of eighteen worldwide) experienced reversals in human development as measured by HDI, affecting some 240 million people. The number of African countries identified as having 'low human development' increased from seventeen countries in 1990 to thirty countries in 2005 (UNDP 2005).

Many African nations with an HDI of less than 0.5 have been able to improve their quality of life without radically increasing demand on natural resources (see p. 12). African nations with medium levels of development (an HDI of 0.5 to 0.8), have witnessed examples of high-income nations that followed a development path linking improvements in quality of life to rapid growth in Ecological Footprint. As appealing as such a development path appears for nations and individuals, these paths will prove increasingly risky and difficult to follow in a resource constrained world.

While not always obvious, disparities in the level of ecological demand among countries with high levels of development (such as the United States at 9.7 gha per person and Italy at 4.0 gha per person) shows that nations do have a choice about the Footprint-intensity of their development.

Figure 6.2 shows how individual nations contribute to Africa's overall Footprint. The height of each bar is proportional to a nation's average Footprint per person and the width is proportional to its population. The area of each bar reflects the country's total Footprint.

As individual countries and the African region work toward improving sustainable development, decision makers will need solid information and metrics in order to set goals and track progress. Measures such as the Ecological Footprint will be critical to managing demand and supply of an increasingly scarce resource, ecological capital.

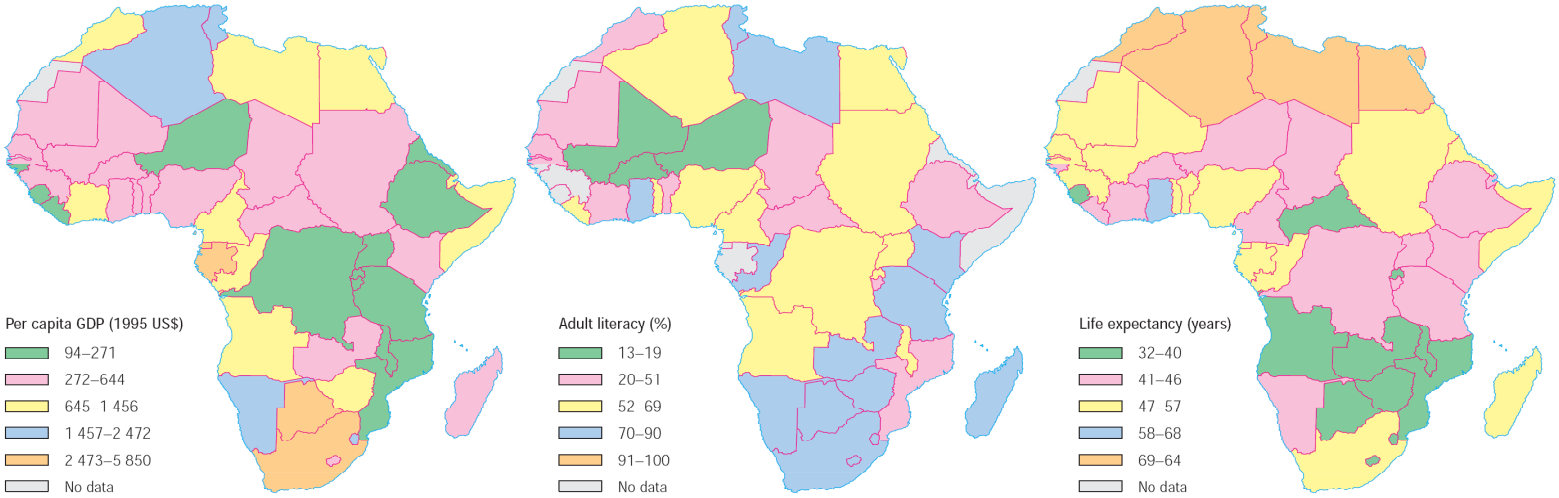


Figure 6.1 HDI by components (GDP, adult literacy, and life expectancy)

Source: UNEP 2006

Width of bar is proportional to population (shown in millions)

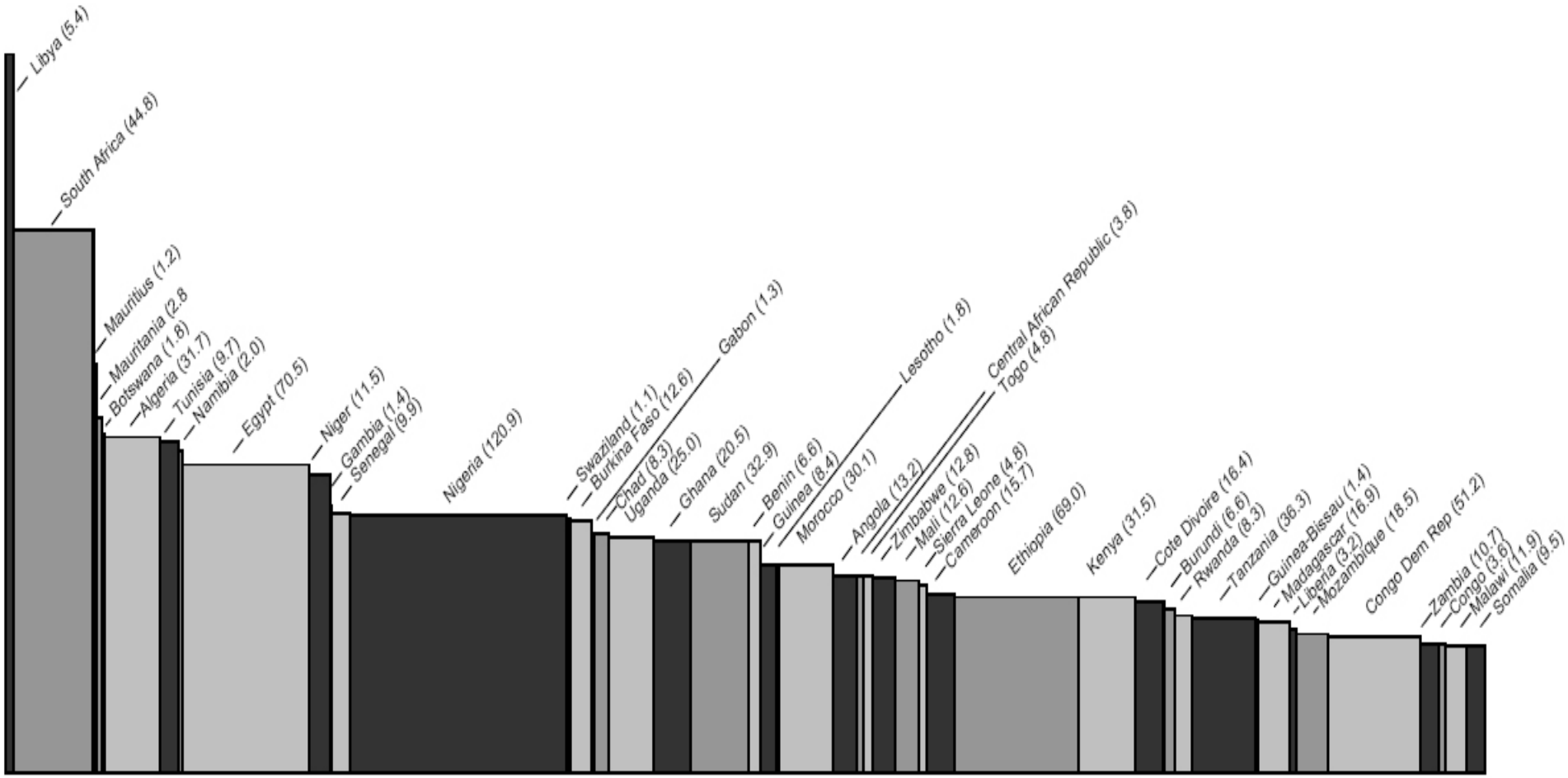


Figure 6.2 Ecological Footprint in Africa

7. Trading Biological Capacity

For any nation, the Ecological Footprint can be measured from a number of angles. The angle used most commonly is the one reported here in all data tables and graphs, known as the "consumption Footprint." It is the Footprint of all of the ecological goods and services consumed by the residents of the nation.

Another angle is to measure the Footprint of all the demands put on the ecosystems within the borders of the nation. The difference between this "domestic Footprint" and the consumption Footprint comes from two sources: a) net imports and b) demands the nation makes on the global commons (such as carbon dioxide emissions and fishing from international waters).

Because of imports and demands on the commons, a nation's consumption is not always constrained by the biocapacity limits of their territory. While at the global level, overshoot leads to the degradation of biological capital, nations can run an ecological deficit without degrading their own ecosystems if they have the means to import biological capacity from elsewhere in the world. Inversely, nations with ecological reserves (those who consume, in net terms, less than what their ecosystems can regenerate) might still experience overuse of their ecological assets due to export pressures or overuse of particular ecosystems (such as local deforestation or overfishing).

Like all regions, Africa is both an importer and an exporter of biological capacity. Overall, the region receives imports of cropland and pasture land capacity from elsewhere and supplies other regions of the world with products from fishing ground and forests. While many African countries are significant exporters of non-renewable resources such as diamonds, oil and ore, many nations also supply the rest of the world with large quantities of biological capacity, as showin in Table 7.1.

Table 7.1 Biocapacity export of selected African countries (in global hectares, 2002 data)

	Cropland	Fishing Grounds	Forest
Cameroon	4,300,000	-	-
Cote D'Ivoire	8,000,000	-	1,100,000
Gabon	-	-	1,800,000
Morocco	-	1,500,000	-
Namibia	-	5,200,000	-
South Africa	7,300,000	1,700,000	4,600,000
Sudan	2,200,000	-	-
Zambia	2,700,000	-	-

As rapidly growing economies around the world continue to increase their consumption of resources, export pressures and demand on African countries' renewable resources will continue to increase. The available biocapacity within the African region will become even more important on a global stage in a future with growing global overshoot.

8. Managing Ecological Assets to Secure Human Well-Being: Five Factors at Play

Local overshoot occurs when ecosystems are exploited beyond their regenerative capacity. For example, fisheries can be overfished or forests overharvested, leading to a decline of the existing stock of ecological capital. Local overshoot has occurred in many places such as the Mediterranean basin, sometimes leaving behind indelible scars and ecosystems with permanently reduced productivity.

Today, however, humanity has entered into an era of global overshoot, as described in Section 4. Global overshoot inevitably leads to the degradation of the ecological capital base on which human societies depend. The recent Millennium Ecosystem Assessment gives detailed information on the current status (www.greenfacts.org).

At the regional and national scale, however, countries can consume more resources than their domestic ecosystems can provide without depleting their own capital if they are able to import capacity from elsewhere. Furthermore, countries can demand less than their ecosystems can provide, but still experience local overshoot due to export pressures or poor management. Countries with a consumption Footprint larger than their own biocapacity, including North America and most of Europe, are called “ecological debtors,” while countries with biocapacity that exceed their Footprint, including much of Asia and Africa, are “ecological creditors.” In other words, nations can finance an ecological deficit by liquidating their domestic ecological capital or by importing biocapacity from elsewhere.

As shown in Figure 8.1 on the following page five factors determine, at the global level, the size of the gap, if any, between available biocapacity and demand on biocapacity. Three factors determine the Ecological Footprint and two determine the amount of available biocapacity.

Three Ecological Footprint Factors: Ecological Footprints - or total demand on biocapacity - are a function of three factors: population, consumption per person, and resource intensity:

Population growth can be reduced and eventually reversed through measures that support families who choose to have fewer children. Offering women better education, economic opportunities and health care are three proven approaches.

To meet regional development challenges, consumption per person in the region may need to rise. In some cases, this increase can be offset by technology and management systems that increase Footprint efficiency (e.g., Footprint efficient agriculture, low-Footprint housing and energy systems, and energy-efficient transportation systems).

Two Biocapacity Factors: The total available biocapacity or ecosystem supply is determined by two factors: the amount of biologically productive area available, and the productivity or yield of that area.

While increasing total bioproductive area can be difficult (especially in arid regions), improved technology and management can help to increase yields on already productive land. Biocapacity can be maintained by protecting soil from erosion and degradation and preserving cropland for agriculture. This involves protecting river basins, wetlands and watersheds to secure freshwater supplies, and maintaining healthy forests and fisheries. It includes taking action to protect ecosystems from climate change and eliminating the use of toxic chemicals that degrade ecosystems.

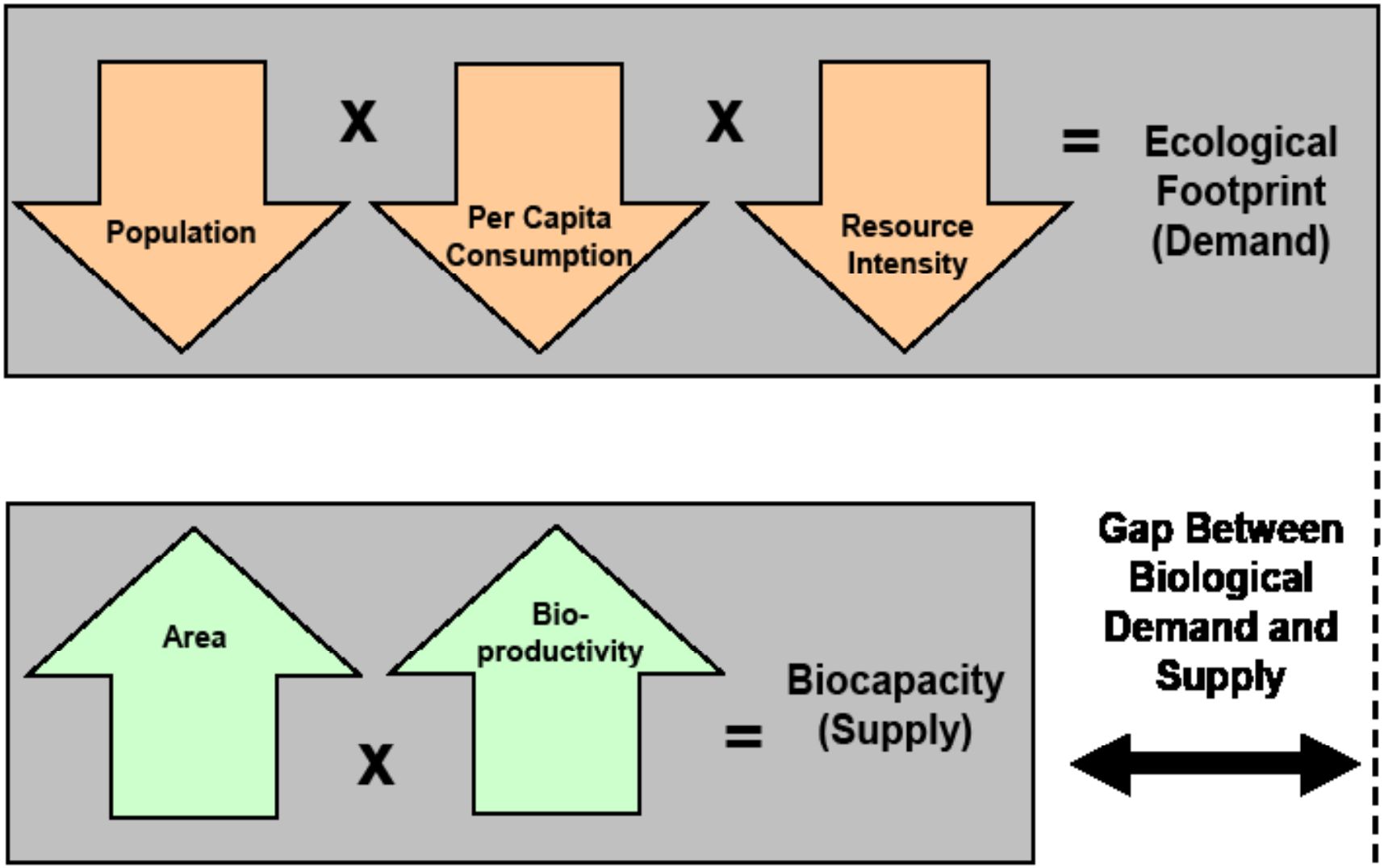


Figure 8.1 Five factors of Biological Supply and Demand. Five factors determine the gap between biological demand and supply. Population, per capita consumption and efficiency determine demand, while area and bioproductivity determine supply of biocapacity.

The five factors become a little more complex in the context of a national economy because of trade. We can look at an economy from the perspective of consumption and analyze how many resources are required to maintain the consumption level of the country. This consumption Footprint is the most commonly reported type of Ecological Footprint. It is the area used to support a defined population's consumption. The national average or per capita consumption Footprint is equal to a country's consumption Footprint divided by its population.

In contrast to the consumption Footprint, a nation's primary production Footprint is the sum of the Footprints for all of the resources harvested and all of the waste generated within the defined geographical region. It is the country's primary demand. 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 CO2 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 consumption Footprint; rather, they are included in the consumption Footprint of the country that imports the t-shirts. However, these ecological resources are included in the exporting country's primary production Footprint.

To illustrate the point, this can be compared to the situation of a barber and a farmer. Both may have the same consumption pattern (eating about the same food, owning a similar type of house etc.) which would lead to about the same Footprint. However, the farmer uses a lot of resources to generate his or her income, while the barber requires very little resources to generate a possibly similar income. In this case their primary production Footprint is vastly different, large for the farmer, small for the barber.

This is illustrated in Figure 8.2 in the following page, which shows both the consumption and the production Footprint. For instance, if Tanzania has a given biocapacity of forest, some of it is used for domestic consumption, some forest products are imported from other countries, but a much larger amount of forest products is exported (legally or illegally). This means the demand on Tanzanian forests is a combination of the domestic consumption plus the net exports of forest products. This then can be compared with the forest capacity of Tanzania (biocapacity on the bottom). This diagram helps to illustrate how much biocapacity is available within a country, and to where pressure on the local forests originates. Note that some countries have a production Footprint that is smaller than the consumption Footprint. For instance, Switzerland imports more food than it exports. As a result, the Swiss food Footprint for their consumption is larger than their production Footprint for food.

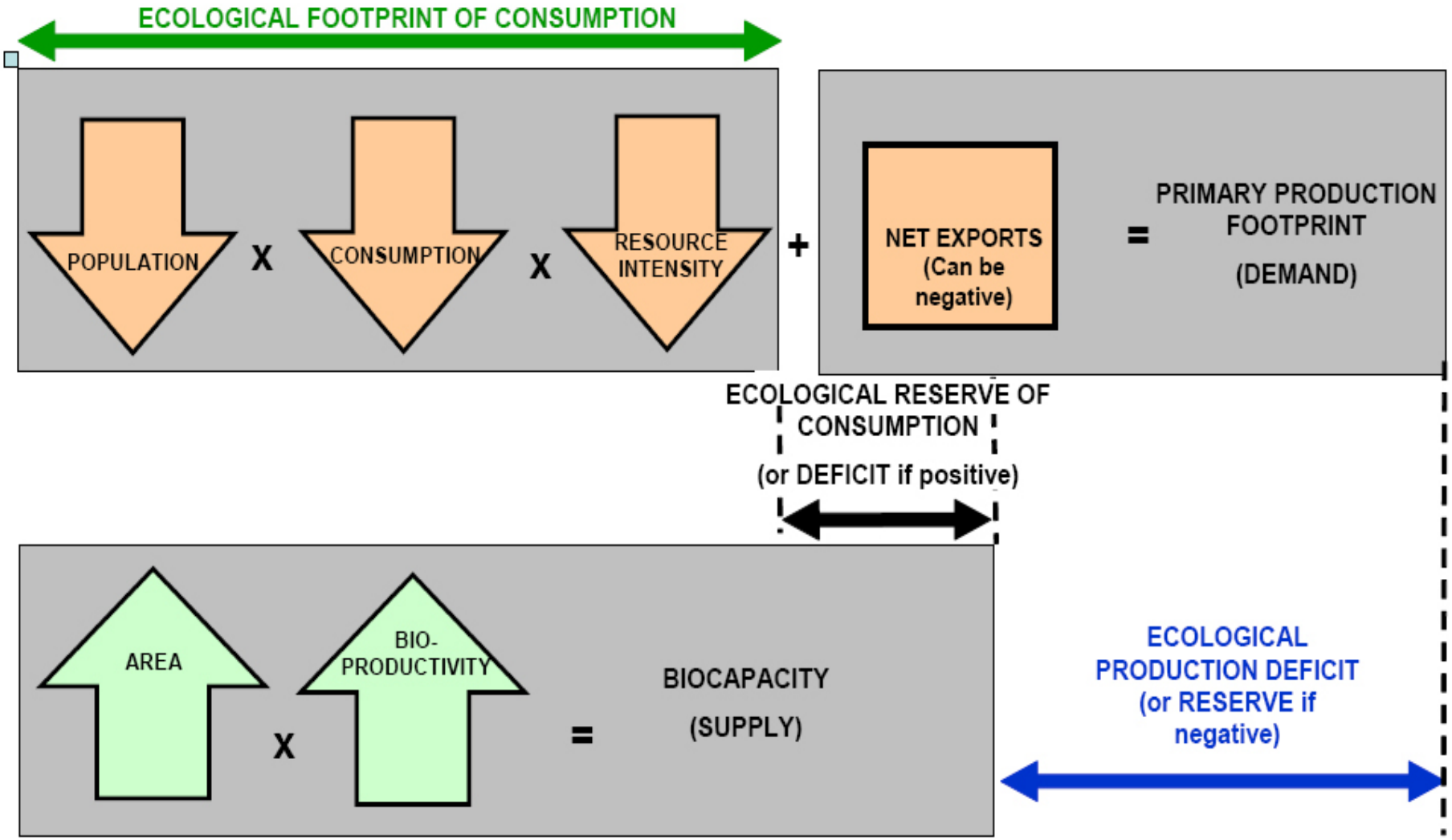


Figure 8.2 Five factors of Biological Supply and Demand, including Net Exports.

9. Fact Pages for Selected Countries

The key information in this factbook is displayed in a country-specific double-page layout with consistently organized graphs and tables. These graphs and tables provide a quantitative description of human development, ecological performance and links between the two for twenty-five countries. As an overview, pages 22 and 23 summarize the situation for Africa as a whole, using the same layout.

Each fact page (Section 9) is divided into three sections:
9.1 Human development benchmarks
9.2 Human development and ecological performance
9.3 Ecological time trends

9.1. Human development benchmarks
Figure 9.1.1 shows the country's Human Development Index (HDI) for the year 2003 broken down into its three components: life expectancy, education, and per capita income or GDP. Tables 9.1.1 – 9.1.3 provide the same information in absolute values rather than in an indexed format. Figure 9.1.1 compares the country's HDI performance against the world average (dotted lines), and the pie chart in Figure 9.1.2 shows the percentage of the national income going to the top and bottom income quintiles.

Africa's income distribution pattern among income groups is similar to other countries. The income distribution in the UK, for example, resembles Africa's average, where the richest twenty percent of the population control about forty percent of the national income. However, the overall per capita income in the UK is much higher than in Africa and, as a result this disparity deprives the poorest segments of African society from meeting basic material needs.

Among the HDI component indicators, life expectancy is the category in which Africa scores visibly lower than many other regions of the world. The most significant contributor to this large discrepancy is the HIV/AIDS epidemic that affects African communities, most dramatically in the Southern Africa sub-region. Diseases like malaria are also widespread and contribute to increased infant mortality and decreased life expectancy. The Human Development Index parallels the Millennium Development Goals (MDGs) in how it frames the development challenges.

Table 9.1.2 summarizes development impacts on gender. According to the World Health Organization, the adult literacy rate is the percentage of the population aged fifteen years and over who can both read and write a short, simple statement about their everyday life. The combined gross enrollment ratio, according to UNESCO, is the total enrollment in all levels of education, regardless of age, divided by the population of the age-group which officially corresponds to primary, secondary, and tertiary schooling.

The GDP Index looks at earned income normalized by purchasing power parity (PPP), which reflects the fact that one dollar can buy different amount of goods in different countries. PPP US$ are calibrated according to what one dollar can buy within the US.

While most African countries lag behind the world average in the HDI, over the past forty-five years Africa has made remarkable progress in improving the basic education and literacy rates for both males and females. This is indeed an extremely promising development as education is strongly interlinked with other human development outcomes such as health and gender equity. All data presented in this factbook are taken from the Human Development Report of UNDP.

9.2. Human development and ecological performance
Figure 9.2.1 is the key diagram used in this report to discuss the link between human development and ecological assets. Globally, sustainable development can be assessed using the Human Development Index (HDI) as an indicator of socio-economic

development and the Ecological Footprint as a measure of human demand on the biosphere. The United Nations considers an HDI of over 0.8 to reflect “high human development.” An Ecological Footprint less than 1.8 global hectares per person makes a country’s resource demands globally replicable. Despite growing adoption of sustainable development as an explicit policy goal, most countries do not meet both minimum requirements.

This graph is used as a backdrop for more country specific information and to put each country in context with the rest of the world. The dark line on the graph represents change in Ecological Footprint and HDI over time, for most countries from 1975 to 2003. In all but one case (South Africa), either or both Ecological Footprint and HDI have increased over time. (Note: Footprint data reported through year 2002; HDI data reported through year 2003).

Tables 9.2.1 and 9.2.1 show economic outcomes.

Trade is depicted in Table 9.2.1, which show imports, exports, and the trade balance in both dollar terms and Footprint terms. A negative Footprint balance of 10 million global hectares, for example, would indicate that the country imported 10 million more global hectares than it exported. The dollar intensity of imports and exports shows to what extent imports or exports are more resource intensive. Higher numbers here indicate lower resource intensity. Table 9.2.1 also shows the percentage of development assistance as well as debt service payments as a percentage of the country’s GDP.

Table 9.2.2 compares population, income in absolute dollars and the country’s Ecological Footprint per capita.

9.3. Ecological time trends

Biocapacity and Ecological Footprints are measured in global hectares. A global hectare is an area-normalized unit of productivity, equal to the annual productivity of one hectare of biologically productive land or sea with world-average productivity. Use of global hectares as a productivity measure allows world-wide comparisons of biocapacity and demand, while recognizing large differences in ecosystem productivities.

Forty-five years ago, Africa was endowed with expansive ecological reserves. In 1961, Africa had an available biocapacity of 3.5 global hectares per person compared to an Ecological Footprint of 1.2 global hectares per person. By 2002, this ecological reserve had shrunk from 2.3 to 0.2 global hectares per person. Today, the average African has a Footprint of 1.1 global hectares compared with an available biocapacity of 1.3 global hectares per person. Considering recent population growth rates and the age distribution of Africa’s population, it is likely that Africa’s Ecological Footprint will soon overtake its biocapacity. This will leave Africa, for the first time in its history, with a continental ecological deficit.

Rapid population growth over the past half-century has played a significant role in Africa’s diminishing biocapacity. In 1960, Africa’s per capita biocapacity was approximately equal to the world average at that time. Over the past forty-five years, per capita availability of biocapacity in Africa decreased at a more rapid rate than in the rest of the world. Consequently, Africa’s present endowment of natural capital is substantially less than the world average. A major driver of this reduction is population growth, where Africa has outpaced other continents.

Over the last half-century, advances in agricultural technology have helped Africa increase the productivity of each global hectare, producing fifteen percent more biocapacity per year in 2002 than in 1961. This means that despite maintaining a constant Ecological Footprint of 1.3 global hectares per person over the last forty-five years, Africans now consume, on average, fifteen percent more biocapacity per person than in 1961. Africa, on average, has also kept pace with other regions in the world in boosting its absolute biocapacity.

Yet, as shown in Figure 9.3.1, in spite of the stable (but relatively small) per capita Footprint over the last forty-five years, Footprint components in Africa have shifted. For instance, all food-oriented components such as cropland, grazing land and fishing grounds show a decline. This decrease is offset by an increase in Africa's carbon Footprint. This reflects an overall global trend towards urbanization. Africa's present urban population of thirty-nine percent is expected to increase to fifty-four percent in 2005 (UNEP 2006), exhibiting the fastest growth rate in the world at 3.5 percent per year.

Most striking are the overall comparisons of Ecological Footprint and biocapacity trends as depicted in Figure 9.3.2. Overall, countries that have the economic ability to purchase resources from abroad are less constrained by their own biocapacity.

For instance, the Footprints of France, the UK, the US, Switzerland and even China far exceed their own biocapacity. Yet for most of these nations, the Footprint increase seems to slow down or stabilize as their Footprint continues to exceed domestic biocapacity. These graphs are consistent with the economic news today dominated by China's demand for resources.

In contrast, countries with limited financial ability to purchase resources from abroad, such as Benin, Burkina Faso, Burundi, Rwanda, and Uganda, show a remarkable trend of Footprint being constrained by domestic biocapacity. These countries are experiencing real ecological constraints that directly impact their ability to access sufficient resources. The graph for Rwanda shows a small increase in the Footprint curve, attributed to receipt of food aid in the late 1990s.

Other countries have experienced such limitations only more recently. Kenya, Niger and Nigeria, for example, were not able to increase their Footprint once they exceeded their domestic biocapacity. South Africa shows a particularly dramatic shift in Footprint growth after exceeding its own biocapacity.

Further, the curves in Figure 9.3.4 show that Ghana and Tanzania might be running into similar resource constraints as Kenya, Niger, South Africa, or Nigeria within decades if not years.

Algeria provides an example of the opposite effect. Due to its oil exports, Algeria has been able to afford extra imports. Additionally, because of Algeria's access to cheap fossil fuel, it has been able to transcend its own biocapacity, externalizing the CO2 costs on the rest of the world much like many other high or middle-income countries.

Figures 9.3.2 and 9.3.4 show details of each country's Ecological Footprint and Biocapacity.

Fact pages for the following countries and regions are included in the Section 9:

Africa	Mali
Algeria	Mozambique
Benin	Niger
Brazil	Nigeria
Burkina Faso	Rwanda
Burundi	Senegal
China	South Africa
Egypt	Switzerland
Ethiopia	Tanzania
France	Uganda
Germany	United Kingdom
Ghana	US
India	Zambia
Kenya	World

Africa

9.1 Human Development Benchmarks

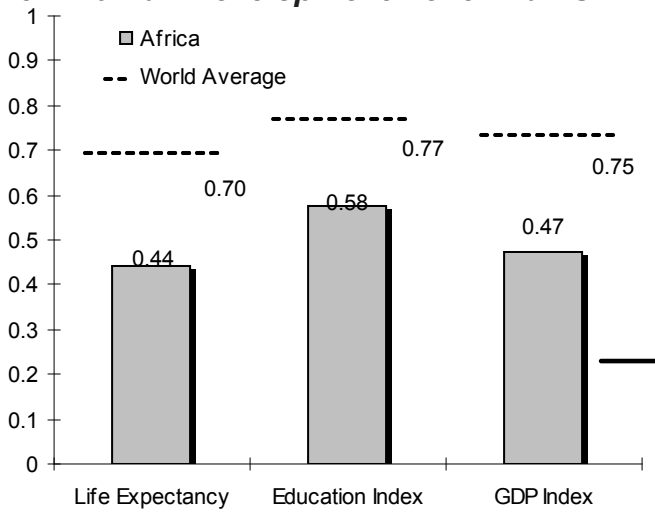


Figure 9.1.1: HDI Components, Indexed

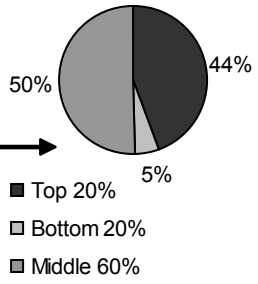


Figure 9.1.2: Income Distribution

Life Expectancy (years)	51
Gross Enrollment (%)	55%
Adult Literacy Rate (%)	59%
GDP per capita (PPP US$)	$2,424

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	50%
Male adult literacy rate (%)	67%
Female combined gross enrollment ratio (%)	44%
Male combined gross enrollment ratio (%)	51%
Female estimated earned income (PPP US$)	$1,457
Male estimated earned income (PPP US$)	$3,395

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	44%
Urban population with access to improved water source (%)	65%
Percentage of population undernourished	22%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

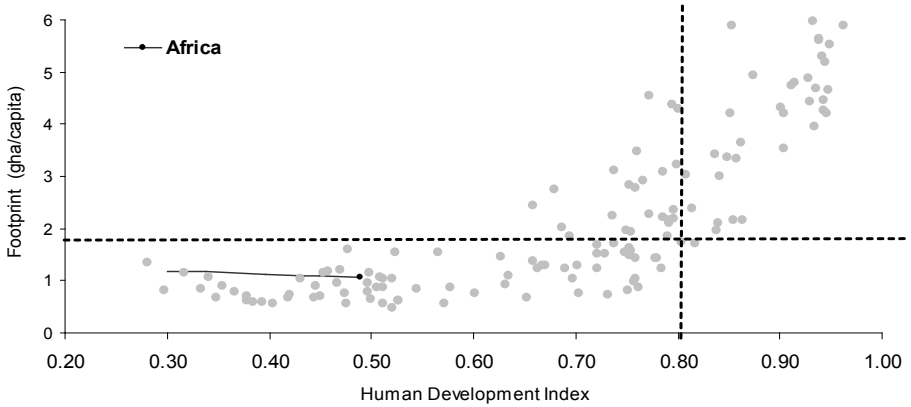


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$229.4	178.2	1,287
Exports	$218.2	136.5	1,598
Net (Exports - Imports)	-$11.2	-41.7	
ODA (% of GDP)	3.6%		
Debt Service (% of GDP)	4.0%		

Table 9.2.1: Trade and Debt

	World	Africa
Population (Millions)	6225	824
GDP per capita (US$)	$5,801	$794
Footprint (gha/capita)	2.20	1.10
Biocapacity (gha/capita)	1.80	1.30

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

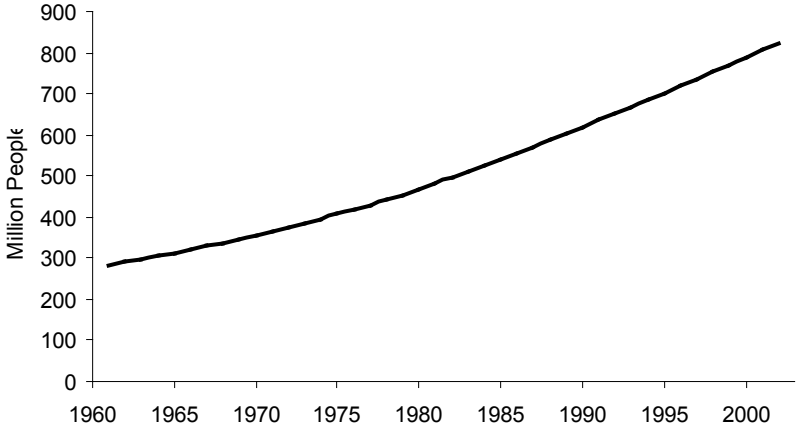


Figure 9.3.1: Population Trend

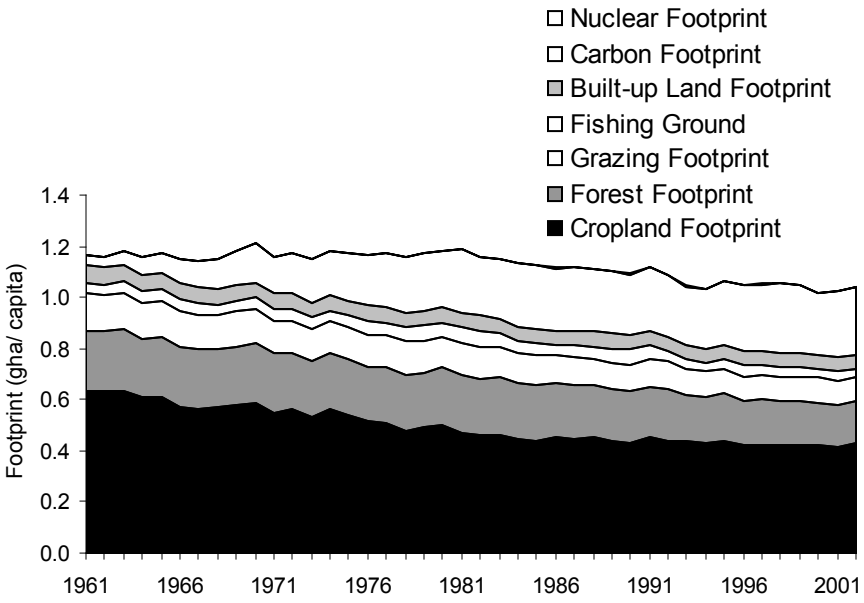


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

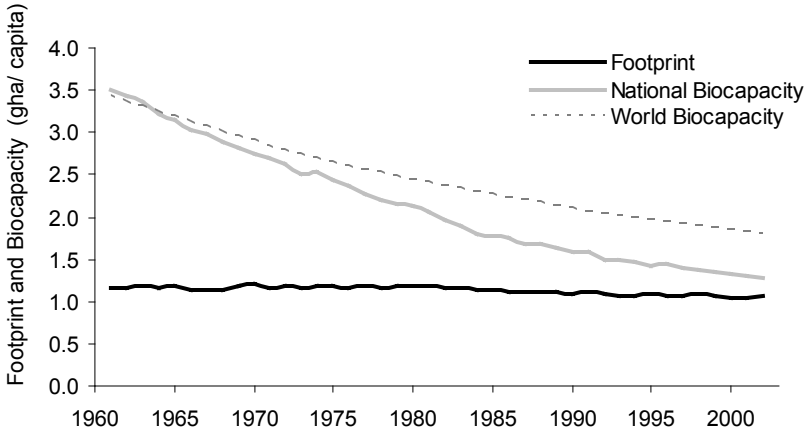


Figure 9.3.2: Footprint and Biocapacity Trend

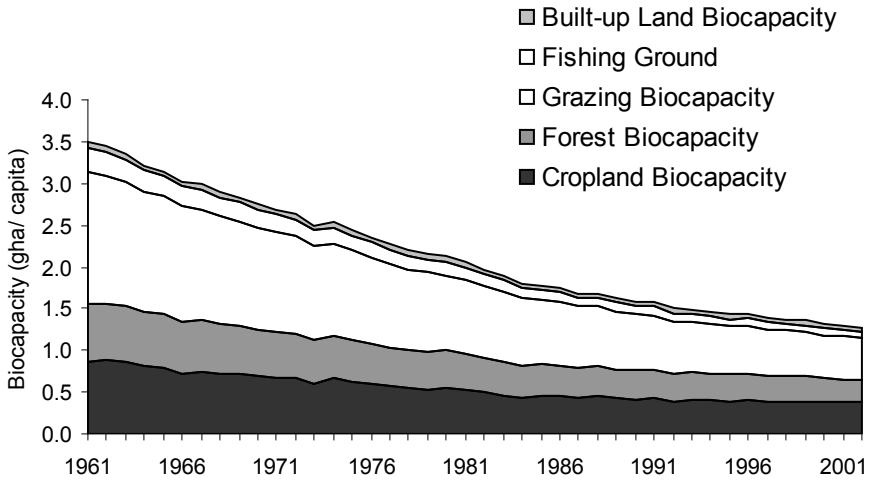


Figure 9.3.4: Biocapacity by Component (1961-2002)

Please see Appendix A for Further Country Footprint and Biocapacity Values

Africa

Algeria

9.1 Human Development Benchmarks

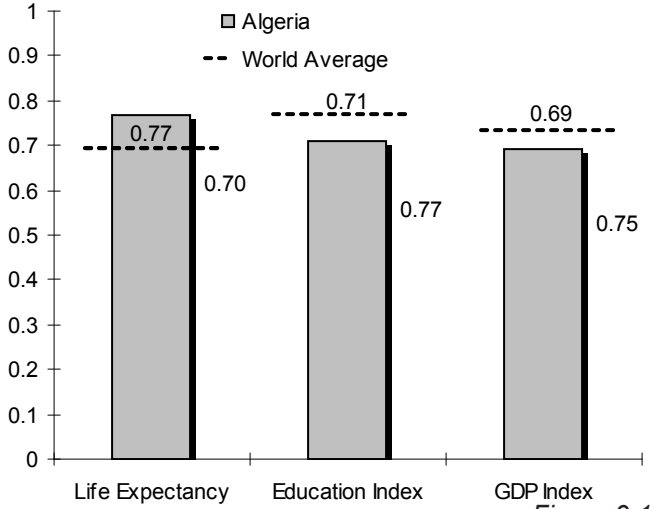


Figure 9.1.1: HDI Components, Indexed

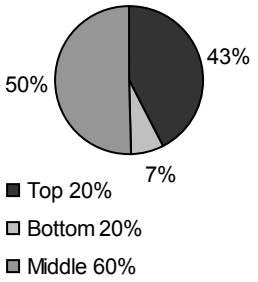


Figure 9.1.2: Income Distribution

Life Expectancy (years)	71
Gross Enrollment (%)	74%
Adult Literacy Rate (%)	70%
GDP per capita (PPP US$)	$6,107

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	60%
Male adult literacy rate (%)	80%
Female combined gross enrollment ratio (%)	72%
Male combined gross enrollment ratio (%)	76%
Female estimated earned income (PPP US$)	$2,896
Male estimated earned income (PPP US$)	$9,244

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	99%
Urban population with access to improved water source (%)	87%
Percentage of population undernourished (%)	5%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

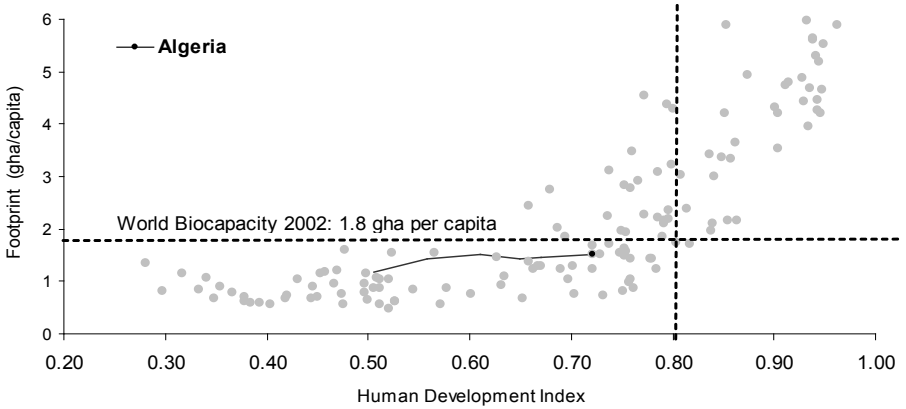


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$16.0	18.6	860
Exports	$25.9	4.2	6,249
Net (Exports - Imports)	$10.0	-14.4	
ODA (% of GDP)	0.3%		
Debt Service (% of GDP)	6.5%		

Table 9.2.1: Trade and Debt

	World	Africa	Algeria
Population (Millions)	6225	824	31
GDP per capita (US$)	$5,801	$794	$2,090
Footprint (gha/capita)	2.20	1.10	1.50
Biocapacity (gha/capita)	1.80	1.30	0.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

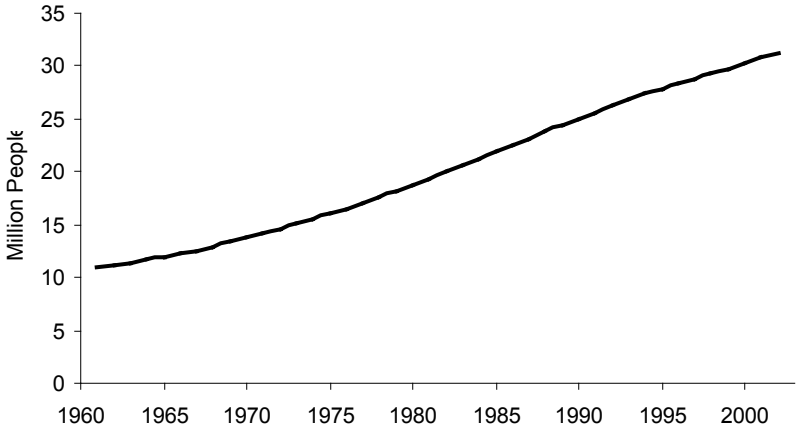


Figure 9.3.1: Population Trend

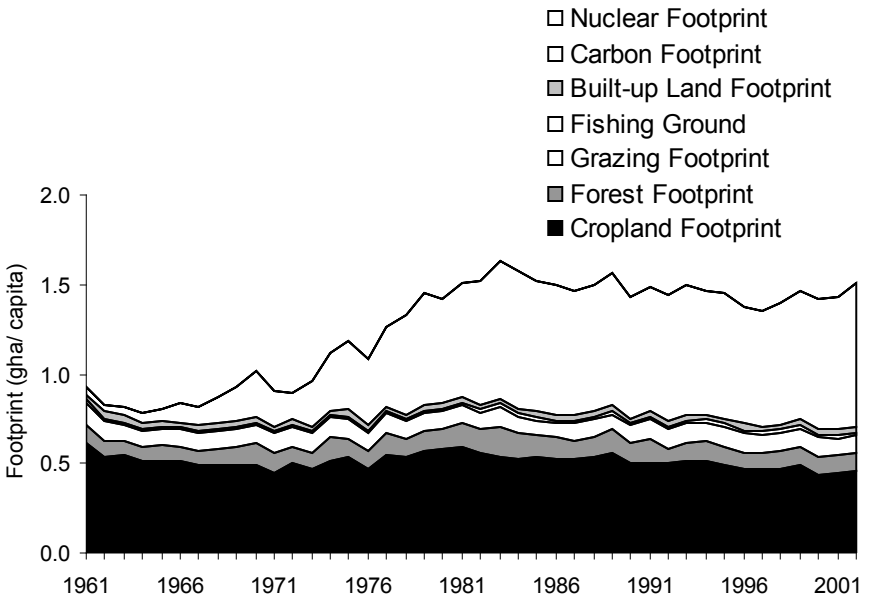


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

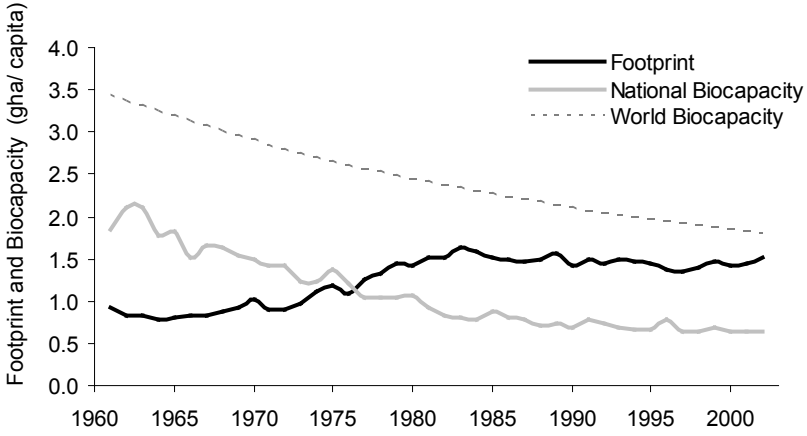


Figure 9.3.2: Footprint and Biocapacity Trend

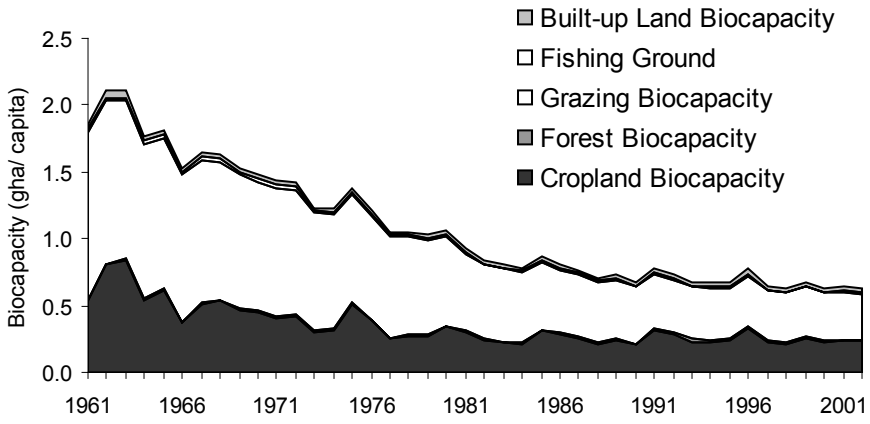


Figure 9.3.4: Biocapacity by Component (1961-2002)

Please see Appendix A for Further Country Footprint and Biocapacity Values

Algeria

Benin

9.1 Human Development Benchmarks

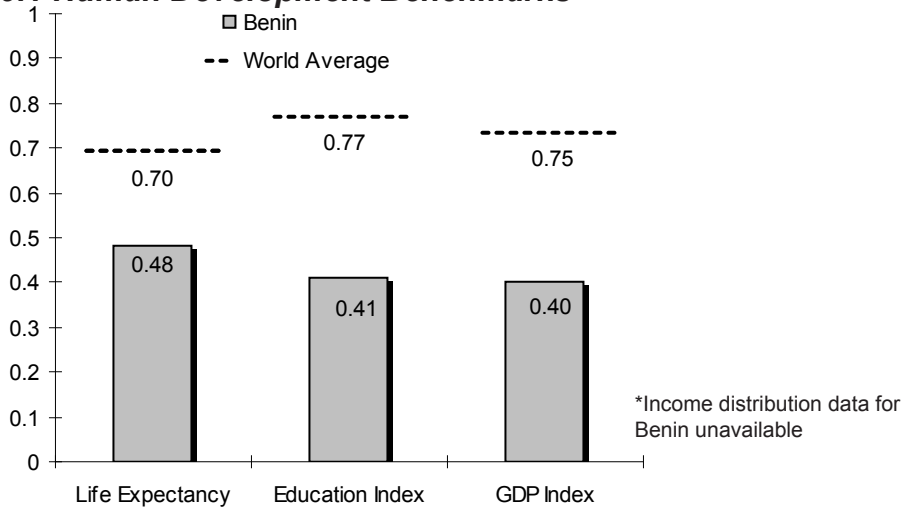


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	54
Gross Enrollment (%)	55%
Adult Literacy Rate (%)	34%
GDP per capita (PPP US$)	$1,115

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	23%
Male adult literacy rate (%)	46%
Female combined gross enrollment ratio (%)	43%
Male combined gross enrollment ratio (%)	66%
Female estimated earned income (PPP US$)	$910
Male estimated earned income (PPP US$)	$1,316

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	58%
Urban population with access to improved water source (%)	68%
Percentage of population undernourished (%)	15%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

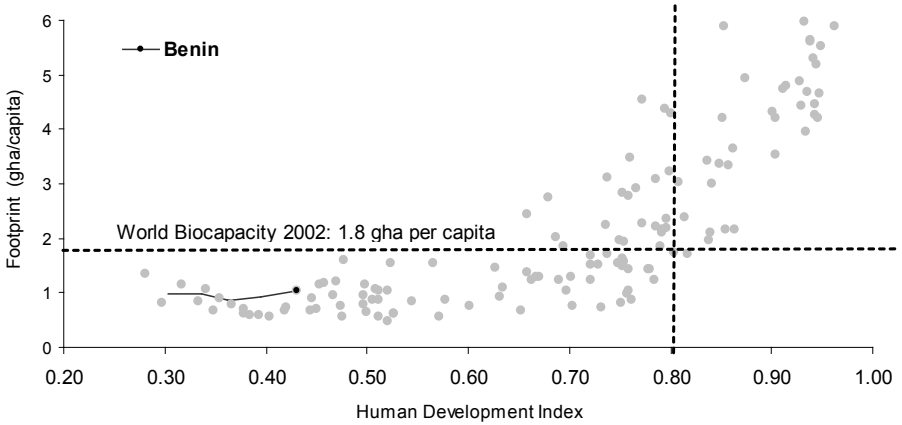


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$0.9	1.6	580
Exports	$0.5	0.9	544
Net (Exports - Imports)	-$0.5	-0.7	
ODA (% of GDP)	8.5%		
Debt Service (% of GDP)	1.7%		

Table 9.2.1: Trade and Debt

	World	Africa	Benin
Population (Millions)	6225	824	7
GDP per capita (US$)	$5,801	$794	$517
Footprint (gha/capita)	2.20	1.10	1.00
Biocapacity (gha/capita)	1.80	1.30	0.80

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

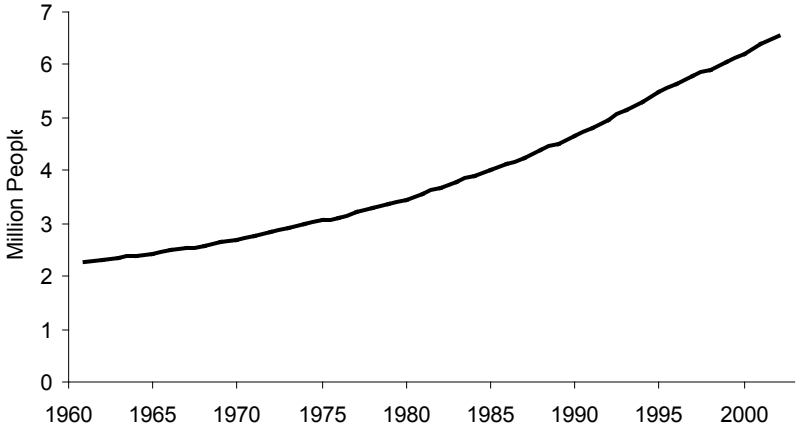


Figure 9.3.1: Population Trend

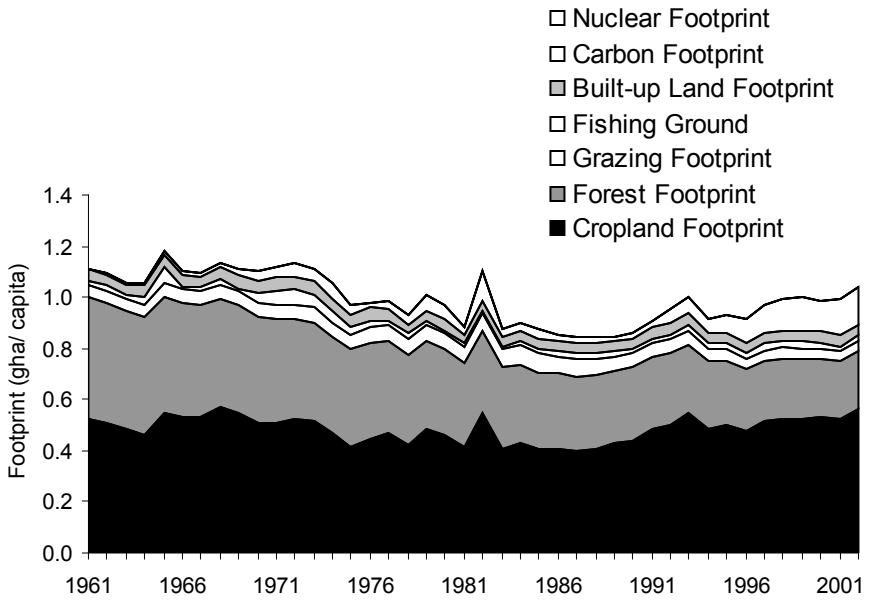


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

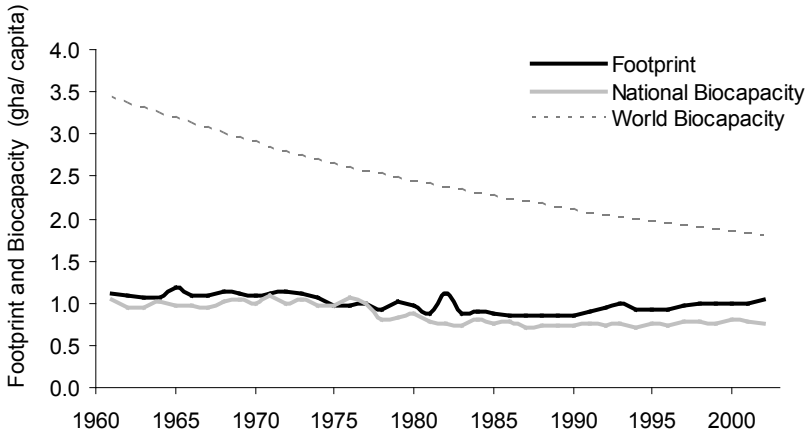


Figure 9.3.2: Footprint and Biocapacity Trend

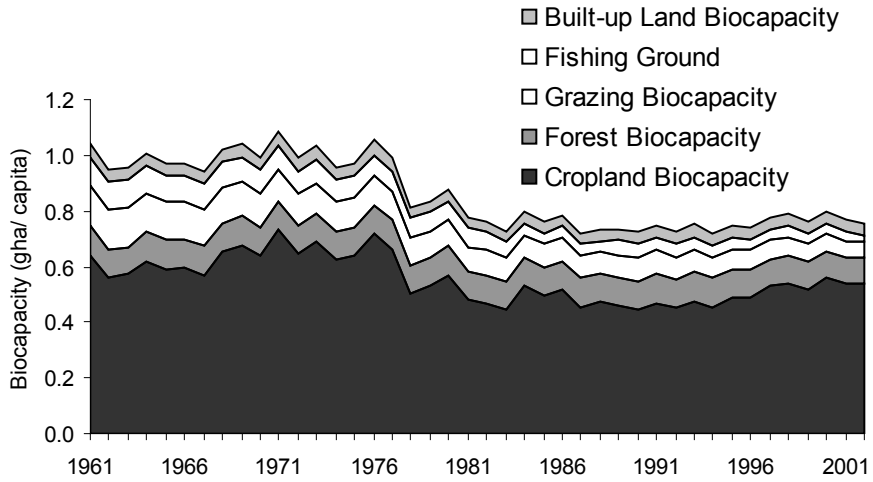


Figure 9.3.4: Biocapacity by Component (1961-2002)

Benin

Brazil

9.1 Human Development Benchmarks

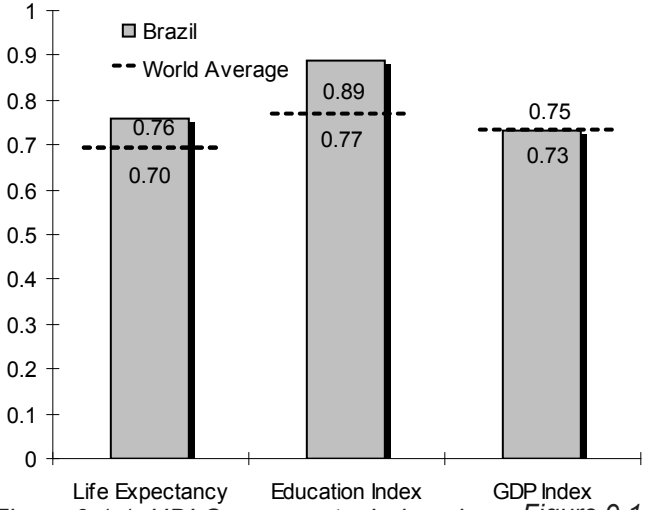


Figure 9.1.1: HDI Components, Indexed

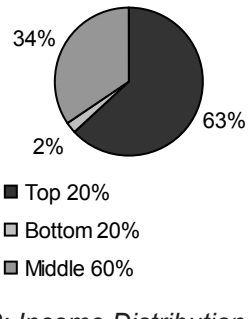


Figure 9.1.2: Income Distribution

Life Expectancy (years)	71
Gross Enrollment (%)	91%
Adult Literacy Rate (%)	88%
GDP per capita (PPP US$)	$7,790

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	89%
Male adult literacy rate (%)	88%
Female combined gross enrollment ratio (%)	93%
Male combined gross enrollment ratio (%)	89%
Female estimated earned income (PPP US$)	$4,704
Male estimated earned income (PPP US$)	$10,963

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	83%
Urban population with access to improved water source (%)	89%
Percentage of population undernourished (%)	9%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

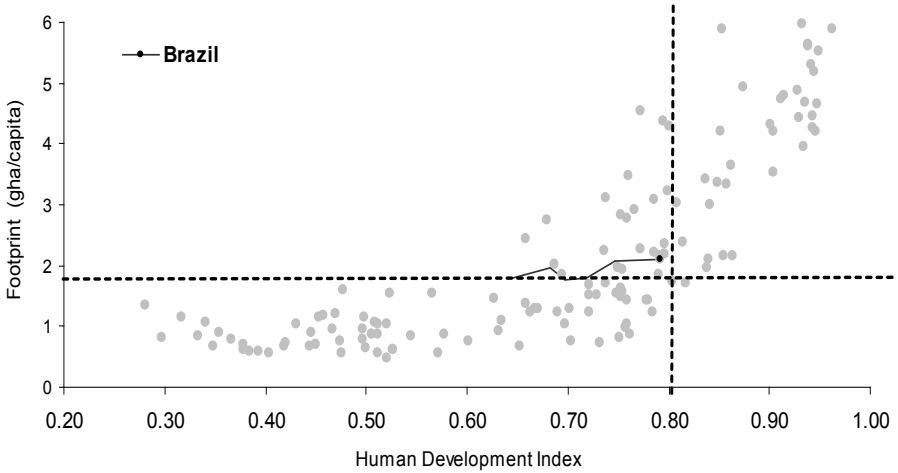


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$64.0	34.8	1,837
Exports	$83.7	135.7	617
Net (Exports - Imports)	$19.7	100.9	
ODA (% of GDP)	0.1%		
Debt Service (% of GDP)	11.5%		

Table 9.2.1: Trade and Debt

	World	Africa	Brazil
Population (Millions)	6225	824	176
GDP per capita (US$)	$5,801	$794	$2,788
Footprint (gha/capita)	2.20	1.10	2.10
Biocapacity (gha/capita)	1.80	1.30	10.10

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

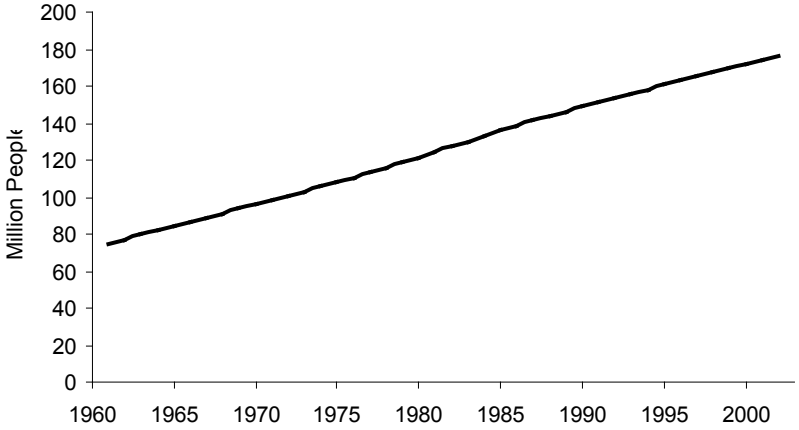


Figure 9.3.1: Population Trend

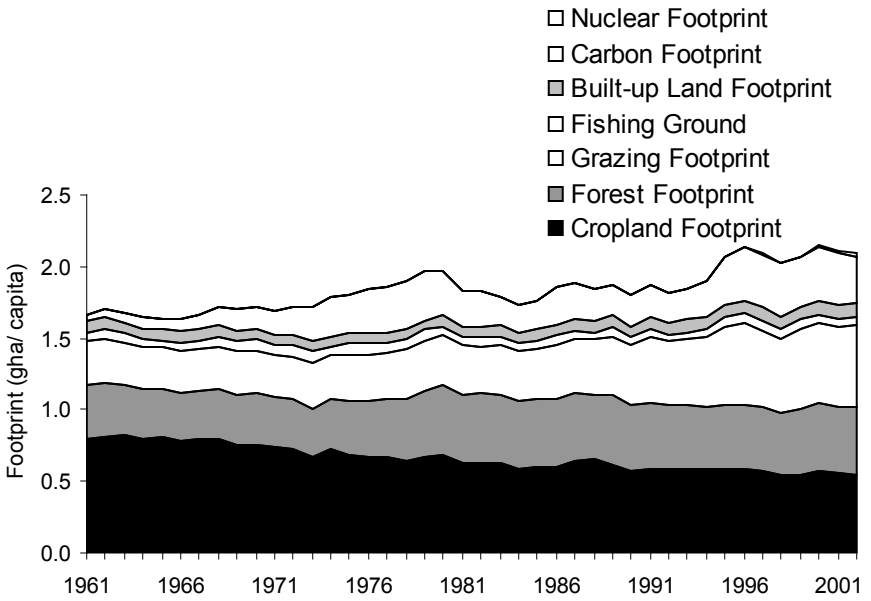


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

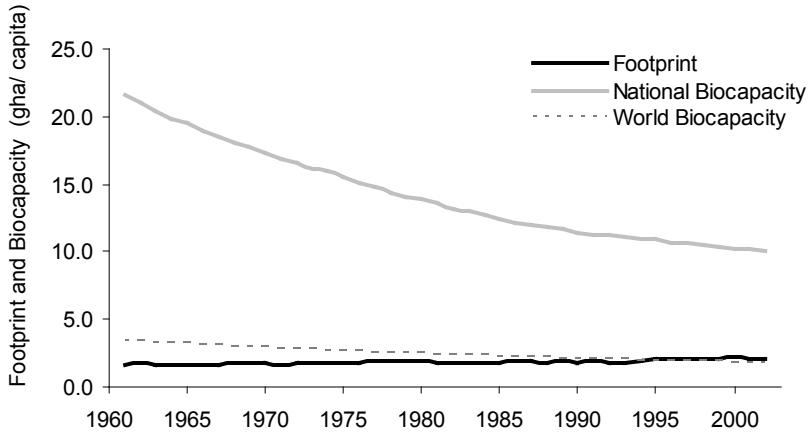


Figure 9.3.2: Footprint and Biocapacity Trend

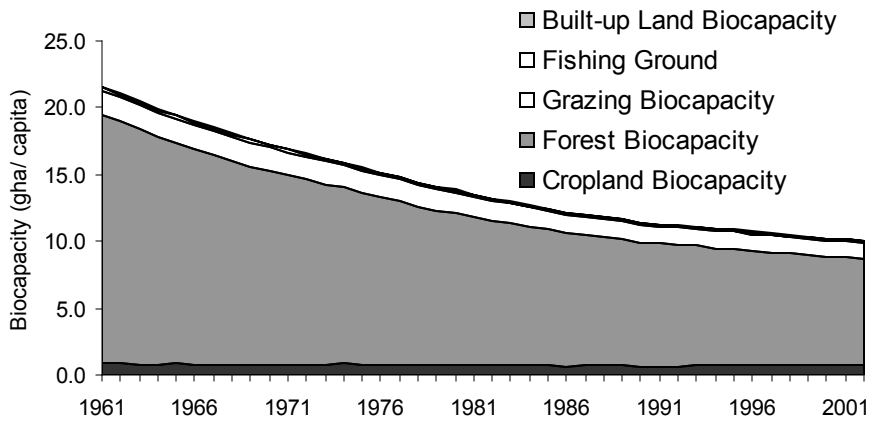


Figure 9.3.4: Biocapacity by Component (1961-2002)

Brazil

Burkina Faso

9.1 Human Development Benchmarks

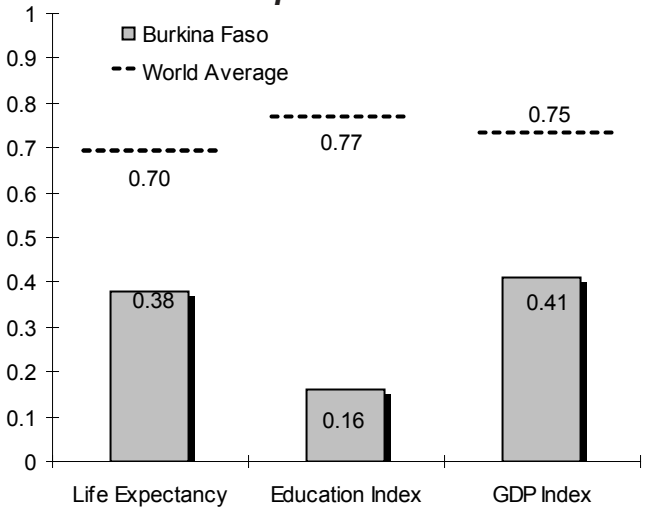


Figure 9.1.1: HDI Components, Indexed

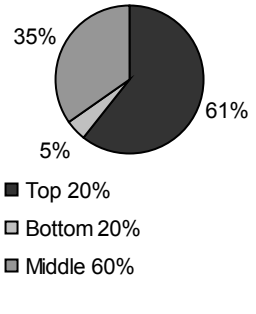


Figure 9.1.2: Income Distribution

Life Expectancy (years)	48
Gross Enrollment (%)	24%
Adult Literacy Rate (%)	13%
GDP per capita (PPP US$)	$1,174

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	8%
Male adult literacy rate (%)	19%
Female combined gross enrollment ratio (%)	20%
Male combined gross enrollment ratio (%)	27%
Female estimated earned income (PPP US$)	$986
Male estimated earned income (PPP US$)	$1,357

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	45%
Urban population with access to improved water source (%)	51%
Percentage of population undernourished (%)	19%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

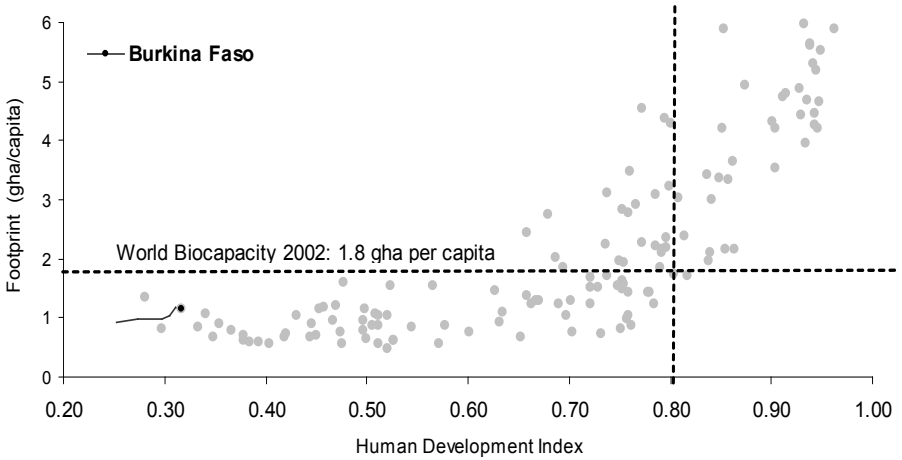


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$1.0	1.7	553
Exports	$0.4	0.8	487
Net (Exports - Imports)	-$0.6	-1.0	
ODA (% of GDP)	10.8%		
Debt Service (% of GDP)	1.2%		

Table 9.2.1: Trade and Debt

	World	Africa	Burkina Faso
Population (Millions)	6225	824	13
GDP per capita (US$)	$5,801	$794	$345
Footprint (gha/capita)	2.20	1.10	1.10
Biocapacity (gha/capita)	1.80	1.30	1.00

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

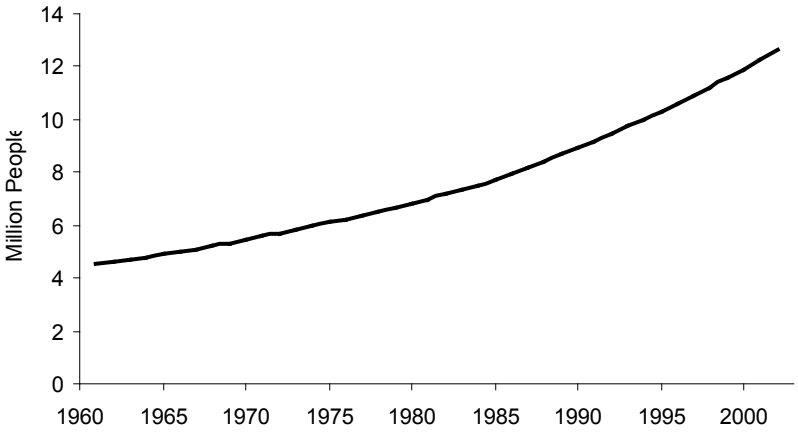


Figure 9.3.1: Population Trend

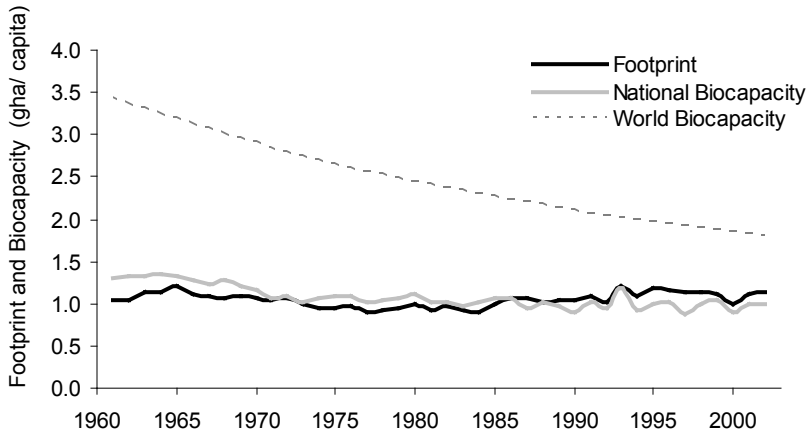


Figure 9.3.2: Footprint and Biocapacity Trend

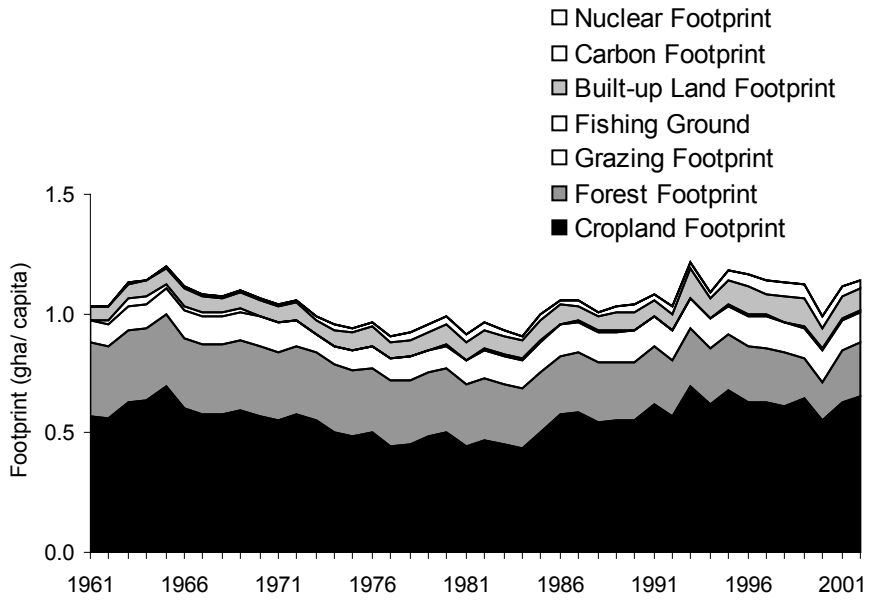


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

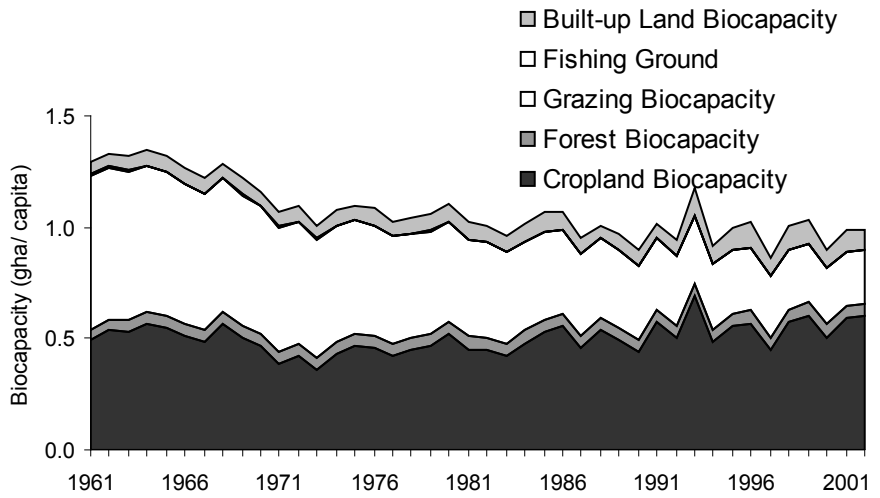


Figure 9.3.4: Biocapacity by Component (1961-2002)

Burkina Faso

Burundi

9.1 Human Development Benchmarks

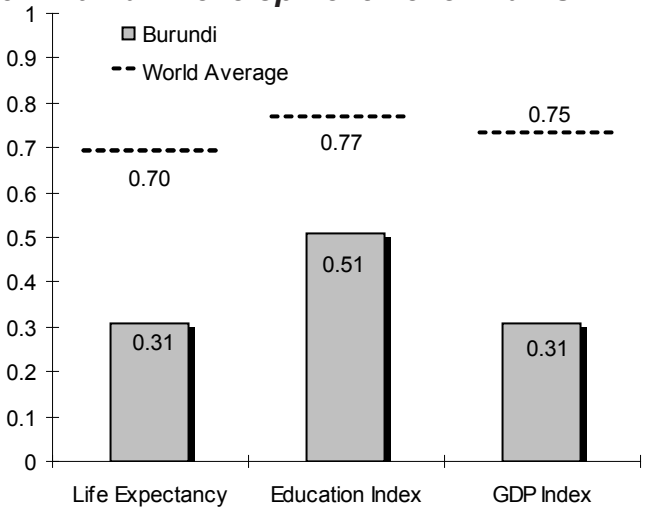


Figure 9.1.1: HDI Components, Indexed

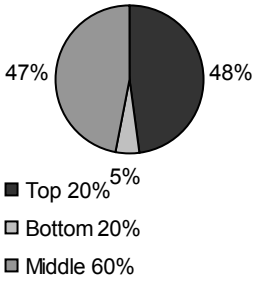


Figure 9.1.2: Income Distribution

Life Expectancy (years)	44
Gross Enrollment (%)	35%
Adult Literacy Rate (%)	59%
GDP per capita (PPP US$)	$648

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	52%
Male adult literacy rate (%)	67%
Female combined gross enrollment ratio (%)	31%
Male combined gross enrollment ratio (%)	40%
Female estimated earned income (PPP US$)	$545
Male estimated earned income (PPP US$)	$758

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	36%
Urban population with access to improved water source (%)	79%
Percentage of population undernourished (%)	68%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

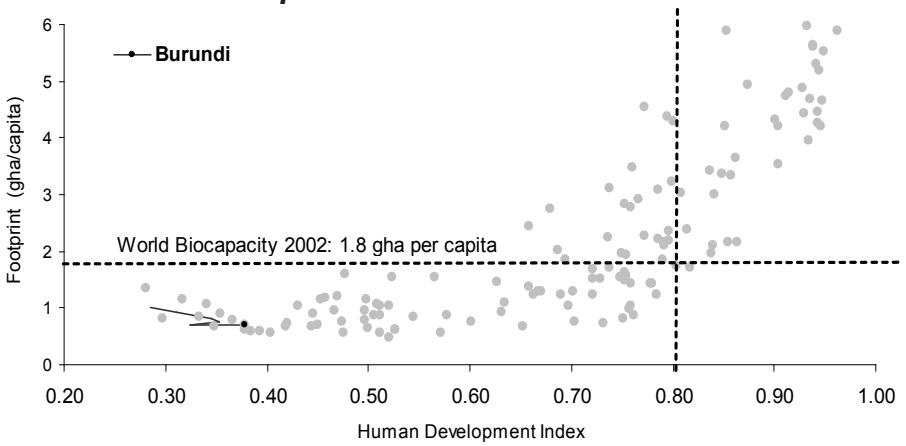


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$0.1	0.4	267
Exports	$0.0	0.1	632
Net (Exports - Imports)	-$0.1	-0.3	
ODA (% of GDP)	37.6%		
Debt Service (% of GDP)	4.9%		

Table 9.2.1: Trade and Debt

	World	Africa	Burundi
Population (Millions)	6225	824	7
GDP per capita (US$)	$5,801	$794	$83
Footprint (gha/capita)	2.20	1.10	0.70
Biocapacity (gha/capita)	1.80	1.30	0.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

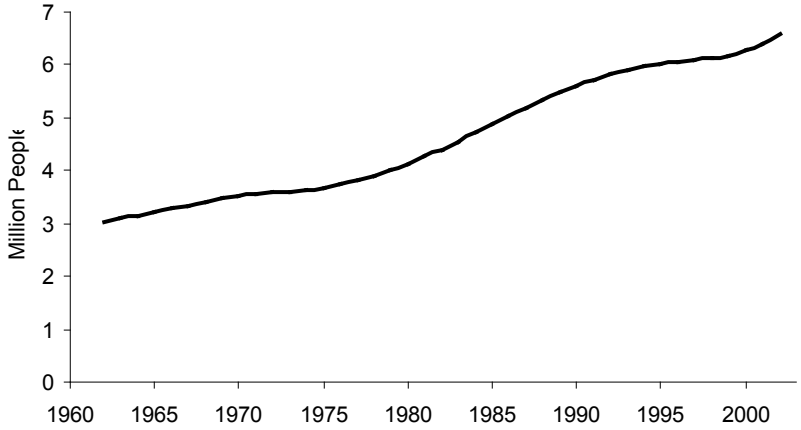


Figure 9.3.1: Population Trend

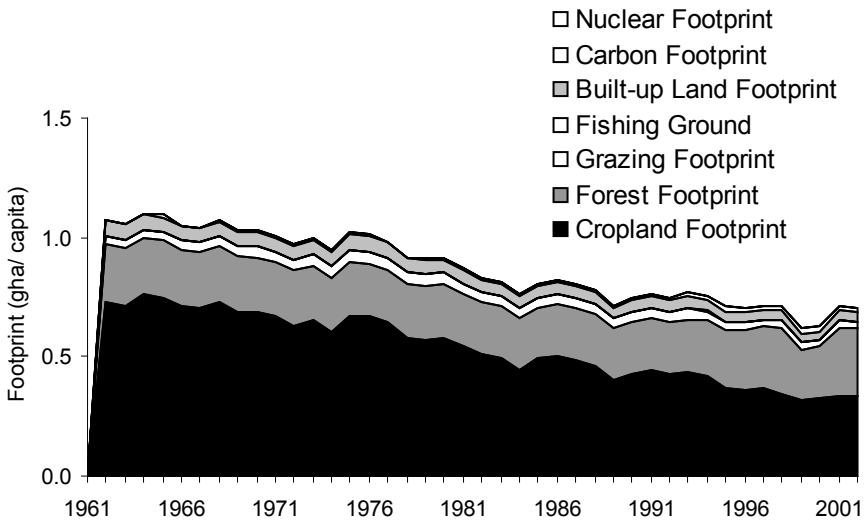


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

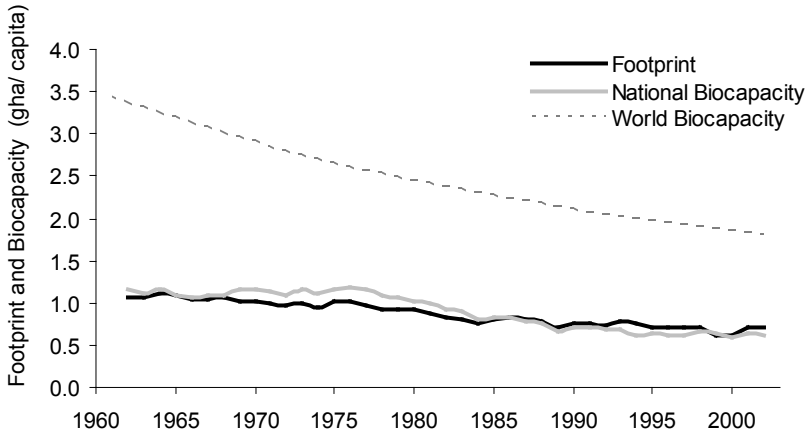


Figure 9.3.2: Footprint and Biocapacity Trend

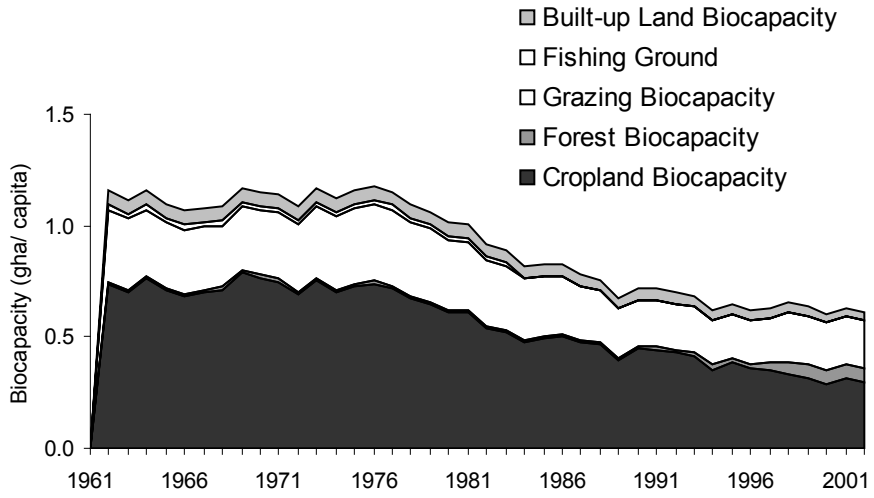


Figure 9.3.4: Biocapacity by Component (1961-2002)

Burundi

China

9.1 Human Development Benchmarks

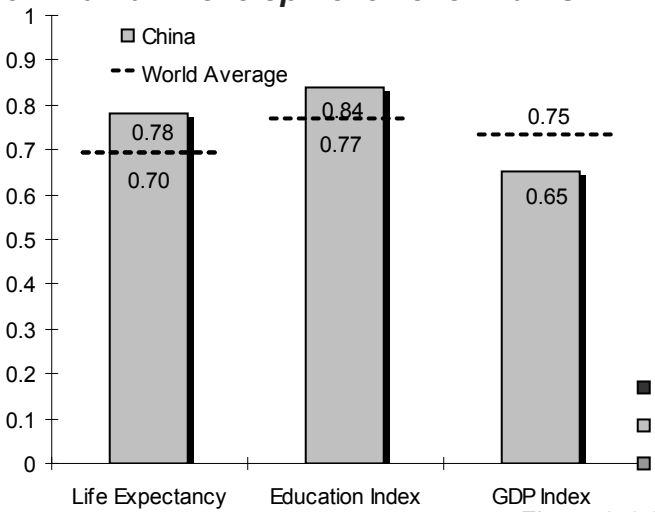


Figure 9.1.1: HDI Components, Indexed

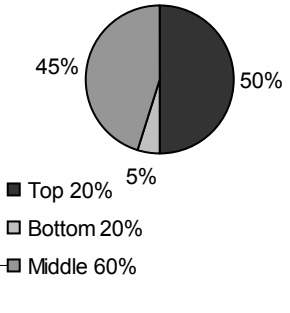


Figure 9.1.2: Income Distribution

Life Expectancy (years)	72
Gross Enrollment (%)	69%
Adult Literacy Rate (%)	91%
GDP per capita (PPP US$)	$5,003

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	87%
Male adult literacy rate (%)	95%
Female combined gross enrollment ratio (%)	68%
Male combined gross enrollment ratio (%)	70%
Female estimated earned income (PPP US$)	$3,961
Male estimated earned income (PPP US$)	$5,976

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	69%
Urban population with access to improved water source (%)	77%
Percentage of population undernourished (%)	11%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

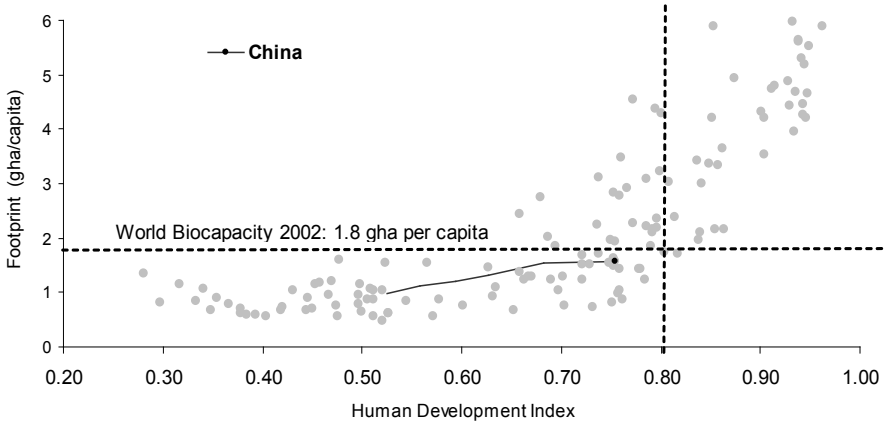


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$453.4	421.5	1,076
Exports	$481.8	238.0	2,024
Net (Exports - Imports)	$28.3	-183.5	
ODA (% of GDP)	0.1%		
Debt Service (% of GDP)	2.6%		

Table 9.2.1: Trade and Debt

	World	Africa	China
Population (Millions)	6225	824	1302
GDP per capita (US$)	$5,801	$794	$1,100
Footprint (gha/capita)	2.20	1.10	1.60
Biocapacity (gha/capita)	1.80	1.30	0.80

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

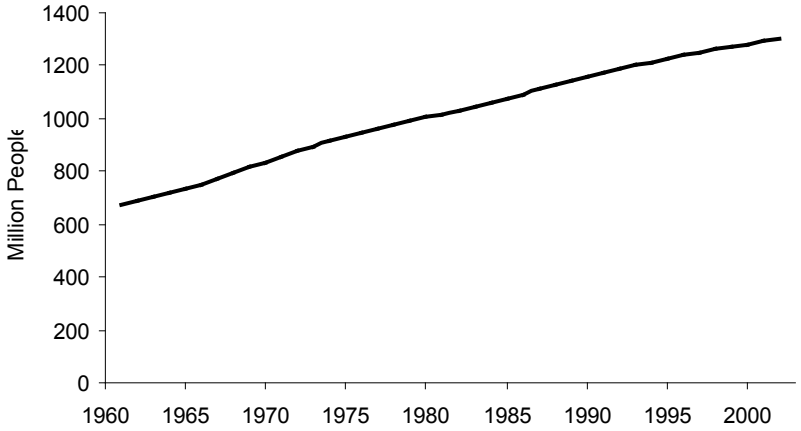


Figure 9.3.1: Population Trend

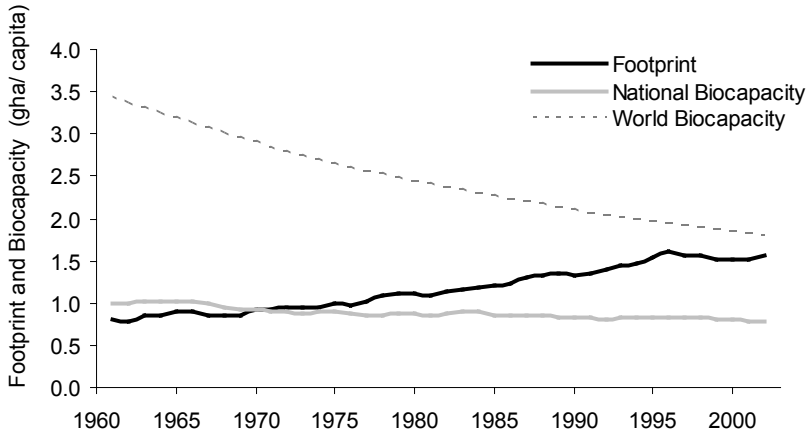


Figure 9.3.2: Footprint and Biocapacity Trend

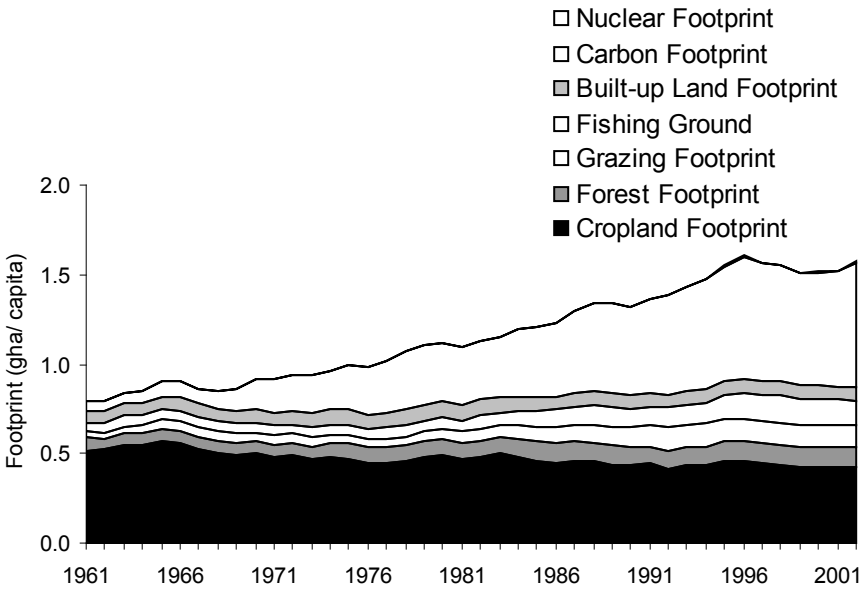


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

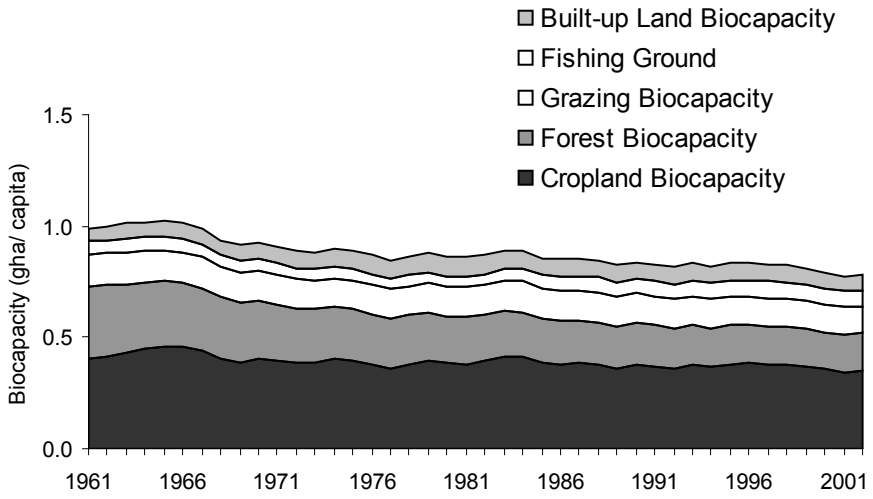


Figure 9.3.4: Biocapacity by Component (1961-2002)

China

Egypt

9.1 Human Development Benchmarks

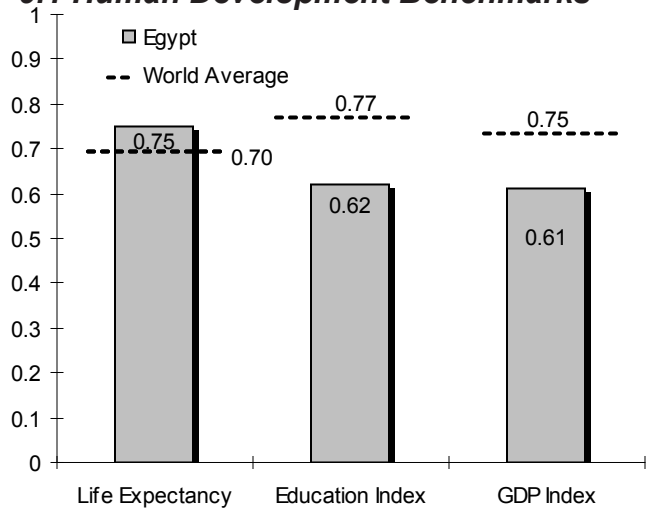


Figure 9.1.1: HDI Components, Indexed

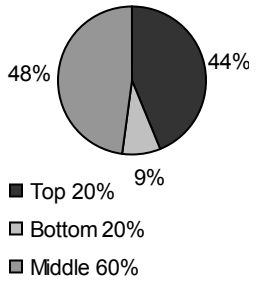


Figure 9.1.2: Income Distribution

Life Expectancy (years)	70
Gross Enrollment (%)	74%
Adult Literacy Rate (%)	56%
GDP per capita (PPP US$)	$3,950

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	44%
Male adult literacy rate (%)	67%
Female combined gross enrollment ratio (%)	N/A
Male combined gross enrollment ratio (%)	N/A
Female estimated earned income (PPP US$)	$1,614
Male estimated earned income (PPP US$)	$6,203

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	98%
Urban population with access to improved water source (%)	68%
Percentage of population undernourished	3%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

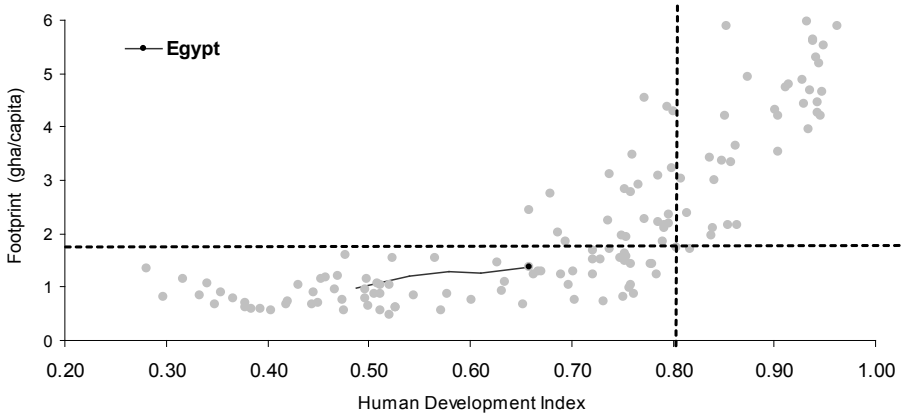


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$0.2	28.3	8
Exports	$0.2	3.4	65
Net (Exports - Imports)	$0.0	-24.9	
ODA (% of GDP)	1.1%		
Debt Service (% of GDP)	3.4%		

Table 9.2.1: Trade and Debt

	World	Africa	Egypt
Population (Millions)	6225	824	71
GDP per capita (US$)	$5,801	$794	$1,220
Footprint (gha/capita)	2.20	1.10	1.40
Biocapacity (gha/capita)	1.80	1.30	0.40

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

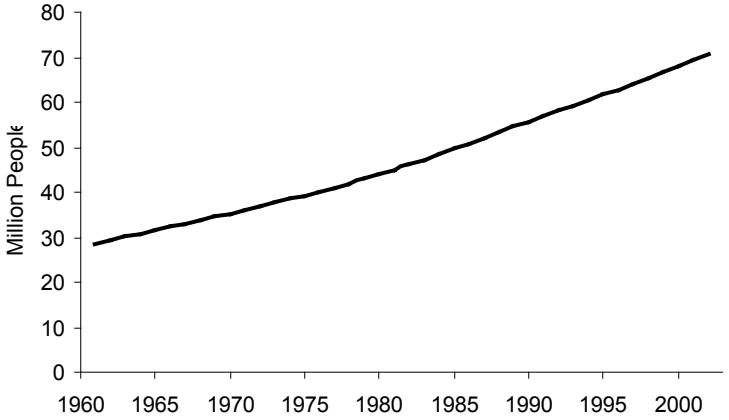


Figure 9.3.1: Population Trend

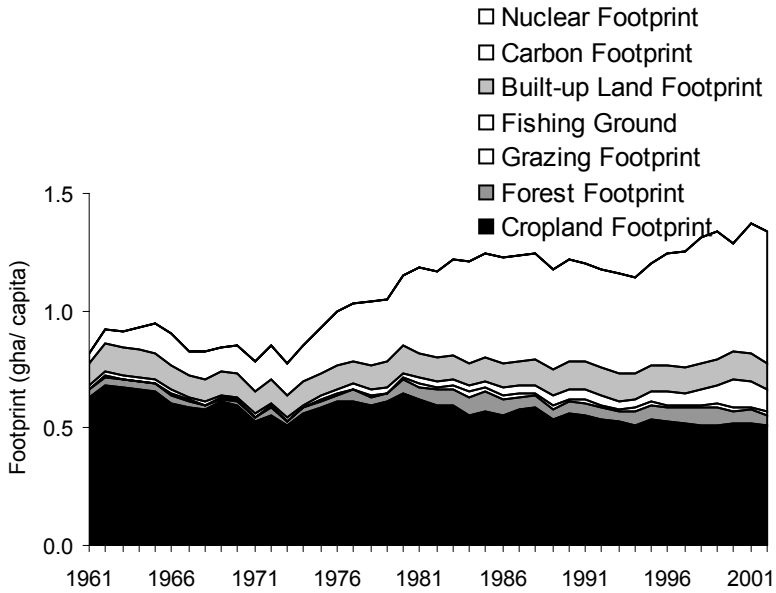


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

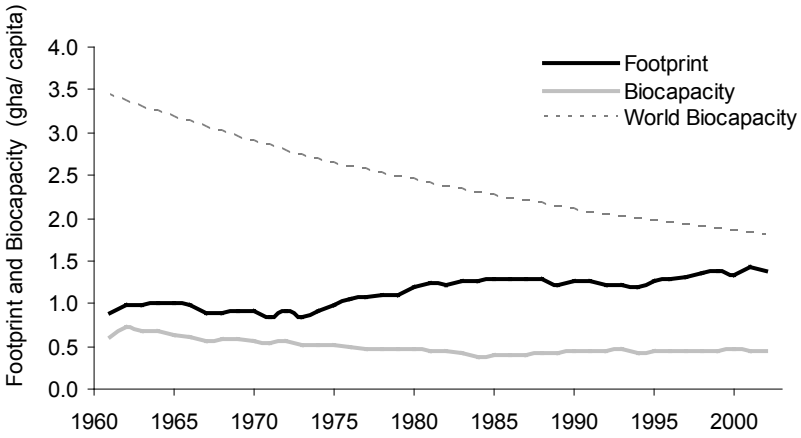


Figure 9.3.2: Footprint and Biocapacity Trend

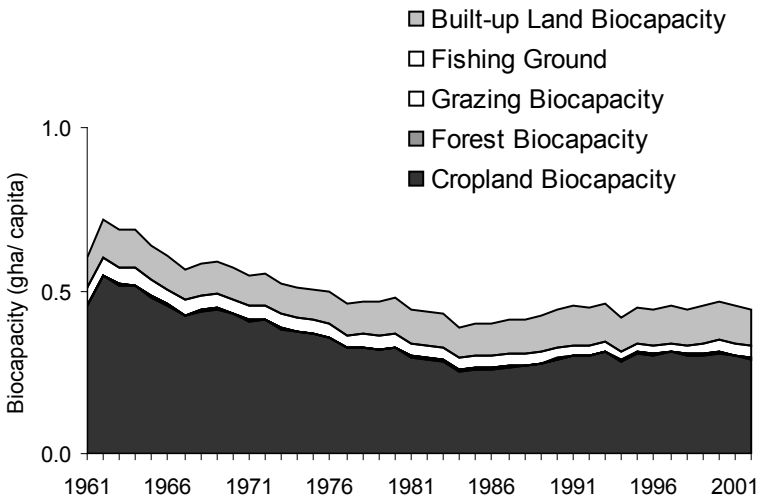


Figure 9.3.4: Biocapacity by Component (1961-2002)

Egypt

Ethiopia

9.1 Human Development Benchmarks

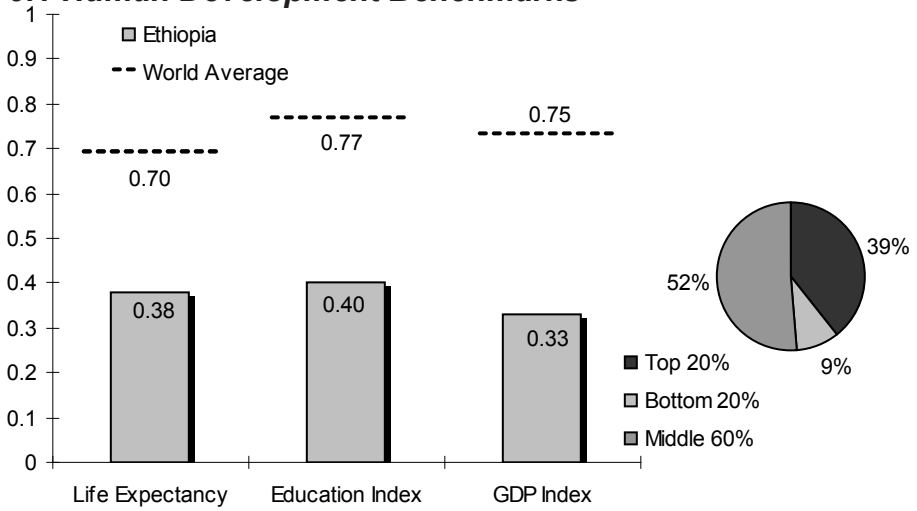


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	48
Gross Enrollment (%)	36%
Adult Literacy Rate (%)	42%
GDP per capita (PPP US$)	$711

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	34%
Male adult literacy rate (%)	49%
Female combined gross enrollment ratio (%)	29%
Male combined gross enrollment ratio (%)	42%
Female estimated earned income (PPP US$)	$487
Male estimated earned income (PPP US$)	$931

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	19%
Urban population with access to improved water source (%)	22%
Percentage of population undernourished (%)	46%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

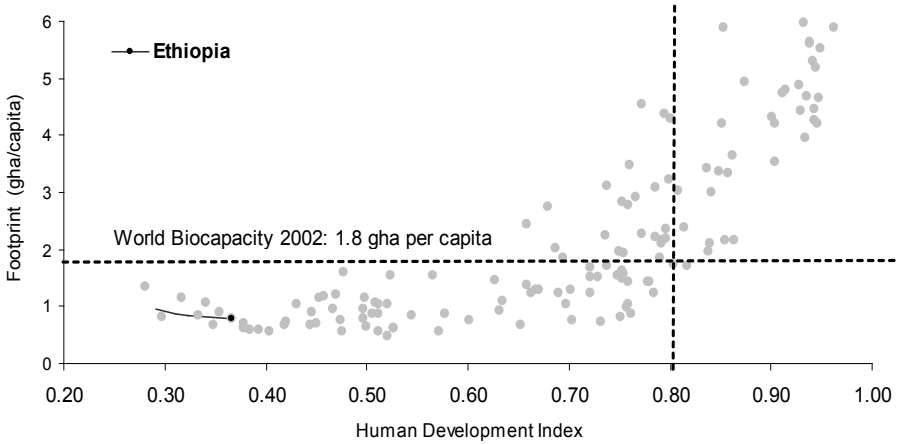


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1985 - 2003 (HDI data unavailable prior to 1985)

	Billion US$	Million gha	$/gha
Imports	$2.5	5.3	467
Exports	$1.1	1.3	878
Net (Exports - Imports)	-$1.3	-4.0	
ODA (% of GDP)	22.6%		
Debt Service (% of GDP)	1.4%		

Table 9.2.1: Trade and Debt

	World	Africa	Ethiopia
Population (Millions)	6225	824	69
GDP per capita (US$)	$5,801	$794	$97
Footprint (gha/capita)	2.20	1.10	0.80
Biocapacity (gha/capita)	1.80	1.30	0.50

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

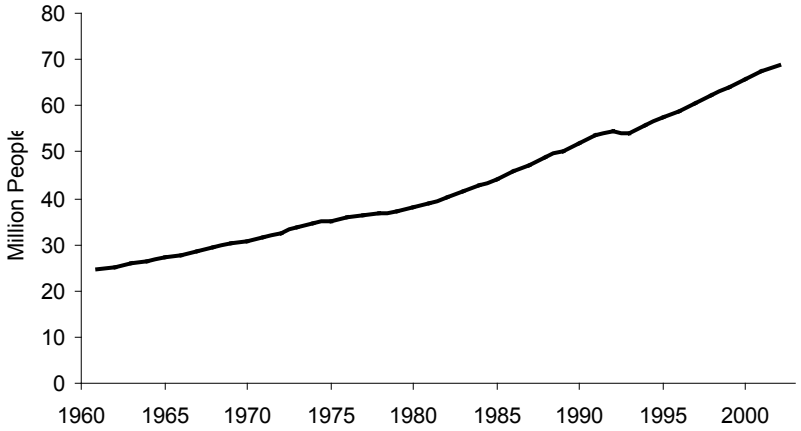


Figure 9.3.1: Population Trend

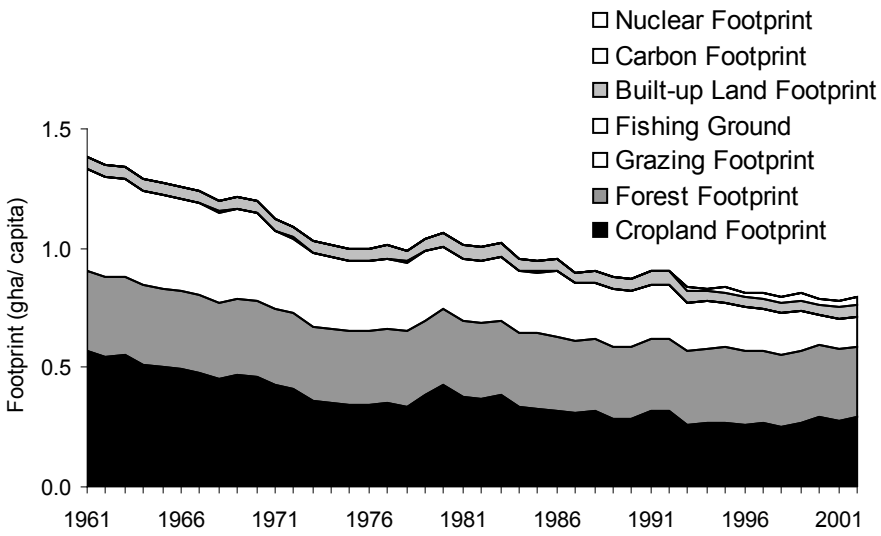


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

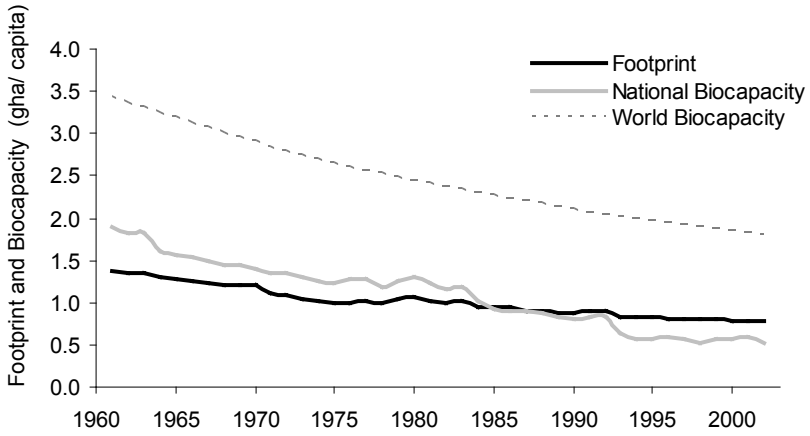


Figure 9.3.2: Footprint and Biocapacity Trend

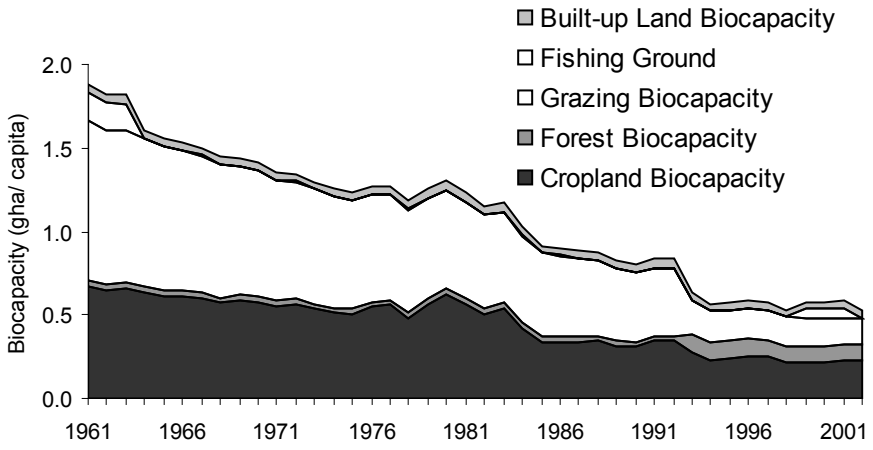


Figure 9.3.4: Biocapacity by Component (1961-2002)

Ethiopia

France

9.1 Human Development Benchmarks

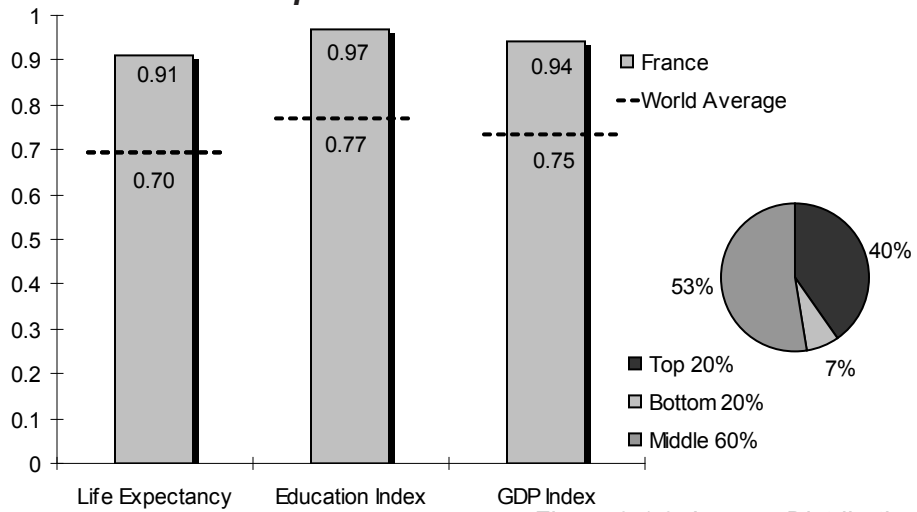


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	80
Gross Enrollment (%)	92%
Adult Literacy Rate (%)	NA
GDP per capita (PPP US$)	$27,677

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female combined gross enrollment ratio (%)	94%
Male combined gross enrollment ratio (%)	90%
Female estimated earned income (PPP US$)	$20,642
Male estimated earned income (PPP US$)	$35,123

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	NA
Urban population with access to improved water source (%)	NA
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

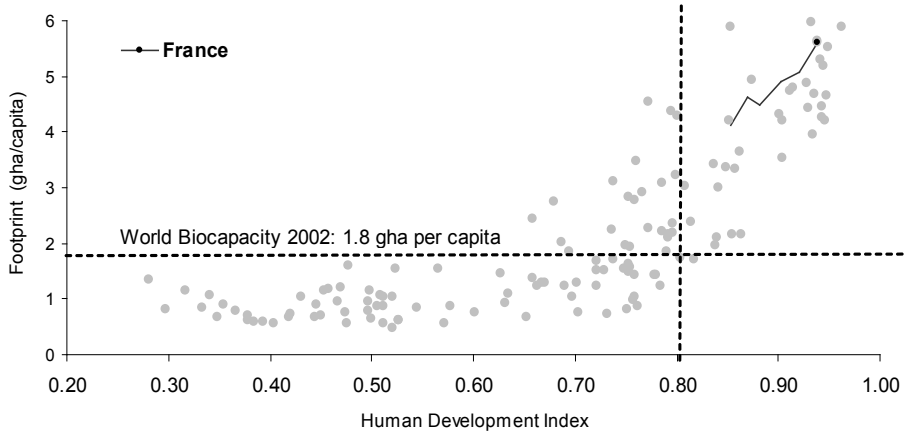


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$439.4	169.1	2,598
Exports	$457.0	169.0	2,704
Net (Exports - Imports)	$17.6	-0.1	
ODA (% of GDP)	0.0%		
Debt Service (% of GDP)	0.0%		

Table 9.2.1: Trade and Debt

	World	Africa	France
Population (Millions)	6225	824	60
GDP per capita (US$)	$5,801	$794	$29,410
Footprint (gha/capita)	2.20	1.10	5.60
Biocapacity (gha/capita)	1.80	1.30	3.20

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

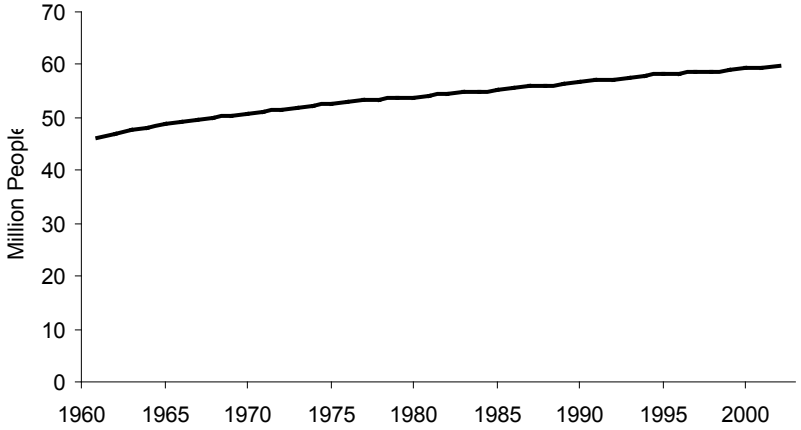


Figure 9.3.1: Population Trend

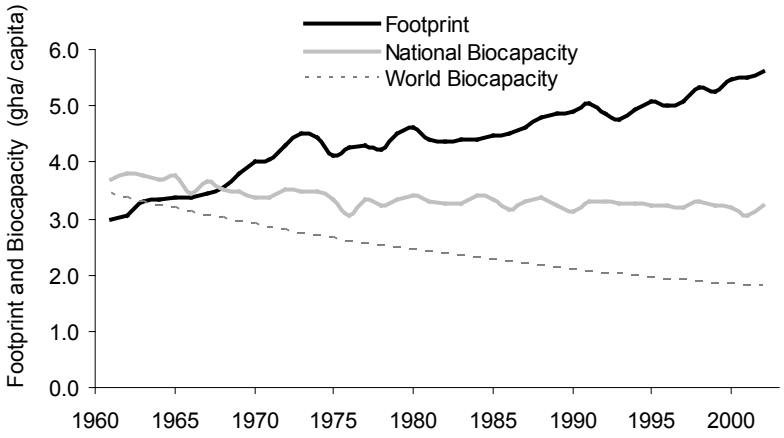


Figure 9.3.2: Footprint and Biocapacity Trend

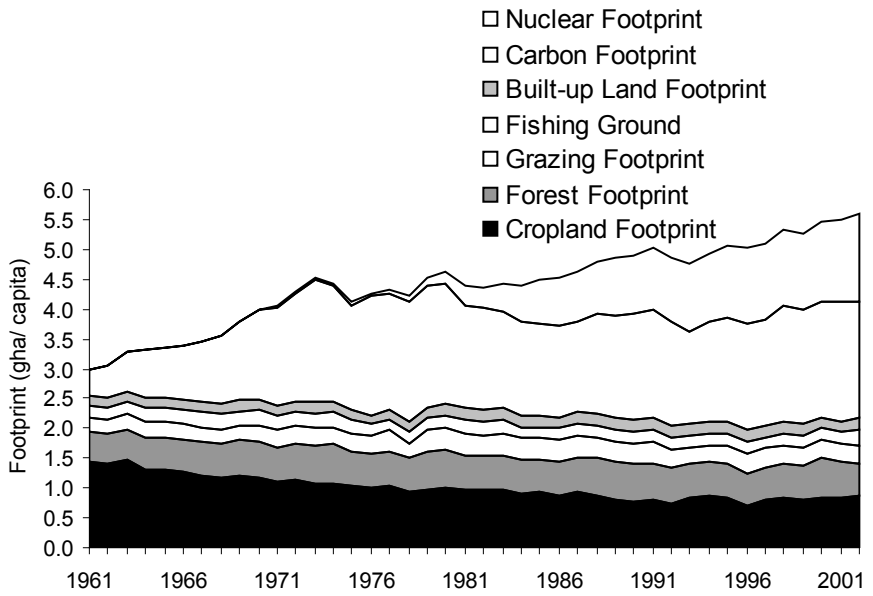


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

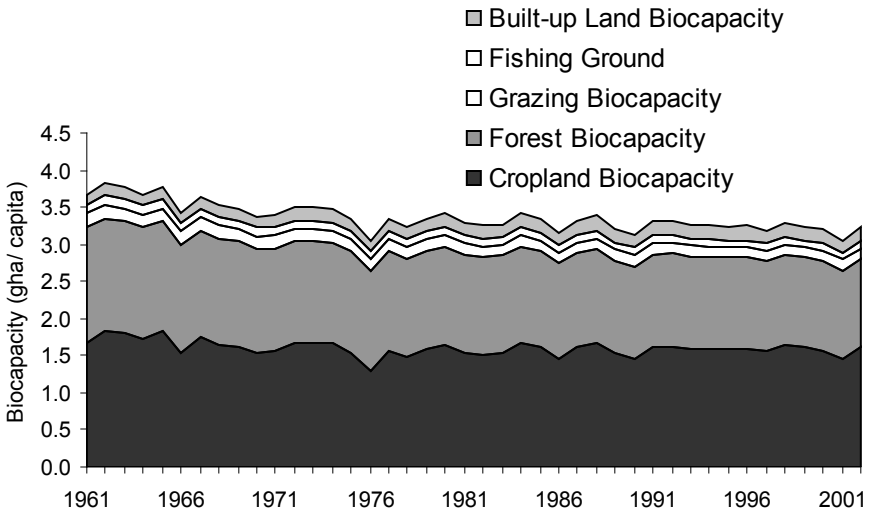


Figure 9.3.4: Biocapacity by Component (1961-2002)

France

Germany

9.1 Human Development Benchmarks

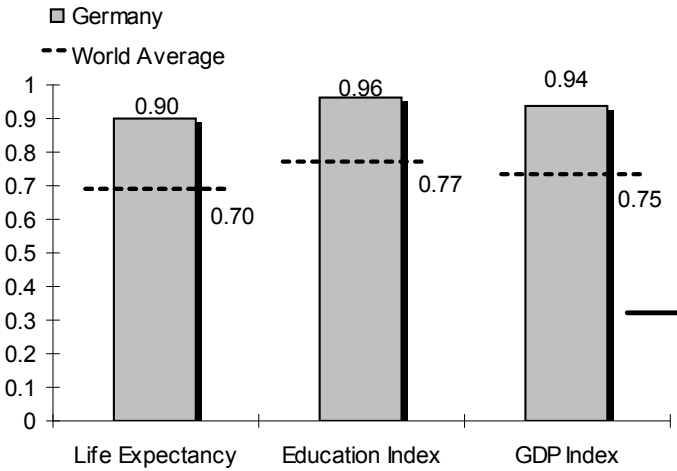


Figure 9.1.1: HDI Components, Indexed

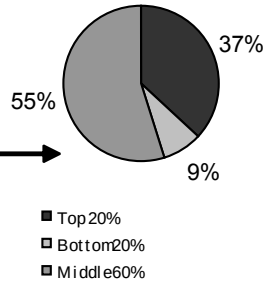


Figure 9.1.2: Income Distribution

Urban population with access to improved sanitation facilities (%)	100%
Urban population with access to improved water source (%)	100%
Percentage of population undernourished	NA

Table 9.1.1: HDI Components, Absolutes

Life Expectancy (years)	79
Gross Enrollment (%)	89
Adult Literacy Rate (%)	NA
GDP Per Capita (PPP US$)	$27,756

Table 9.1.2: Gender Related Development

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female Combined gross enrolment ratio (%)	88%
Male Combined gross enrolment ratio (%)	90%
Female estimated earned income (PPP US$)	$19,534
Male estimated earned income (PPP US$)	$36,258

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

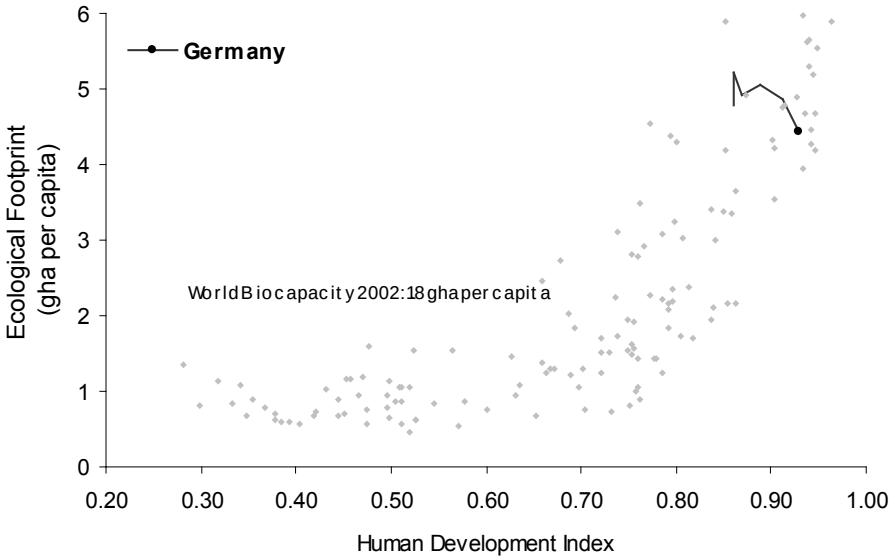


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$769.0	263.5	2,919
Exports	$865.2	277.2	3,121
Net (Exports - Imports)	$96.1	13.7	
ODA (% of GDP)	NA		
Debt Service (% of GDP)	NA		

Table 9.2.1: Trade and Debt

	World	Africa	Germany
Population (Millions)	6225	824	82
GDP per capita (US$)	$5,801	$794	$29,115
Ecological Footprint (gha per capita)	2.20	1.10	4.44
Biocapacity (gha per capita)	1.80	1.30	1.81

Table 9.2.2: Population, GDP and Ecological Footprint

9.3 Ecological Time Trends

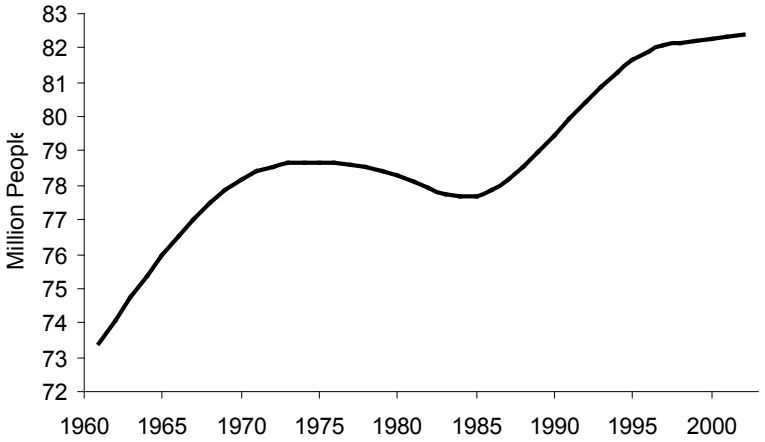


Figure 9.3.1: Population Trend

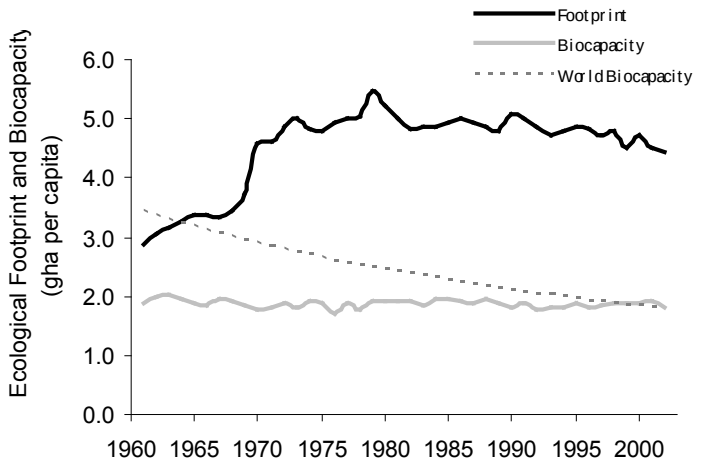


Figure 9.3.2: Footprint and Biocapacity Trend

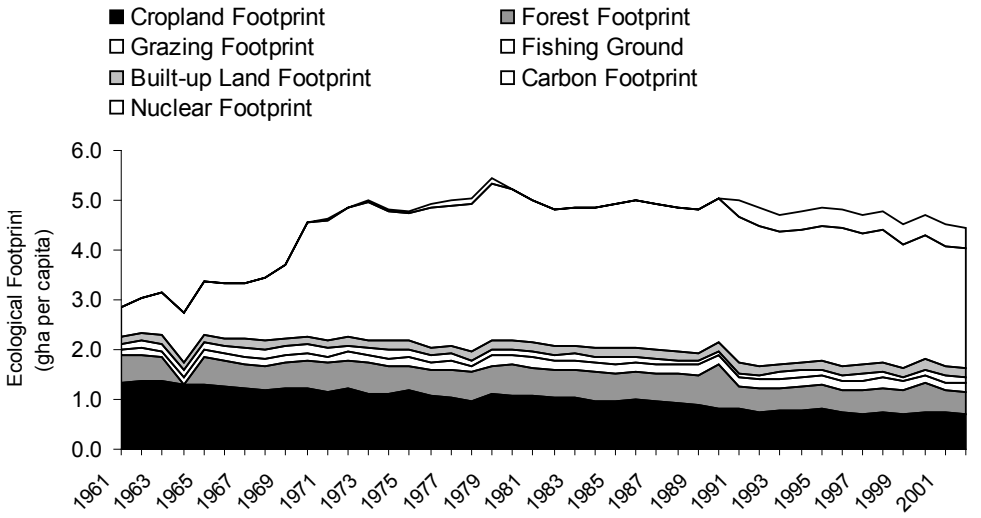


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

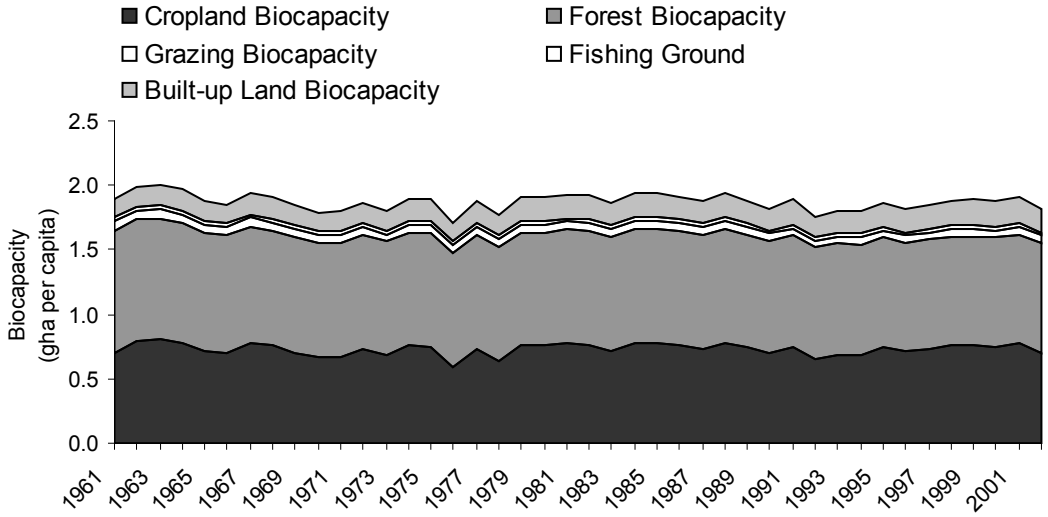


Figure 9.3.4: Biocapacity by Component (1961-2002)

Ghana

9.1 Human Development Benchmarks

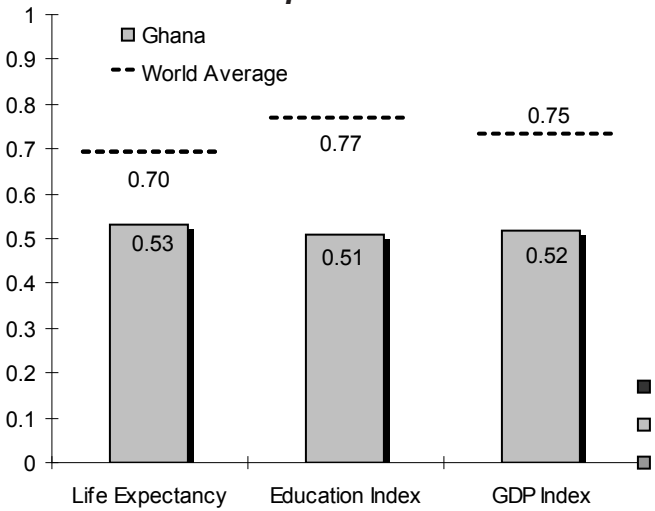


Figure 9.1.1: HDI Components, Indexed

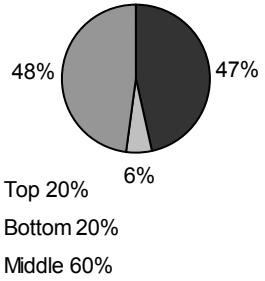


Figure 9.1.2: Income Distribution

Life Expectancy (years)	57
Gross Enrollment (%)	46%
Adult Literacy Rate (%)	54%
GDP per capita (PPP US$)	$2,238

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	46%
Male adult literacy rate (%)	63%
Female combined gross enrollment ratio (%)	43%
Male combined gross enrollment ratio (%)	48%
Female estimated earned income (PPP US$)	$1,915
Male estimated earned income (PPP US$)	$2,567

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	74%
Urban population with access to improved water source (%)	79%
Percentage of population undernourished (%)	13%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

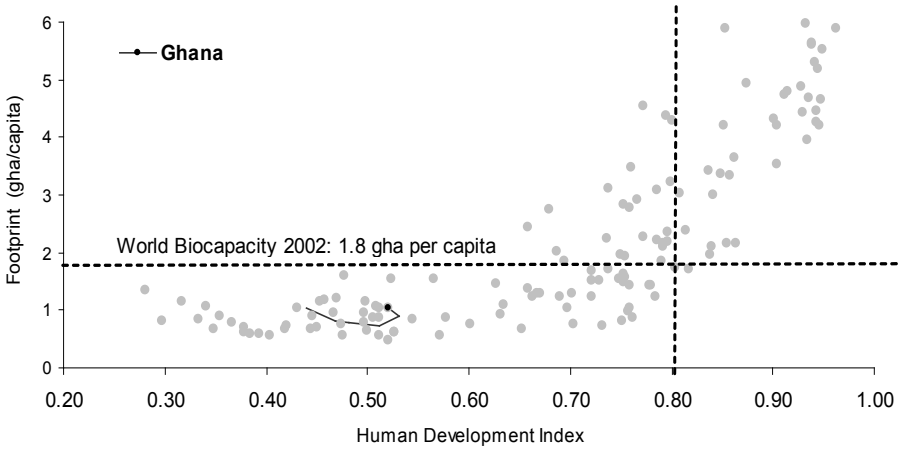


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$4.0	4.8	823
Exports	$3.0	2.7	1,139
Net (Exports - Imports)	-$0.9	-2.1	
ODA (% of GDP)	11.9%		
Debt Service (% of GDP)	6.3%		

Table 9.2.1: Trade and Debt

	World	Africa	Ghana
Population (Millions)	6225	824	20
GDP per capita (US$)	$5,801	$794	$369
Footprint (gha/capita)	2.20	1.10	1.00
Biocapacity (gha/capita)	1.80	1.30	1.30

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

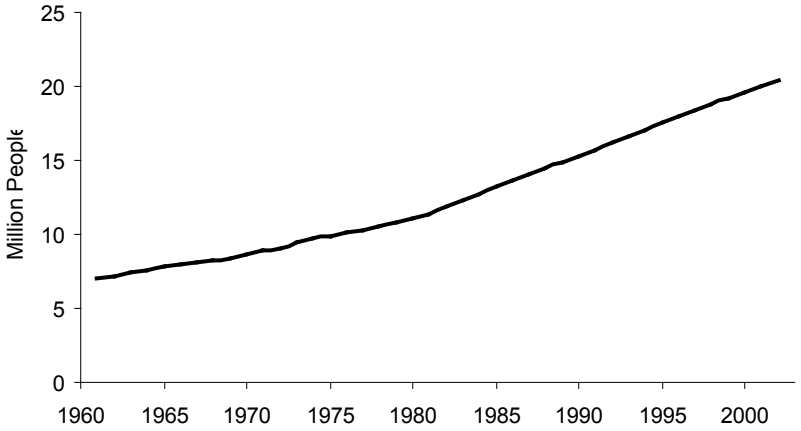


Figure 9.3.1: Population Trend

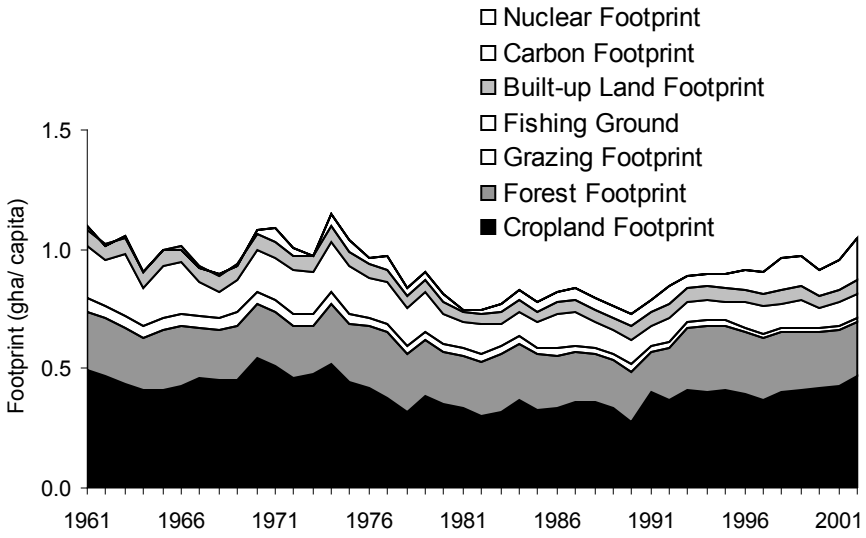


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

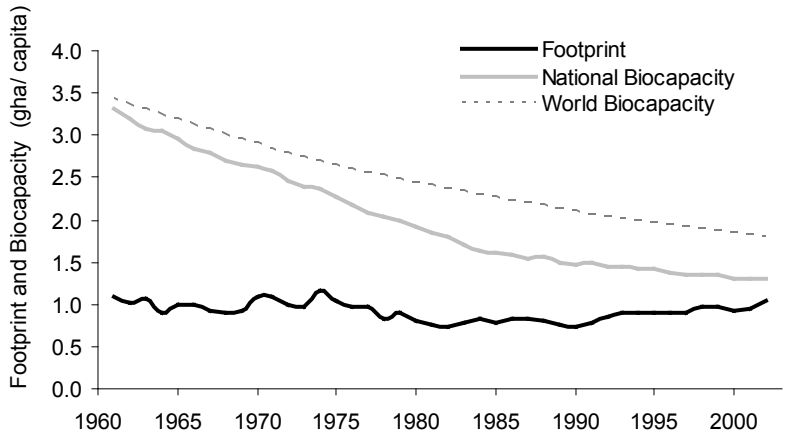


Figure 9.3.2: Footprint and Biocapacity Trend

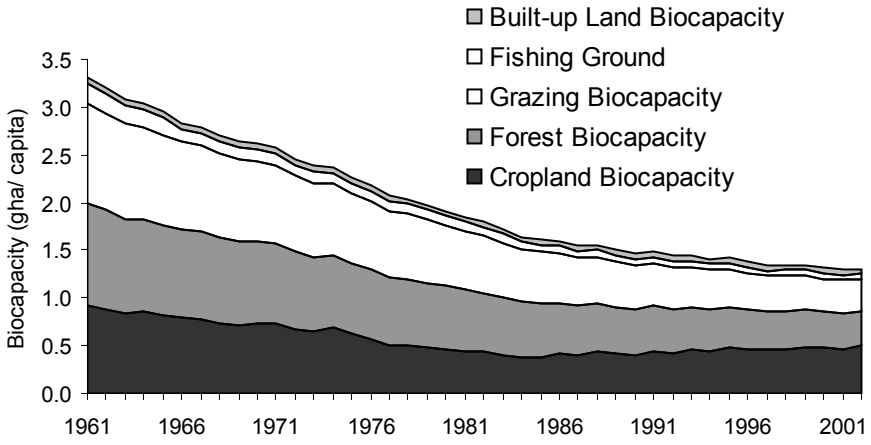


Figure 9.3.4: Biocapacity by Component (1961-2002)

Ghana

India

9.1 Human Development Benchmarks

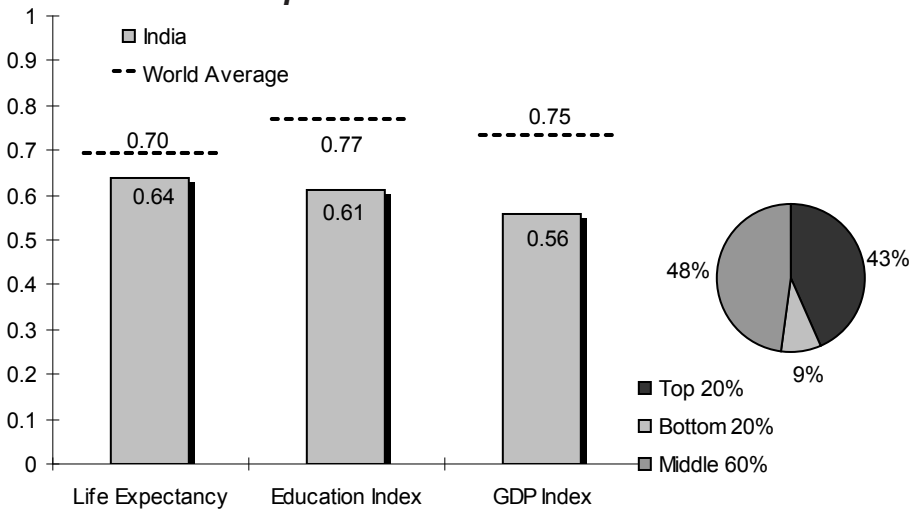


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	63
Gross Enrollment (%)	60%
Adult Literacy Rate (%)	61%
GDP per capita (PPP US$)	$2,892

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	48%
Male adult literacy rate (%)	73%
Female combined gross enrollment ratio (%)	56%
Male combined gross enrollment ratio (%)	64%
Female estimated earned income (PPP US$)	$1,569
Male estimated earned income (PPP US$)	$4,130

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	58%
Urban population with access to improved water source (%)	86%
Percentage of population undernourished (%)	21%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

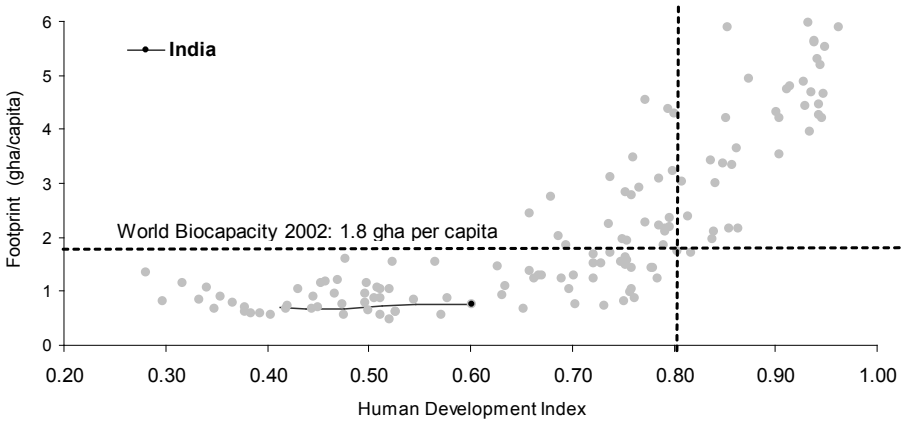


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$96.1	89.5	1,074
Exports	$84.1	49.2	1,709
Net (Exports - Imports)	-$12.0	-40.3	
ODA (% of GDP)	0.2%		
Debt Service (% of GDP)	3.4%		

Table 9.2.1: Trade and Debt

	World	Africa	India
Population (Millions)	6225	824	1050
GDP per capita (US$)	$5,801	$794	$564
Footprint (gha/capita)	2.20	1.10	0.70
Biocapacity (gha/capita)	1.80	1.30	0.40

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

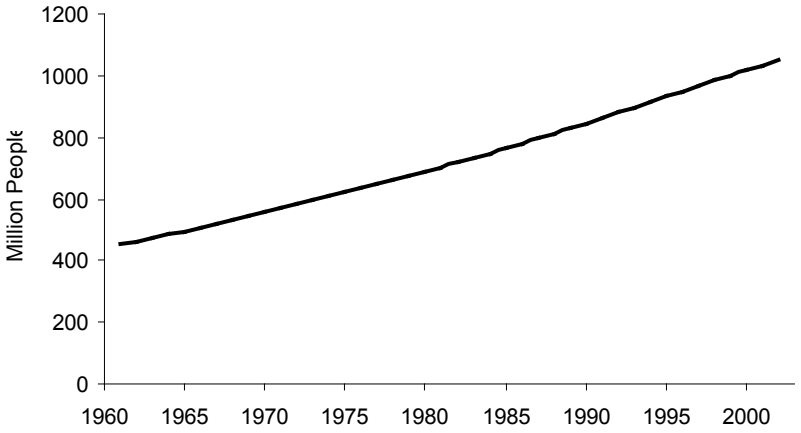


Figure 9.3.1: Population Trend

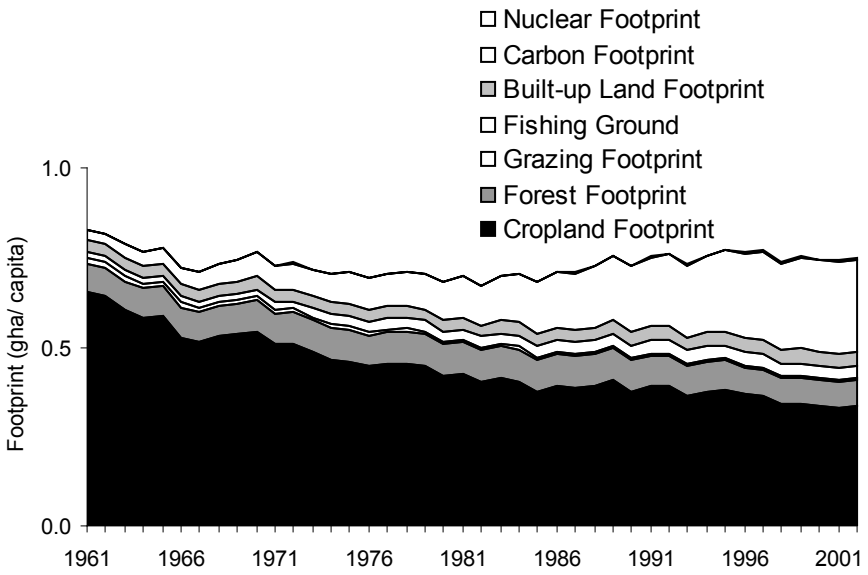


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

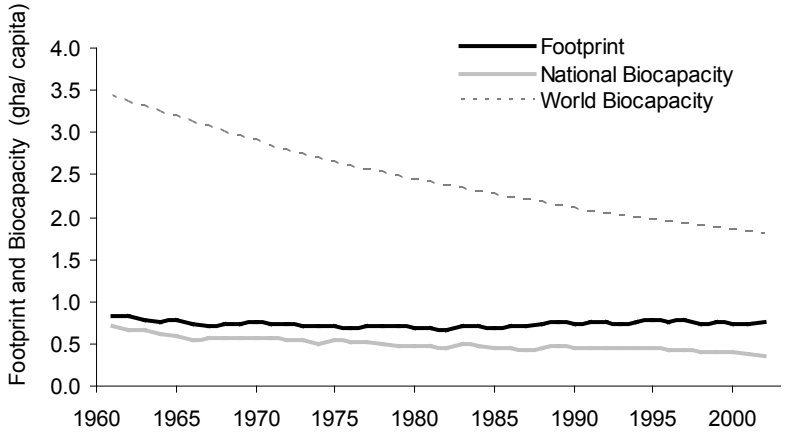


Figure 9.3.2: Footprint and Biocapacity Trend

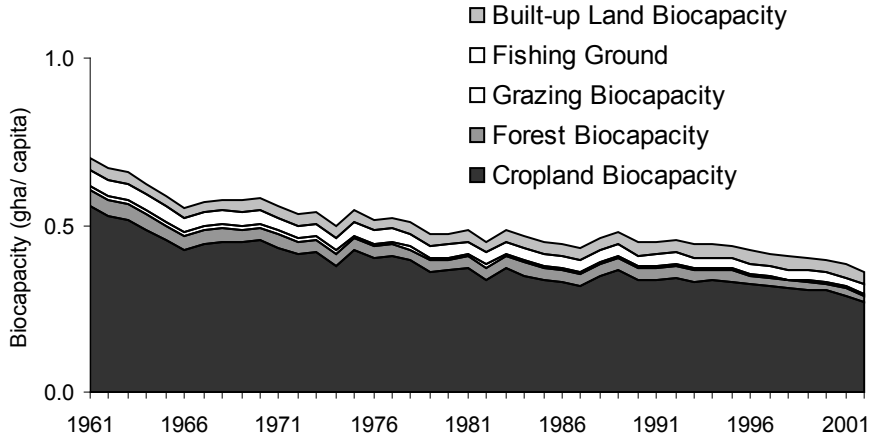


Figure 9.3.4: Biocapacity by Component (1961-2002)

India

Kenya

9.1 Human Development Benchmarks

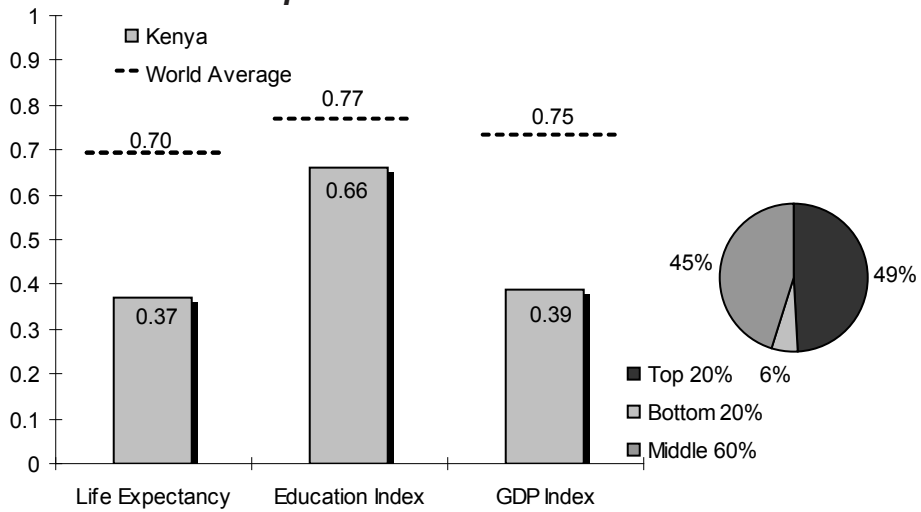


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	47
Gross Enrollment (%)	52%
Adult Literacy Rate (%)	74%
GDP per capita (PPP US$)	$1,037

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	70%
Male adult literacy rate (%)	78%
Female combined gross enrollment ratio (%)	50%
Male combined gross enrollment ratio (%)	53%
Female estimated earned income (PPP US$)	$1,001
Male estimated earned income (PPP US$)	$1,078

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	56%
Urban population with access to improved water source (%)	62%
Percentage of population undernourished (%)	33%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

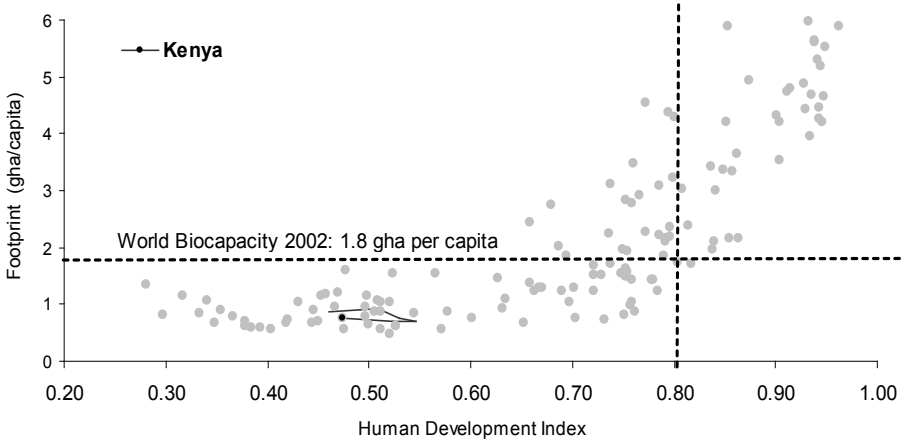


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$4.2	3.4	1,218
Exports	$3.6	1.3	2,731
Net (Exports - Imports)	-$0.6	-2.1	
ODA (% of GDP)	3.4%		
Debt Service (% of GDP)	4.0%		

Table 9.2.1: Trade and Debt

	World	Africa	Kenya
Population (Millions)	6225	824	32
GDP per capita (US$)	$5,801	$794	$450
Footprint (gha/capita)	2.20	1.10	0.80
Biocapacity (gha/capita)	1.80	1.30	0.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

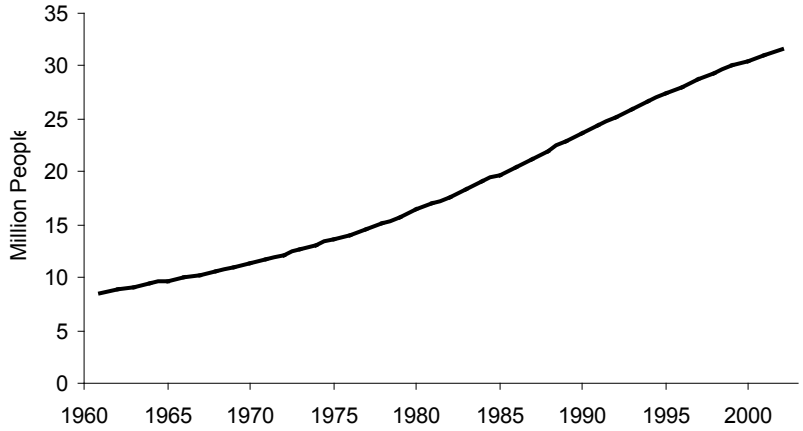


Figure 9.3.1: Population Trend

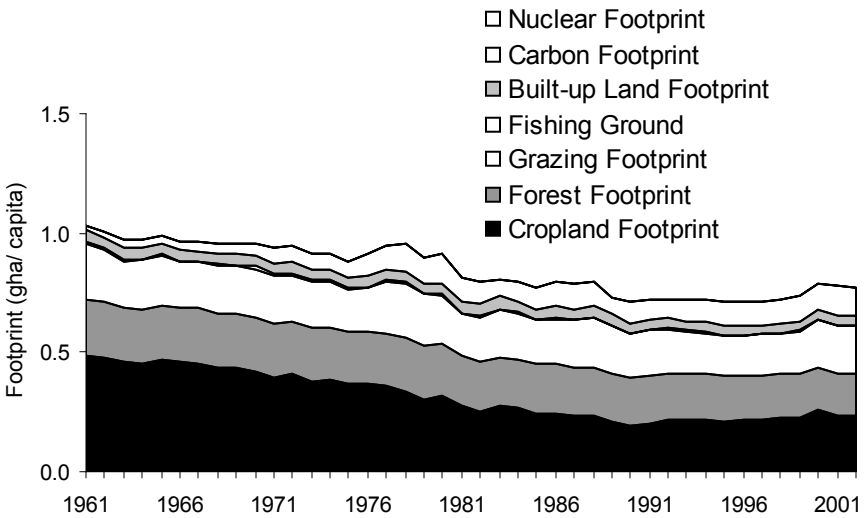


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

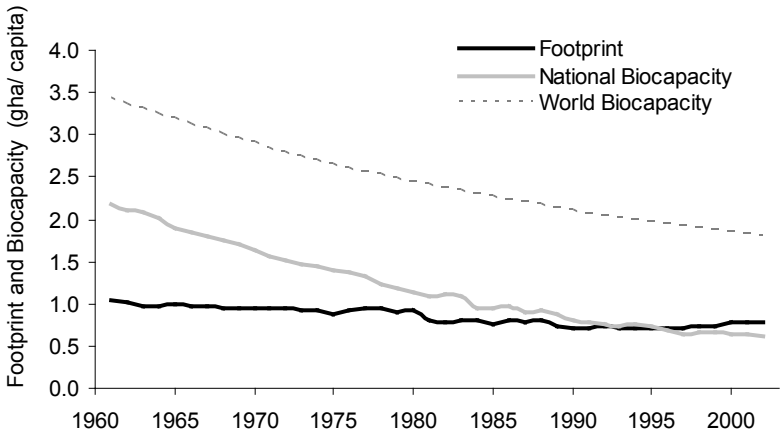


Figure 9.3.2: Footprint and Biocapacity Trend

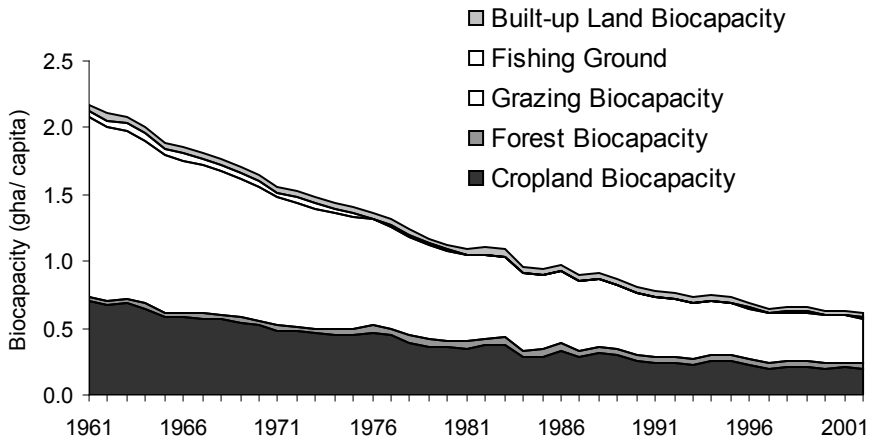


Figure 9.3.4: Biocapacity by Component (1961-2002)

Kenya

Madagascar

9.1 Human Development Benchmarks

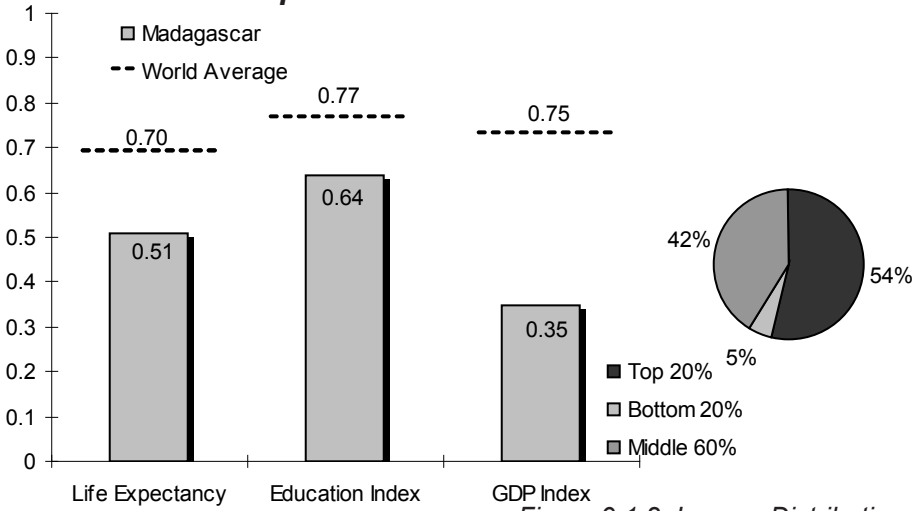


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	55
Gross Enrollment (%)	51%
Adult Literacy Rate (%)	71%
GDP per capita (PPP US$)	$809

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	65%
Male adult literacy rate (%)	76%
Female combined gross enrollment ratio (%)	40%
Male combined gross enrollment ratio (%)	41%
Female estimated earned income (PPP US$)	$603
Male estimated earned income (PPP US$)	$1,017

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	49%
Urban population with access to improved water source (%)	45%
Percentage of population undernourished (%)	37%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

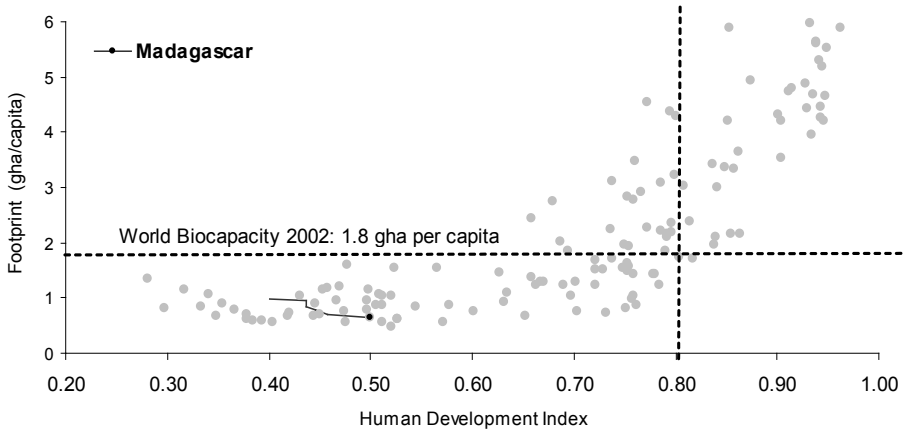


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$1.8	0.7	2,437
Exports	$1.2	0.6	1,954
Net (Exports - Imports)	-$0.6	-0.1	
ODA (% of GDP)	9.9%		
Debt Service (% of GDP)	1.3%		

Table 9.2.1: Trade and Debt

	World	Africa	Madagascar
Population (Millions)	6225	824	17
GDP per capita (US$)	$5,801	$794	$324
Footprint (gha/capita)	2.20	1.10	0.60
Biocapacity (gha/capita)	1.80	1.30	3.00

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

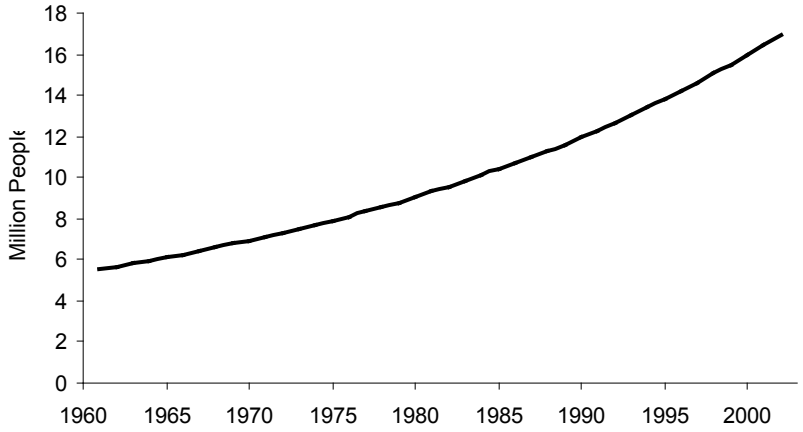


Figure 9.3.1: Population Trend

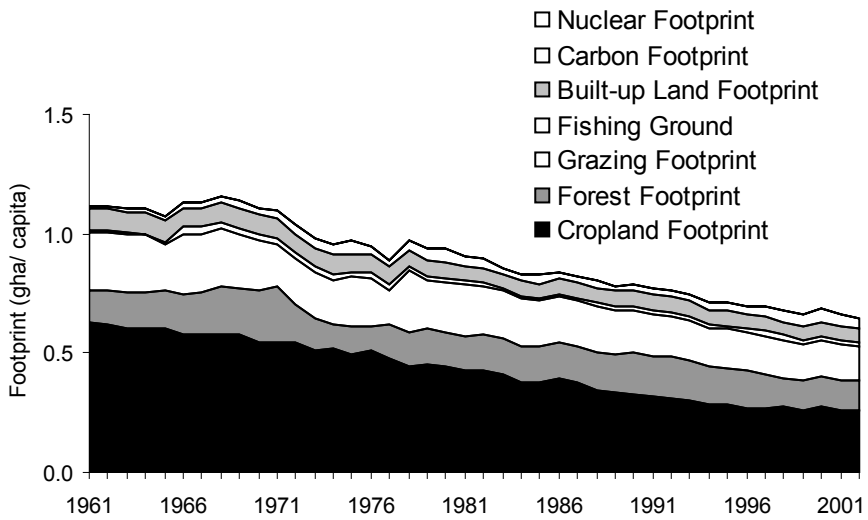


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

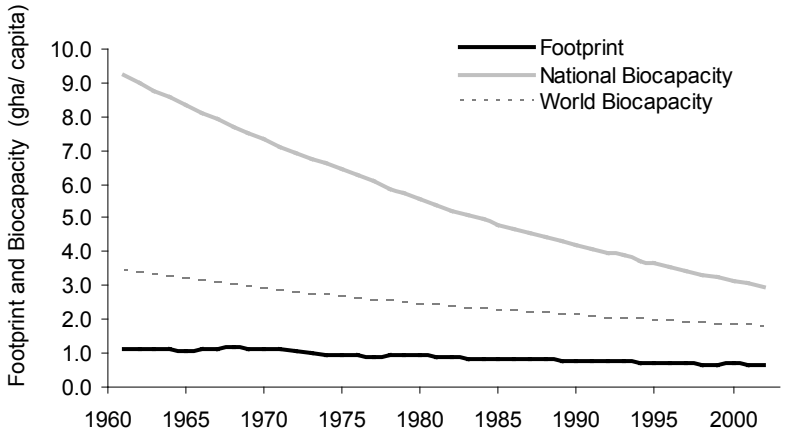


Figure 9.3.2: Footprint and Biocapacity Trend

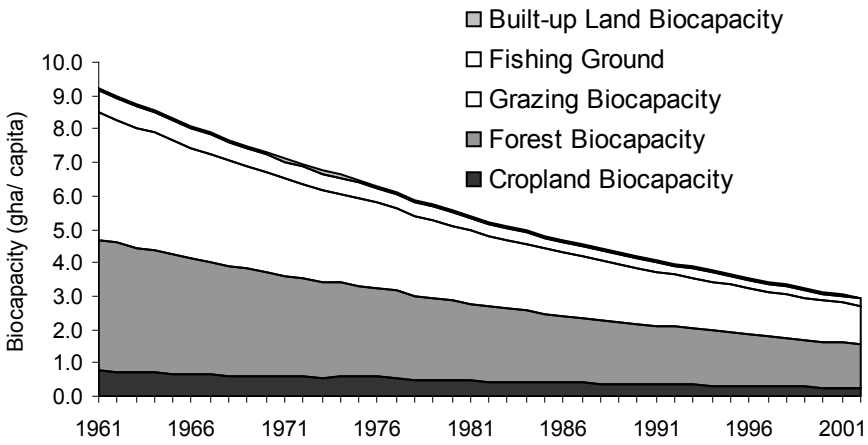


Figure 9.3.4: Biocapacity by Component (1961-2002)

Madagascar

Mali

9.1 Human Development Benchmarks

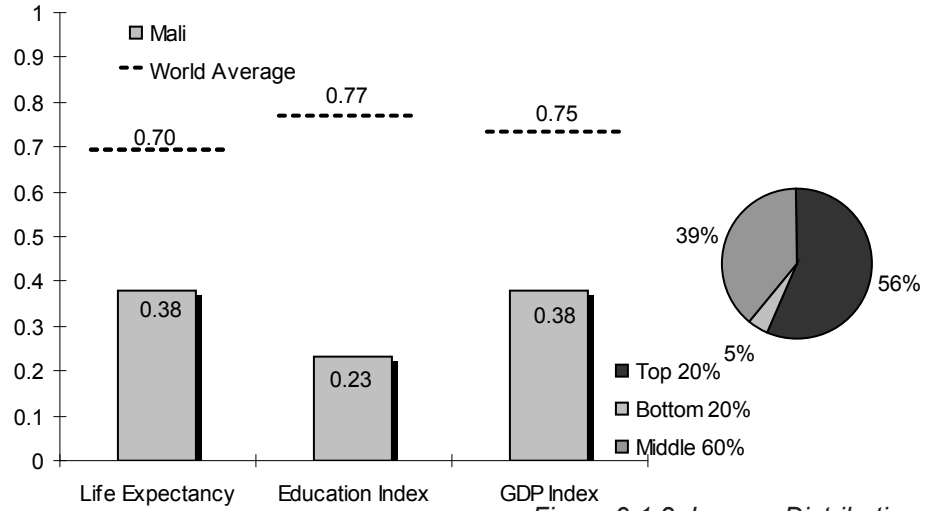


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	48
Gross Enrollment (%)	32%
Adult Literacy Rate (%)	19%
GDP per capita (PPP US$)	$994

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	12%
Male adult literacy rate (%)	27%
Female combined gross enrollment ratio (%)	27%
Male combined gross enrollment ratio (%)	38%
Female estimated earned income (PPP US$)	$742
Male estimated earned income (PPP US$)	$1,247

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	59%
Urban population with access to improved water source (%)	48%
Percentage of population undernourished (%)	29%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

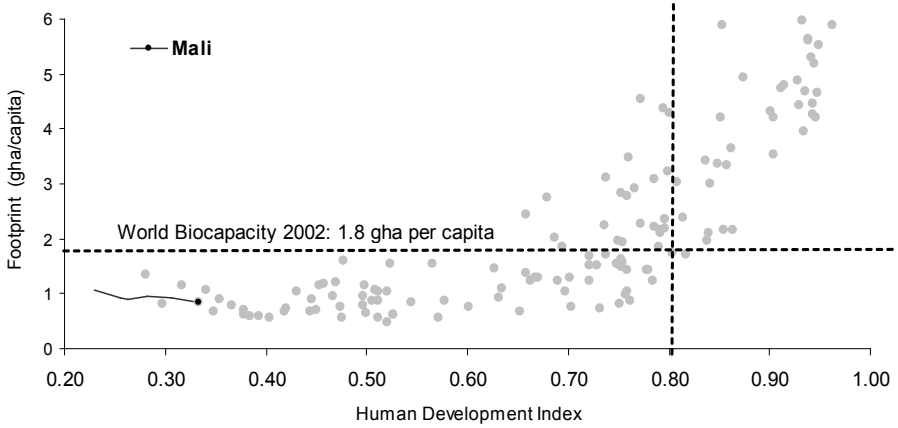


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$1.3	0.8	1,659
Exports	$1.1	0.9	1,281
Net (Exports - Imports)	-$0.2	0.1	
ODA (% of GDP)	12.2%		
Debt Service (% of GDP)	1.8%		

Table 9.2.1: Trade and Debt

	World	Africa	Mali
Population (Millions)	6225	824	13
GDP per capita (US$)	$5,801	$794	$371
Footprint (gha/capita)	2.20	1.10	0.80
Biocapacity (gha/capita)	1.80	1.30	1.30

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

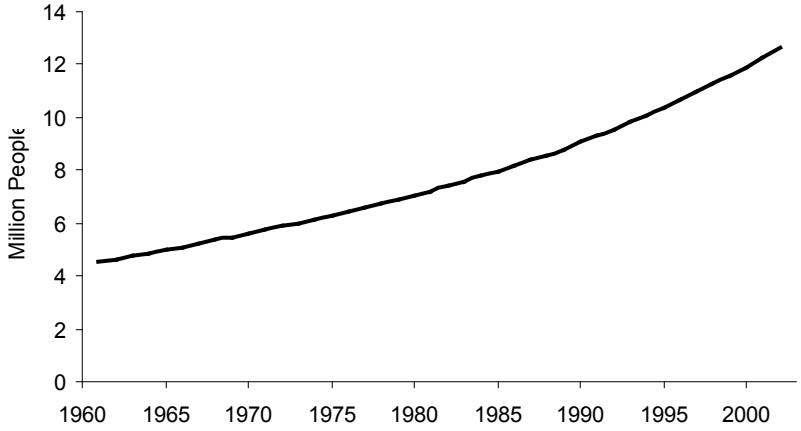


Figure 9.3.1: Population Trend

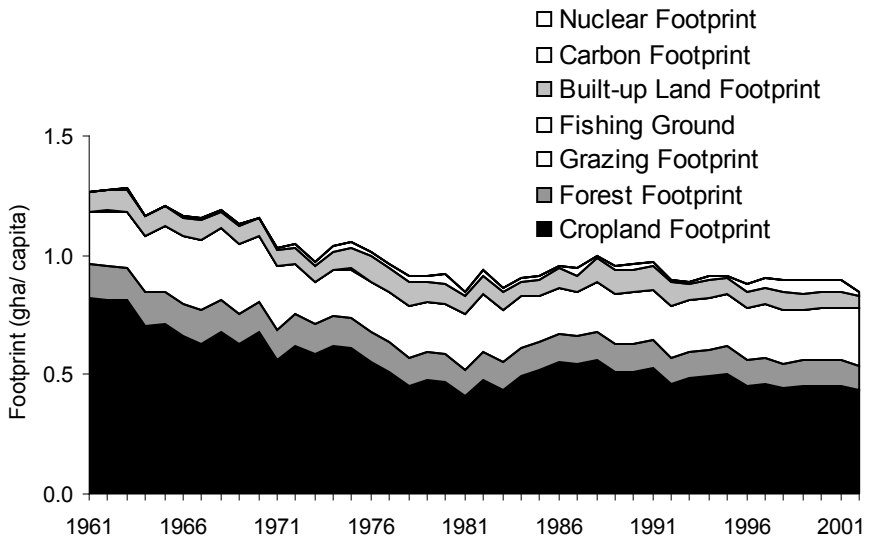


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

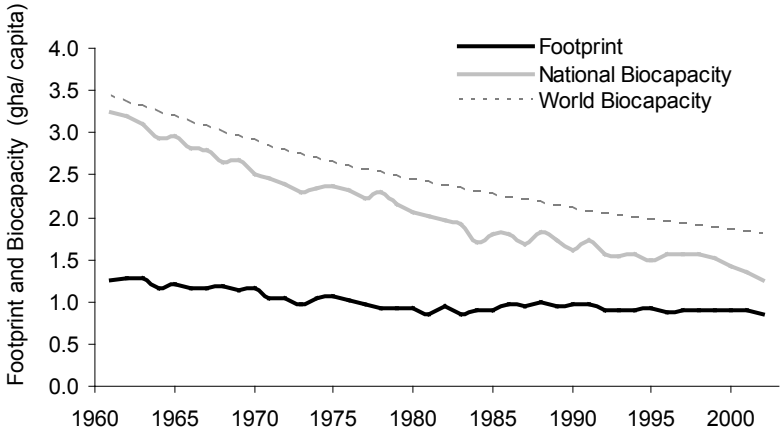


Figure 9.3.2: Footprint and Biocapacity Trend

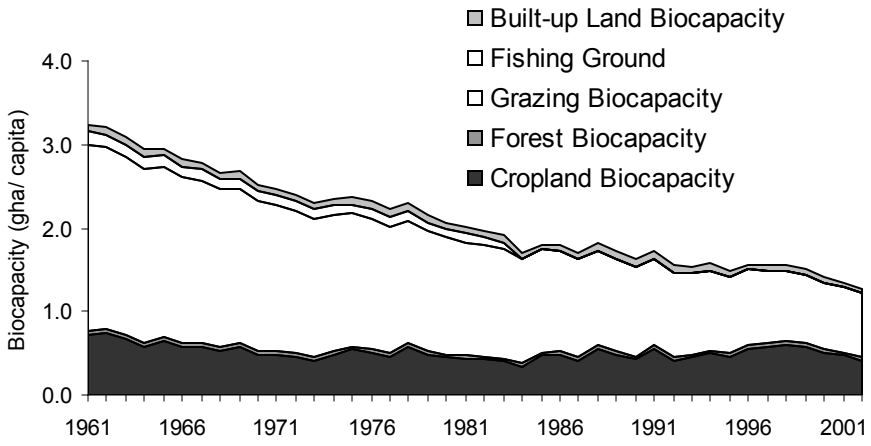


Figure 9.3.4: Biocapacity by Component (1961-2002)

Mali

Mozambique

9.1 Human Development Benchmarks

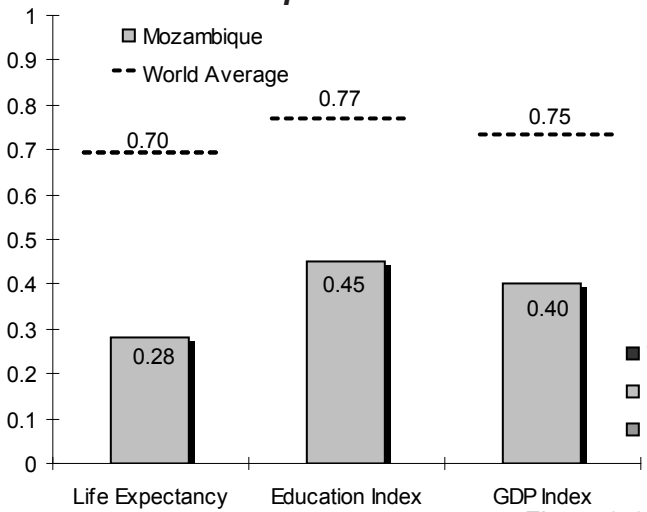


Figure 9.1.1: HDI Components, Indexed

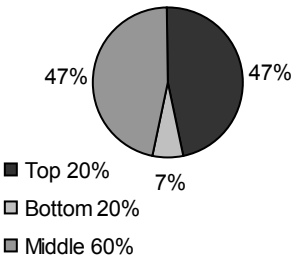


Figure 9.1.2: Income Distribution

Life Expectancy (years)	42
Gross Enrollment (%)	43%
Adult Literacy Rate (%)	47%
GDP per capita (PPP US$)	$1,117

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	31%
Male adult literacy rate (%)	62%
Female combined gross enrollment ratio (%)	38%
Male combined gross enrollment ratio (%)	48%
Female estimated earned income (PPP US$)	$910
Male estimated earned income (PPP US$)	$1,341

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	51%
Urban population with access to improved water source (%)	42%
Percentage of population undernourished (%)	47%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

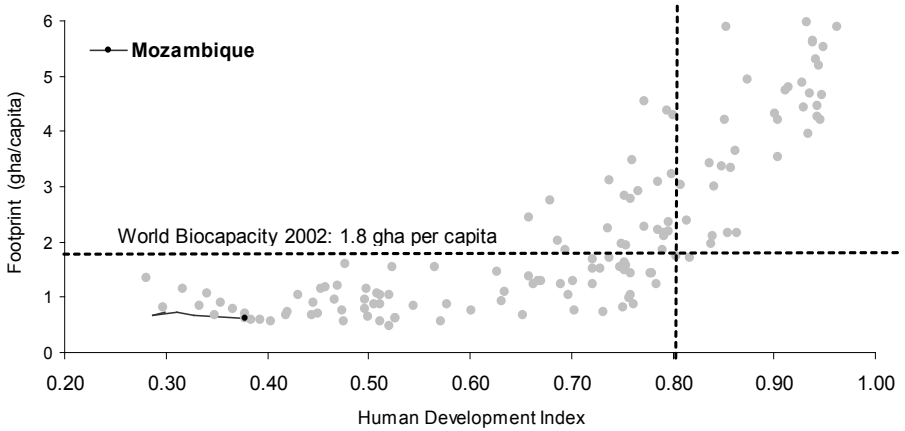


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1980 - 2003 (HDI data unavailable prior to 1980)

	Billion US$	Million gha	$/gha
Imports	$1.7	2.1	816
Exports	$1.0	1.5	680
Net (Exports - Imports)	-$0.7	-0.6	
ODA (% of GDP)	23.9%		
Debt Service (% of GDP)	2.0%		

Table 9.2.1: Trade and Debt

	World	Africa	Mozambique
Population (Millions)	6225	824	19
GDP per capita (US$)	$5,801	$794	$230
Footprint (gha/capita)	2.20	1.10	0.60
Biocapacity (gha/capita)	1.80	1.30	2.10

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

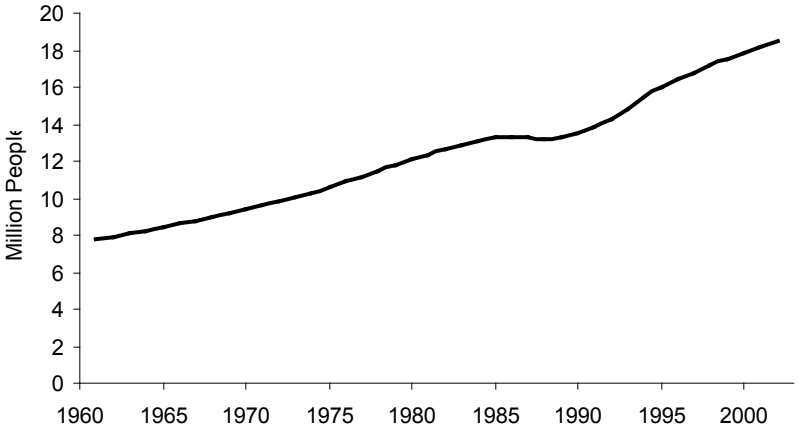


Figure 9.3.1: Population Trend

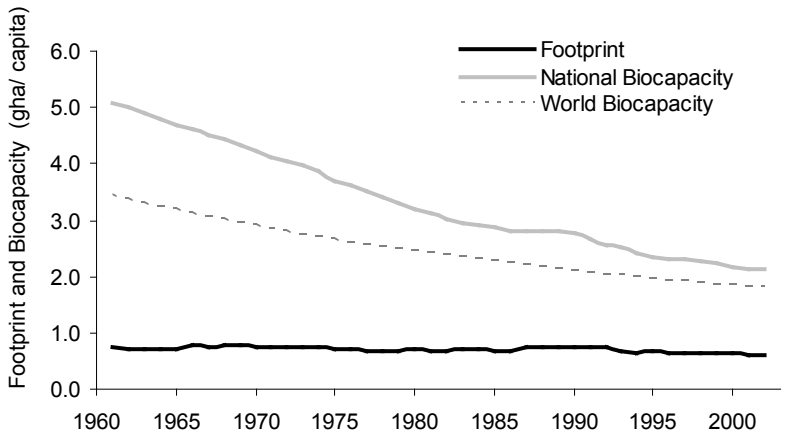


Figure 9.3.2: Footprint and Biocapacity Trend

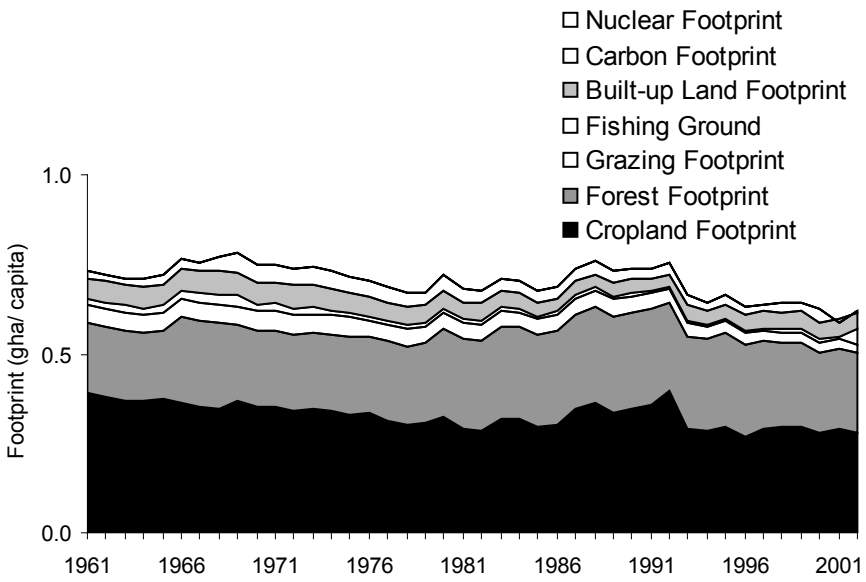


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

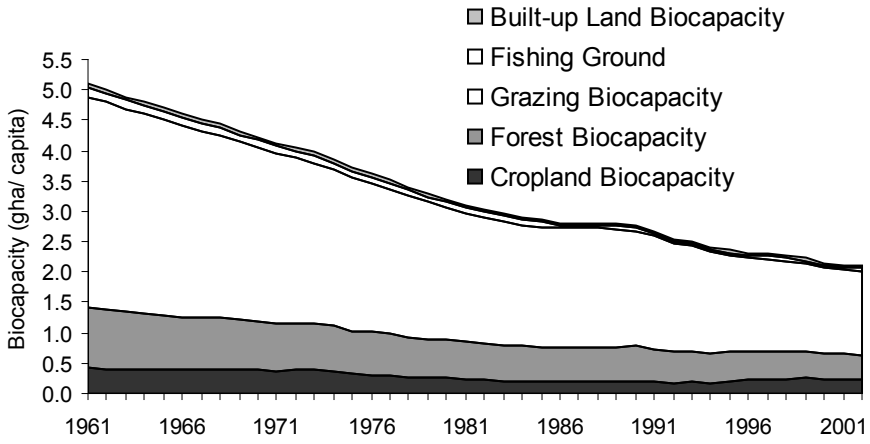


Figure 9.3.4: Biocapacity by Component (1961-2002)

Mozambique

Niger

9.1 Human Development Benchmarks

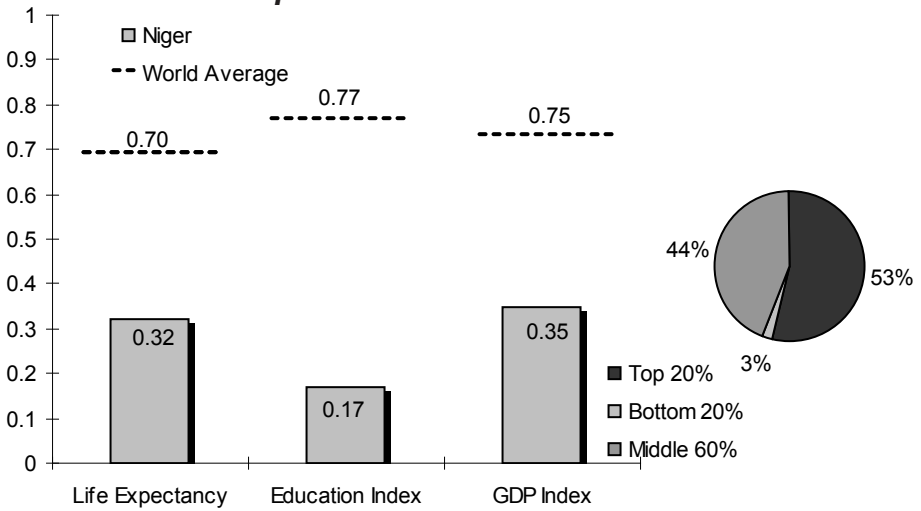


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	44
Gross Enrollment (%)	21%
Adult Literacy Rate (%)	14%
GDP per capita (PPP US$)	$835

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	9%
Male adult literacy rate (%)	20%
Female combined gross enrollment ratio (%)	17%
Male combined gross enrollment ratio (%)	25%
Female estimated earned income (PPP US$)	$601
Male estimated earned income (PPP US$)	$1,056

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	43%
Urban population with access to improved water source (%)	46%
Percentage of population undernourished (%)	34%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

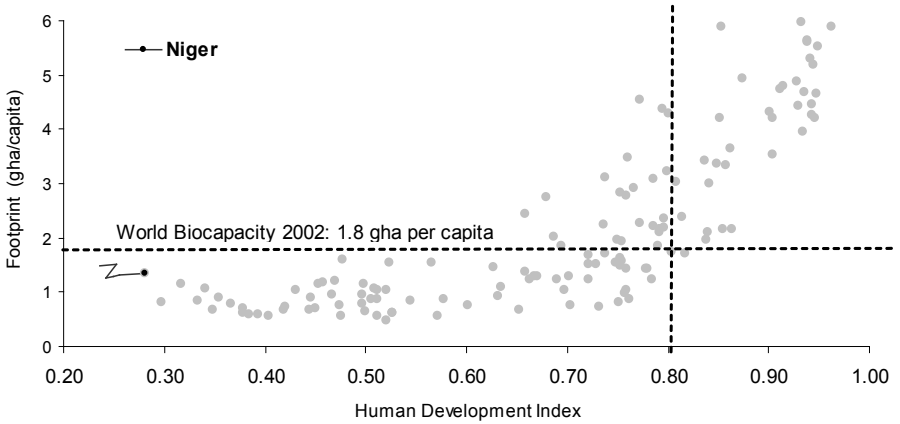


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$0.7	2.2	304
Exports	$0.4	0.4	1,232
Net (Exports - Imports)	-$0.2	-1.9	
ODA (% of GDP)	16.6%		
Debt Service (% of GDP)	1.2%		

Table 9.2.1: Trade and Debt

	World	Africa	Niger
Population (Millions)	6225	824	12
GDP per capita (US$)	$5,801	$794	$232
Footprint (gha/capita)	2.20	1.10	1.30
Biocapacity (gha/capita)	1.80	1.30	1.20

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

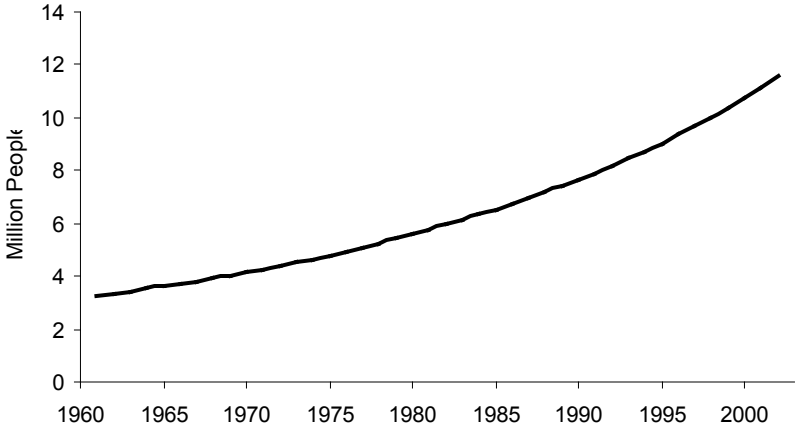


Figure 9.3.1: Population Trend

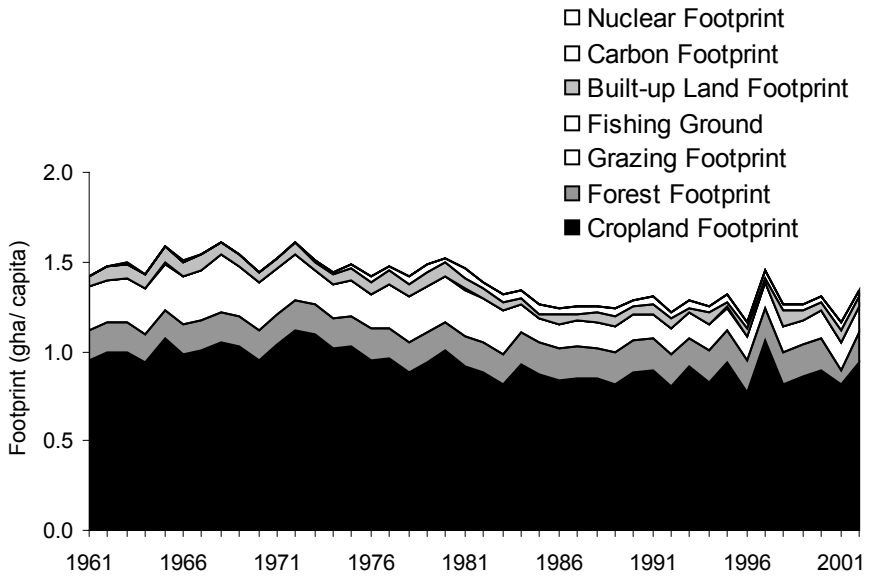


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

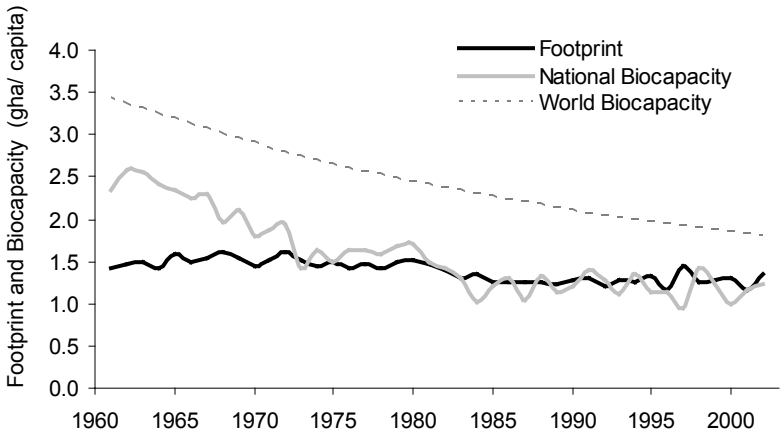


Figure 9.3.2: Footprint and Biocapacity Trend

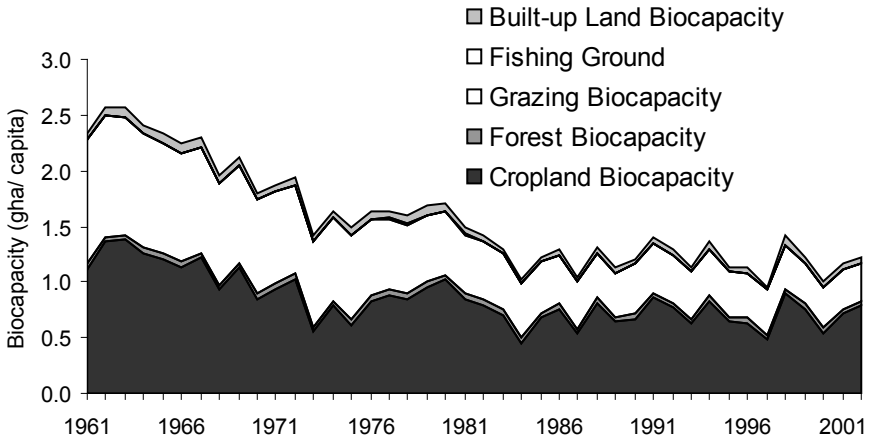


Figure 9.3.4: Biocapacity by Component (1961-2002)

Niger

Nigeria

9.1 Human Development Benchmarks

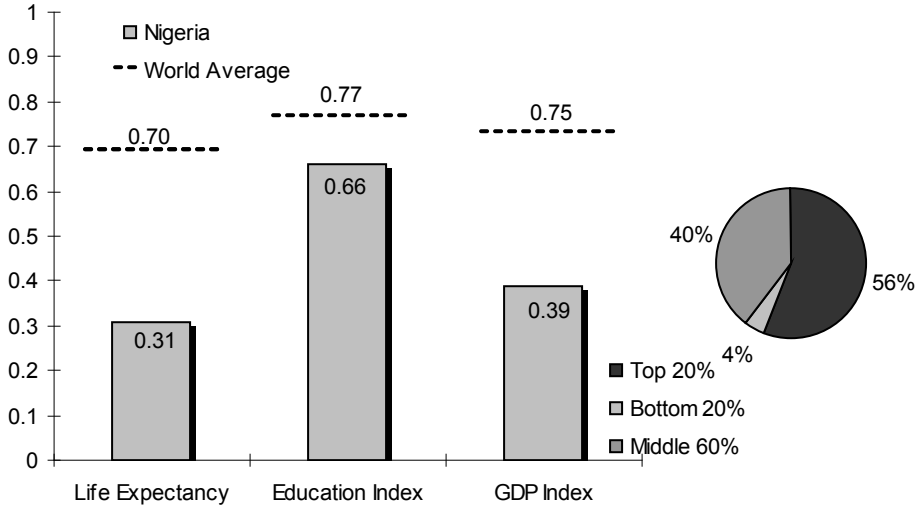


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	43
Gross Enrollment (%)	64%
Adult Literacy Rate (%)	67%
GDP per capita (PPP US$)	$1,050

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	59%
Male adult literacy rate (%)	74%
Female combined gross enrollment ratio (%)	57%
Male combined gross enrollment ratio (%)	71%
Female estimated earned income (PPP US$)	$614
Male estimated earned income (PPP US$)	$1,495

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	48%
Urban population with access to improved water source (%)	60%
Percentage of population undernourished (%)	9%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

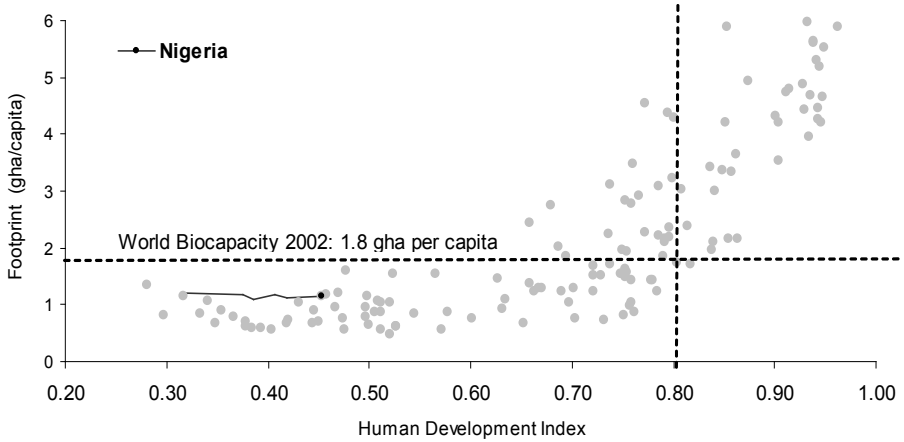


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$23.9	25.7	933
Exports	$29.2	2.3	12,690
Net (Exports - Imports)	$5.3	-23.4	
ODA (% of GDP)	0.5%		
Debt Service (% of GDP)	2.8%		

Table 9.2.1: Trade and Debt

	World	Africa	Nigeria
Population (Millions)	6225	824	121
GDP per capita (US$)	$5,801	$794	$428
Footprint (gha/capita)	2.20	1.10	1.20
Biocapacity (gha/capita)	1.80	1.30	1.00

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

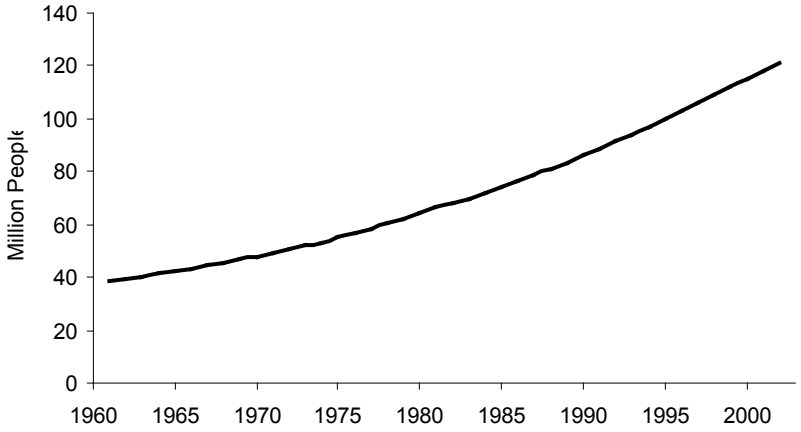


Figure 9.3.1: Population Trend

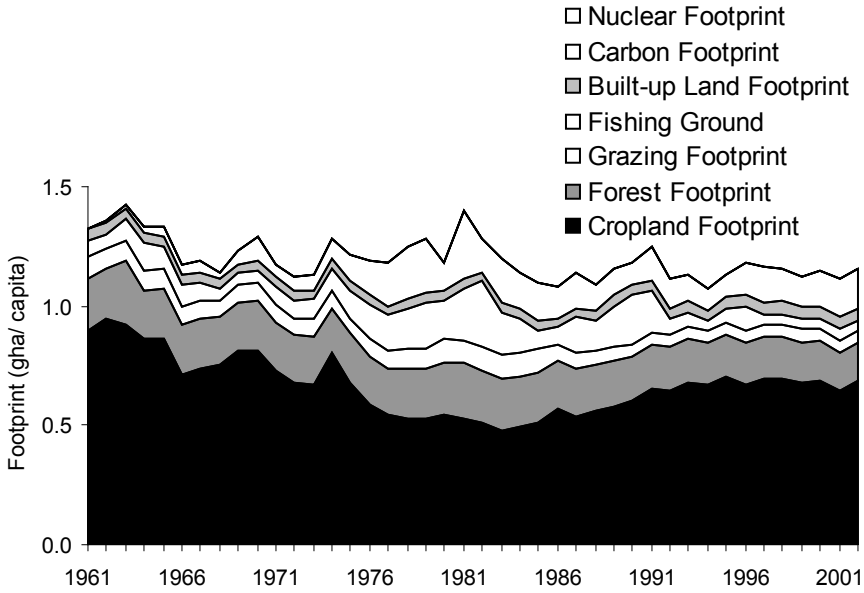


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

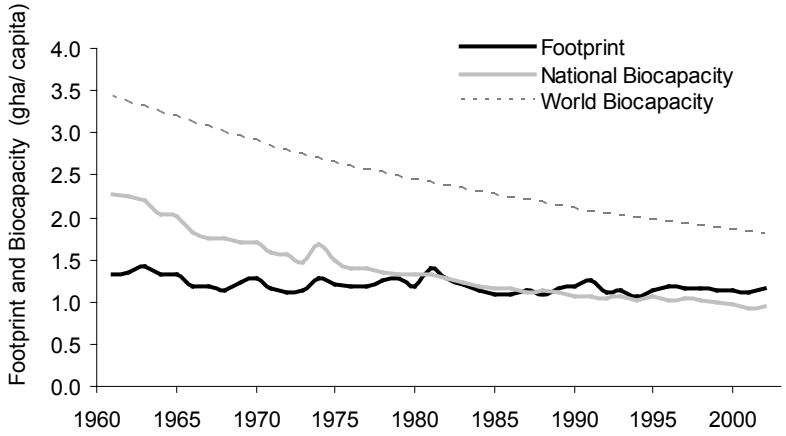


Figure 9.3.2: Footprint and Biocapacity Trend

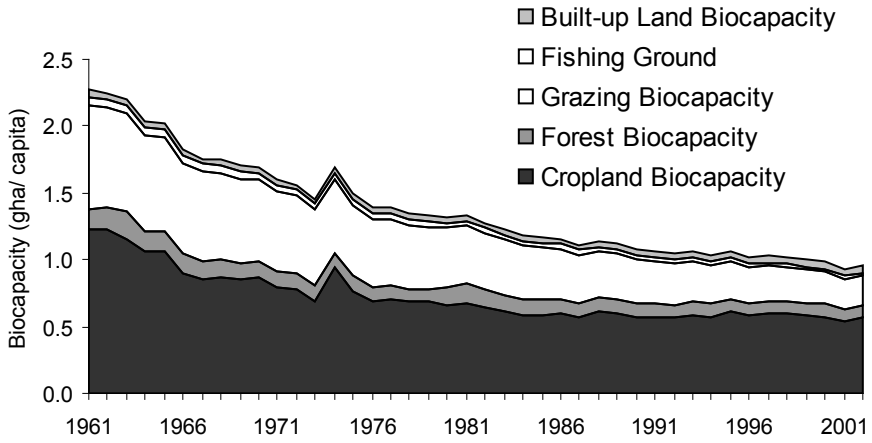


Figure 9.3.4: Biocapacity by Component (1961-2002)

Nigeria

Rwanda

9.1 Human Development Benchmarks

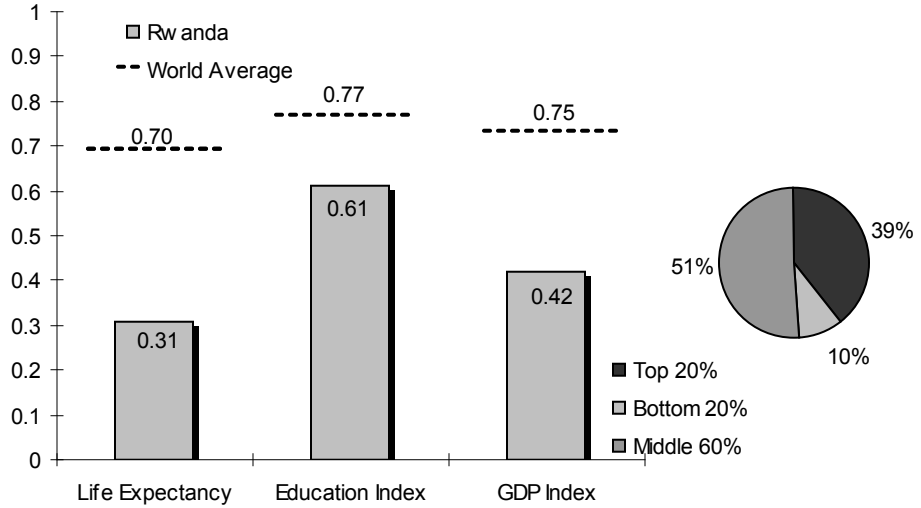


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	44
Gross Enrollment (%)	55%
Adult Literacy Rate (%)	64%
GDP per capita (PPP US$)	$1,268

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	59%
Male adult literacy rate (%)	71%
Female combined gross enrollment ratio (%)	53%
Male combined gross enrollment ratio (%)	58%
Female estimated earned income (PPP US$)	$985
Male estimated earned income (PPP US$)	$1,583

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	56%
Urban population with access to improved water source (%)	73%
Percentage of population undernourished (%)	37%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

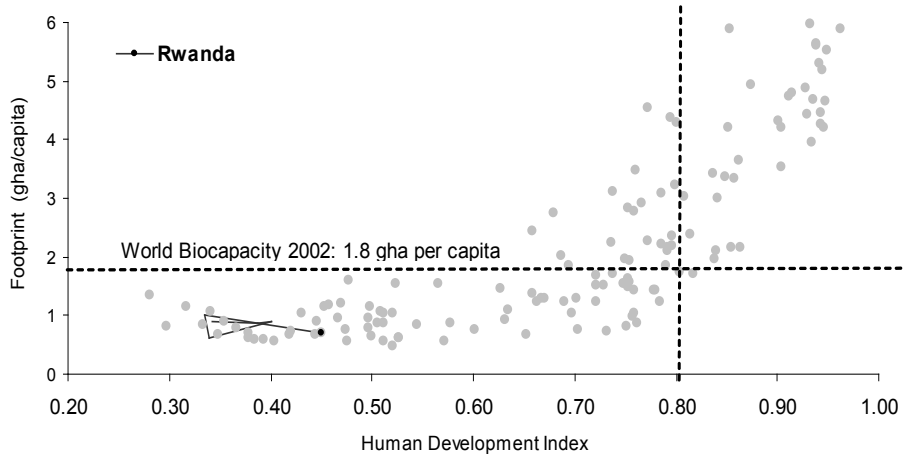


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$0.4	0.9	526
Exports	$0.1	0.1	1,686
Net (Exports - Imports)	-$0.3	-0.8	
ODA (% of GDP)	20.3%		
Debt Service (% of GDP)	1.3%		

Table 9.2.1: Trade and Debt

	World	Africa	Rwanda
Population (Millions)	6225	824	8
GDP per capita (US$)	$5,801	$794	$195
Footprint (gha/capita)	2.20	1.10	0.70
Biocapacity (gha/capita)	1.80	1.30	0.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

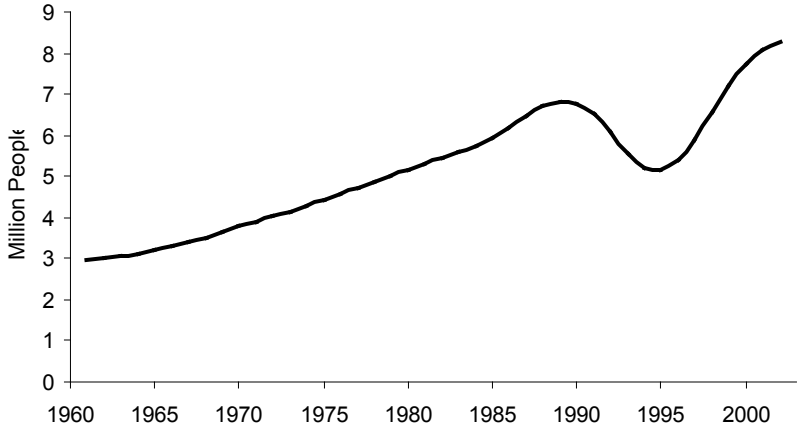


Figure 9.3.1: Population Trend

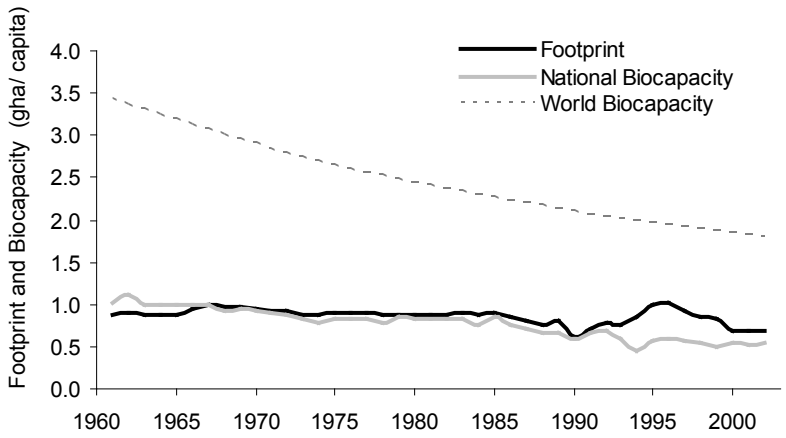


Figure 9.3.2: Footprint and Biocapacity Trend

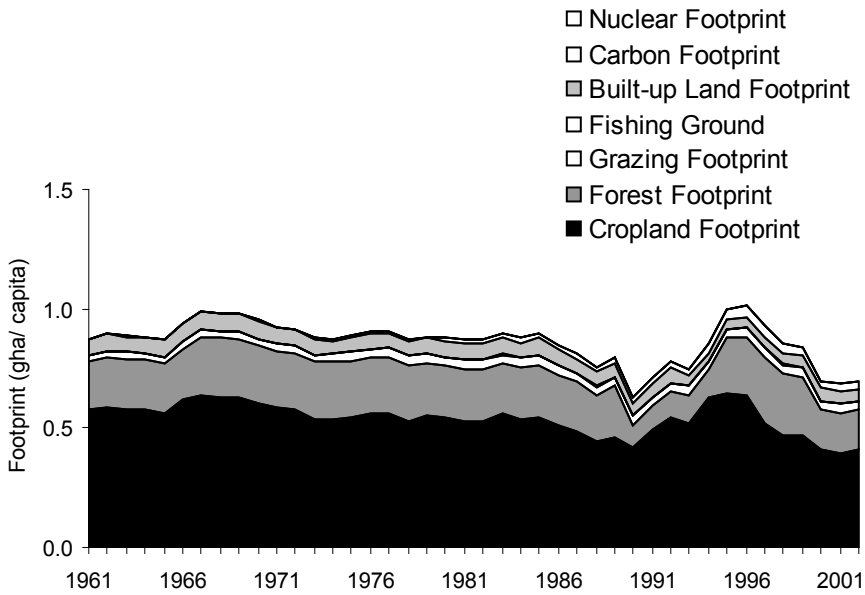


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

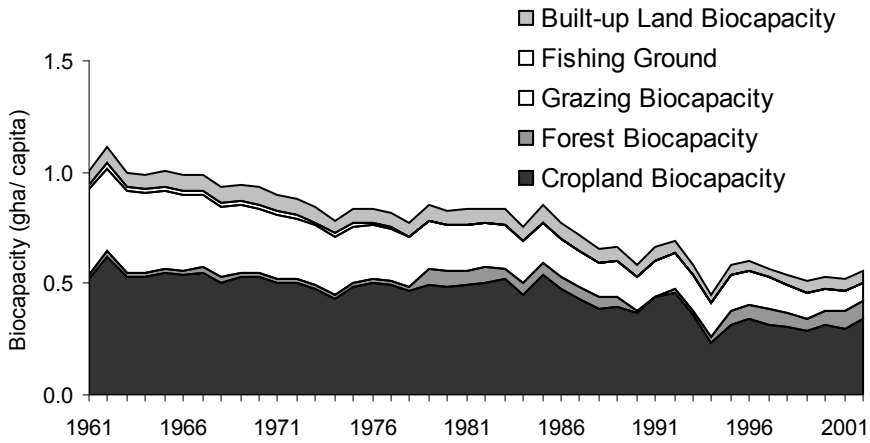


Figure 9.3.4: Biocapacity by Component (1961-2002)

Rwanda

Senegal

9.1 Human Development Benchmarks

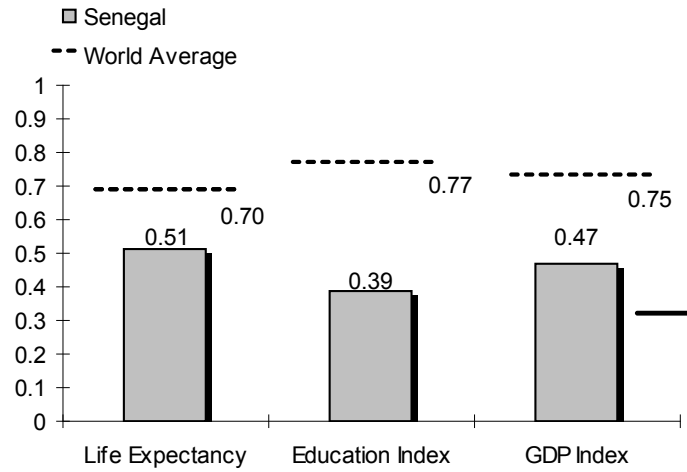


Figure 9.1.1: HDI Components, Indexed

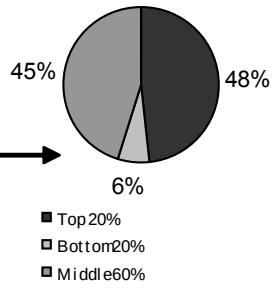


Figure 9.1.2: Income Distribution

Urban population with access to improved sanitation facilities (%)	72%
Urban population with access to improved water source (%)	52%
Percentage of population undernourished	24%

Table 9.1.1: HDI Components, Absolutes

Life Expectancy (years)	56
Gross Enrollment (%)	40
Adult Literacy Rate (%)	39
GDP Per Capita (PPP US$)	$1,648

Table 9.1.2: Gender Related Development

Female adult literacy rate (%)	29%
Male adult literacy rate (%)	51%
Female Combined gross enrolment ratio (%)	37%
Male Combined gross enrolment ratio (%)	43%
Female estimated earned income (PPP US$)	$1,175
Male estimated earned income (PPP US$)	$2,131

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

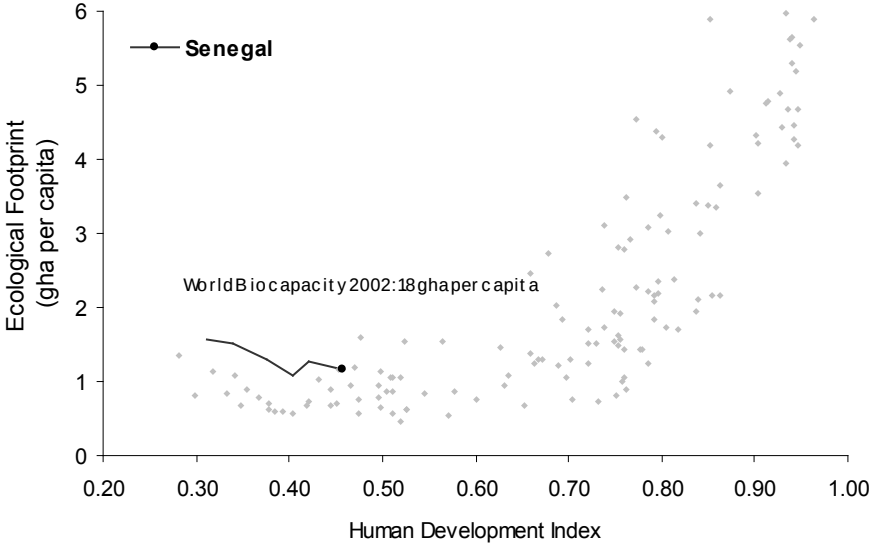


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$23.4	3.3	7,062
Exports	$16.4	2.5	6,608
Net (Exports - Imports)	-$7.0	-0.8	
ODA (% of GDP)	6.9%		
Debt Service (% of GDP)	3.8%		

Table 9.2.1: Trade and Debt

	World	Africa	Senegal
Population (Millions)	6225	824	10
GDP per capita (US$)	$5,801	$794	$634
Ecological Footprint (gha per capita)	2.20	1.10	1.17
Biocapacity (gha per capita)	1.80	1.30	0.78

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

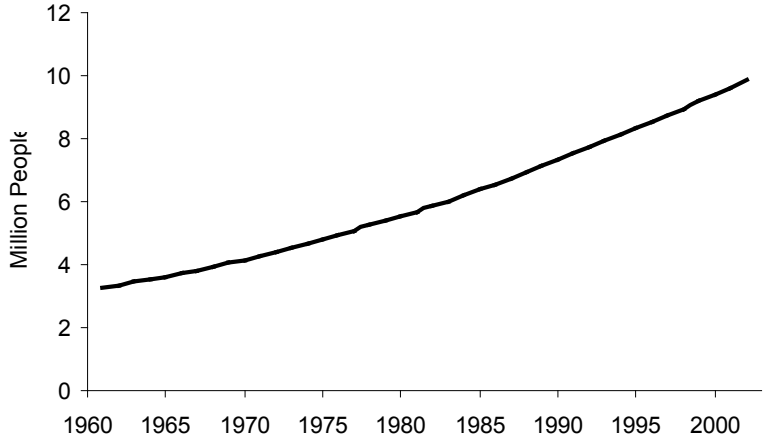


Figure 9.3.1: Population Trend

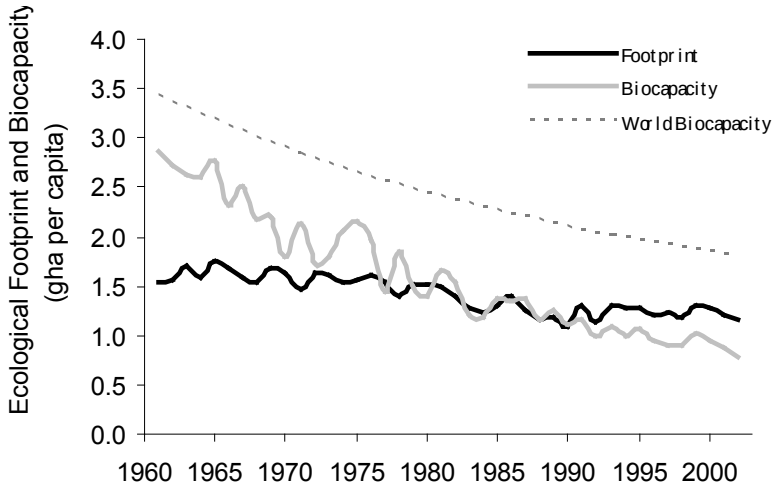


Figure 9.3.2: Footprint and Biocapacity Trend

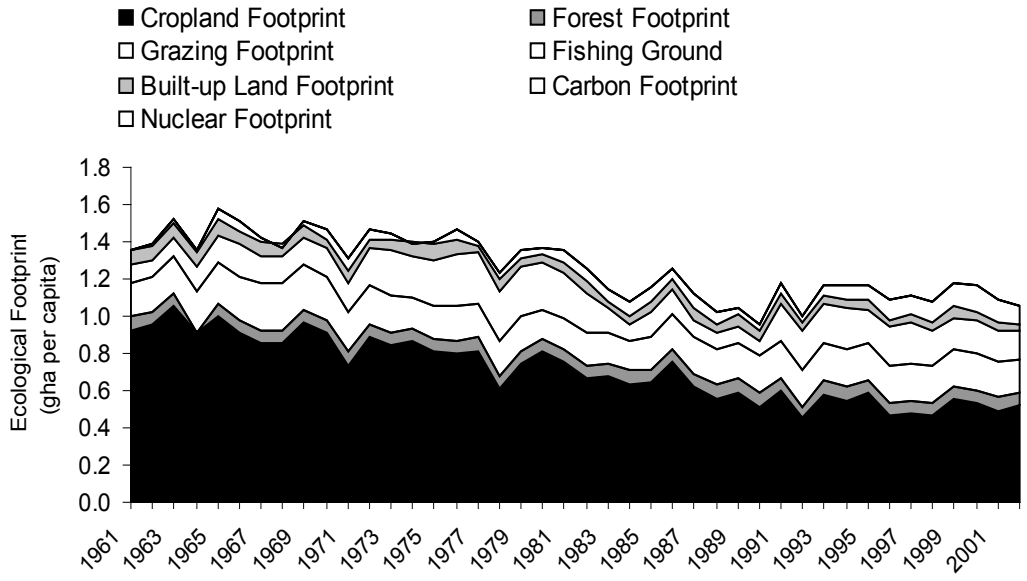


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

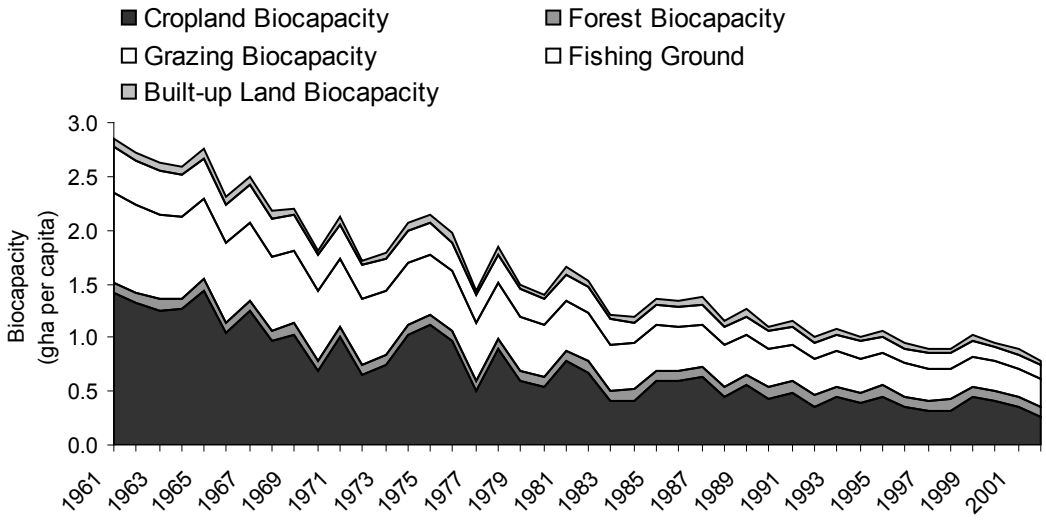


Figure 9.3.4: Biocapacity by Component (1961-2002)

Senegal

South Africa

9.1 Human Development Benchmarks

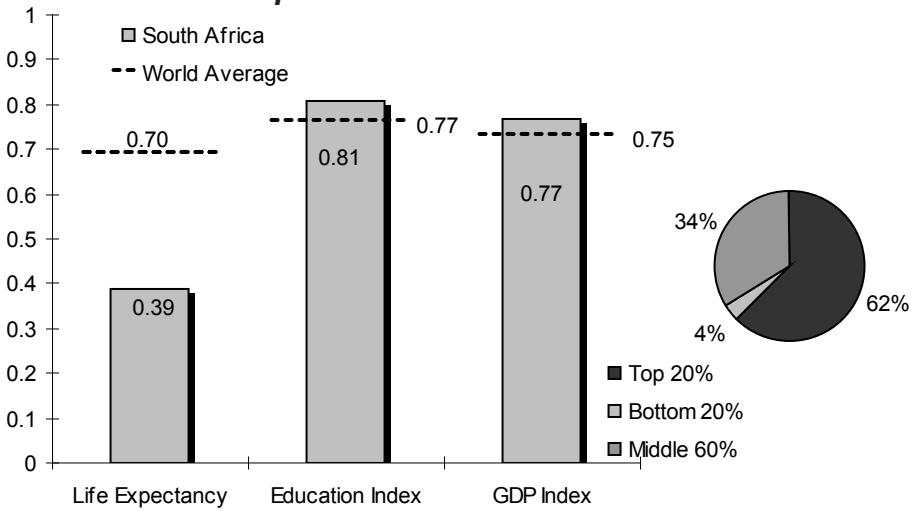


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	48
Gross Enrollment (%)	78%
Adult Literacy Rate (%)	82%
GDP per capita (PPP US$)	$10,346

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	81%
Male adult literacy rate (%)	84%
Female combined gross enrollment ratio (%)	78%
Male combined gross enrollment ratio (%)	78%
Female estimated earned income (PPP US$)	$6,505
Male estimated earned income (PPP US$)	$14,326

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	86%
Urban population with access to improved water source (%)	87%
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

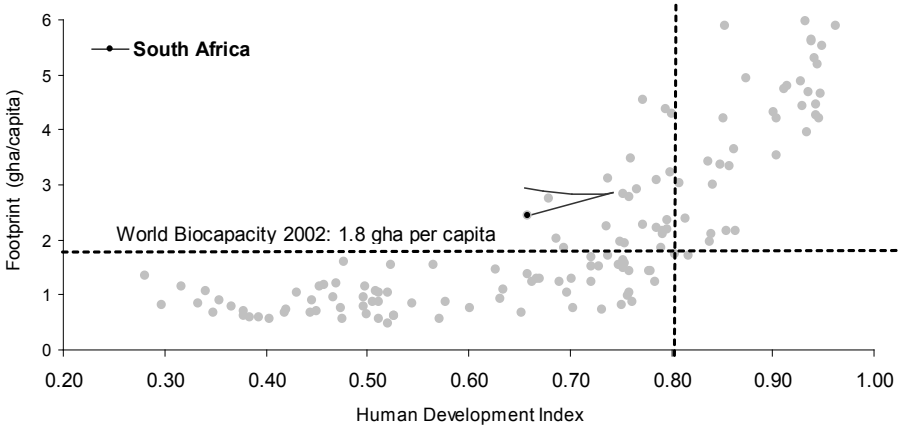


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$41.6	12.9	3,220
Exports	$44.8	46.1	971
Net (Exports - Imports)	$3.2	33.2	
ODA (% of GDP)	0.4%		
Debt Service (% of GDP)	2.7%		

Table 9.2.1: Trade and Debt

	World	Africa	South Africa
Population (Millions)	6225	824	45
GDP per capita (US$)	$5,801	$794	$3,489
Footprint (gha/capita)	2.20	1.10	2.40
Biocapacity (gha/capita)	1.80	1.30	2.00

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

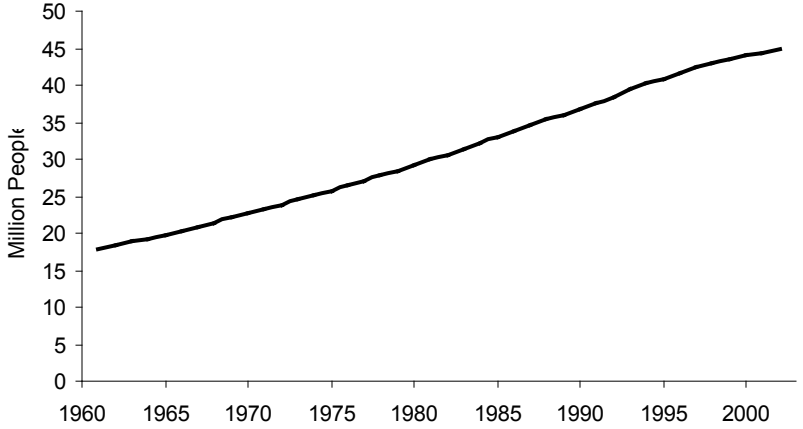


Figure 9.3.1: Population Trend

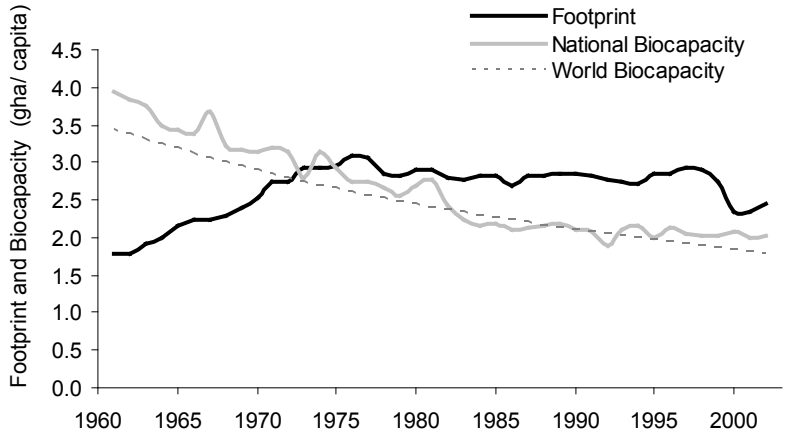


Figure 9.3.2: Footprint and Biocapacity Trend

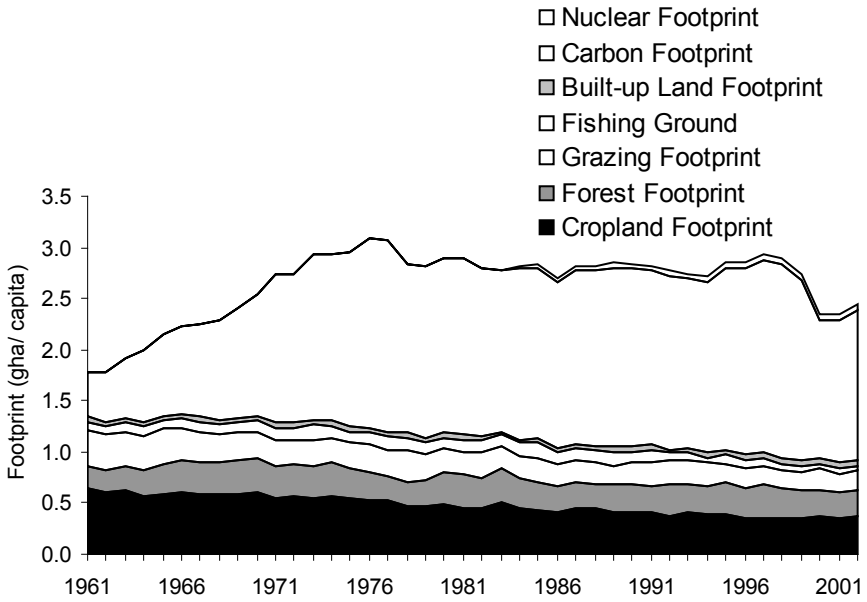


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

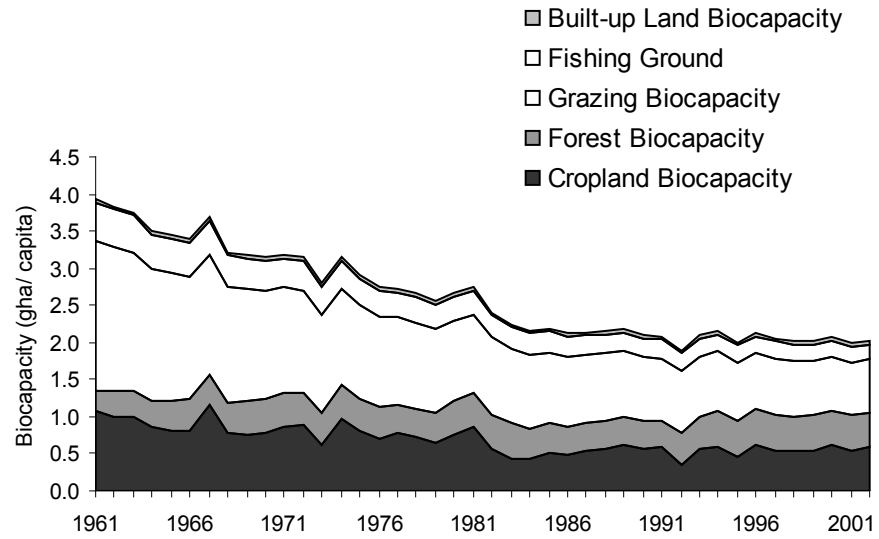


Figure 9.3.4: Biocapacity by Component (1961-2002)

South Africa

Switzerland

9.1 Human Development Benchmarks

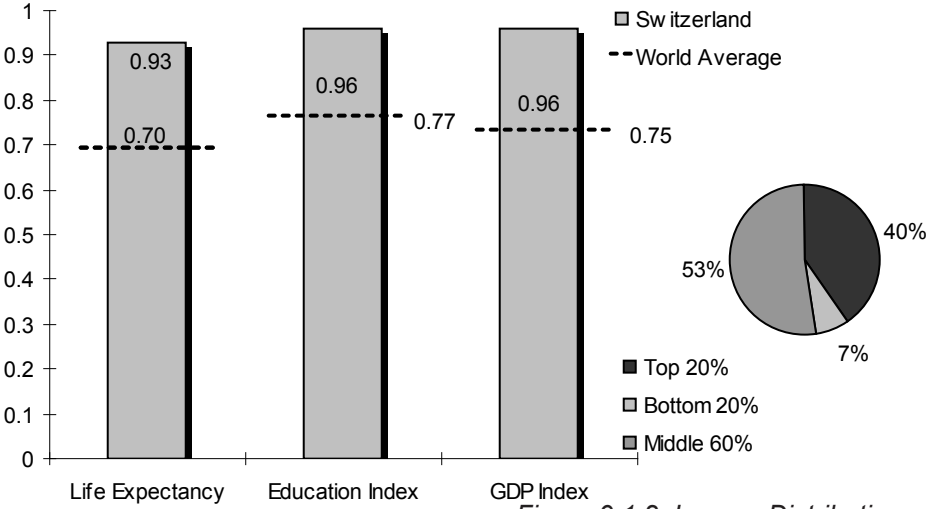


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	81
Gross Enrollment (%)	90%
Adult Literacy Rate (%)	NA
GDP per capita (PPP US$)	$30,552

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female combined gross enrollment ratio (%)	88%
Male combined gross enrollment ratio (%)	92%
Female estimated earned income (PPP US$)	$28,972
Male estimated earned income (PPP US$)	$32,149

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	NA
Urban population with access to improved water source (%)	NA
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

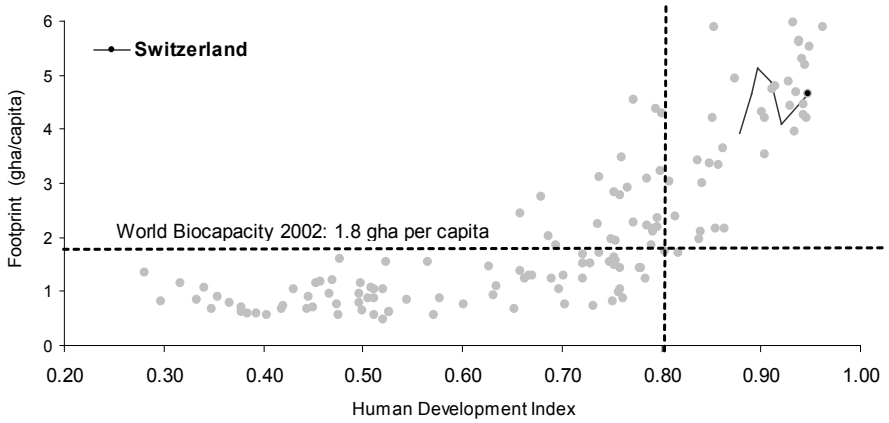


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$118.4	26.9	4,399
Exports	$140.8	19.8	7,127
Net (Exports - Imports)	$22.4	-7.2	
ODA (% of GDP)	0.0%		
Debt Service (% of GDP)	0.0%		

Table 9.2.1: Trade and Debt

	World	Africa	Switzerland
Population (Millions)	6225	824	7
GDP per capita (US$)	$5,801	$794	$43,553
Footprint (gha/capita)	2.20	1.10	4.70
Biocapacity (gha/capita)	1.80	1.30	1.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

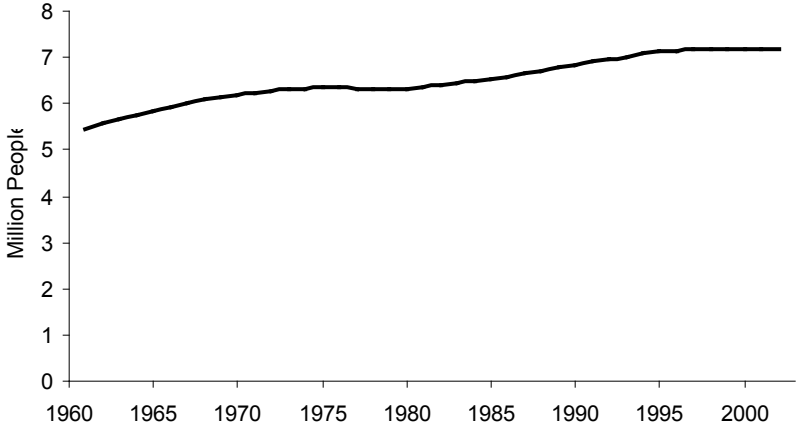


Figure 9.3.1: Population Trend

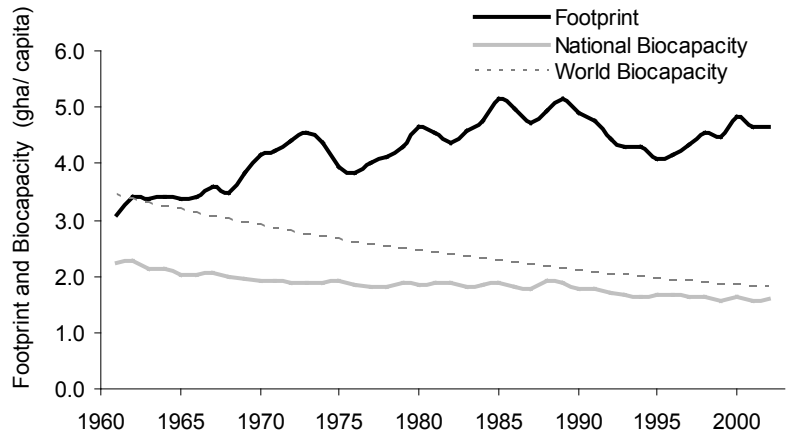


Figure 9.3.2: Footprint and Biocapacity Trend

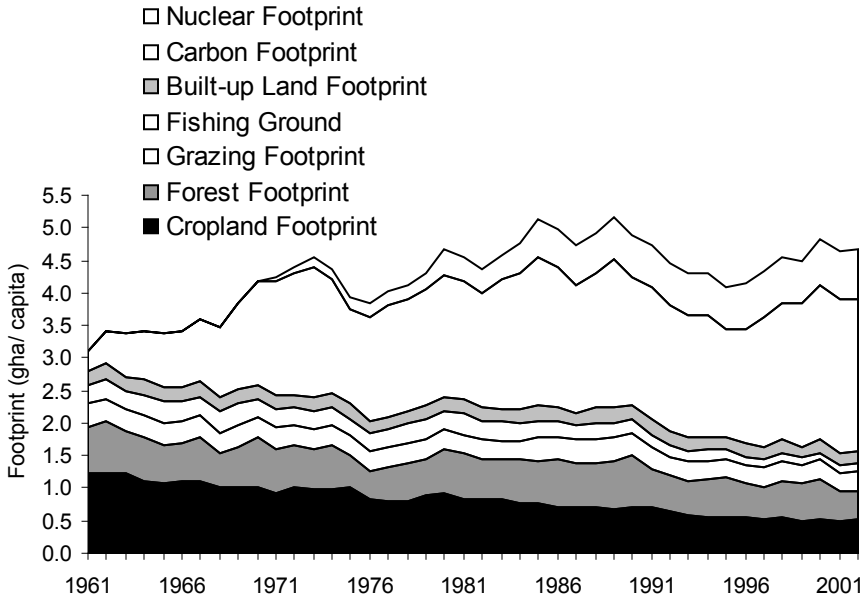


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

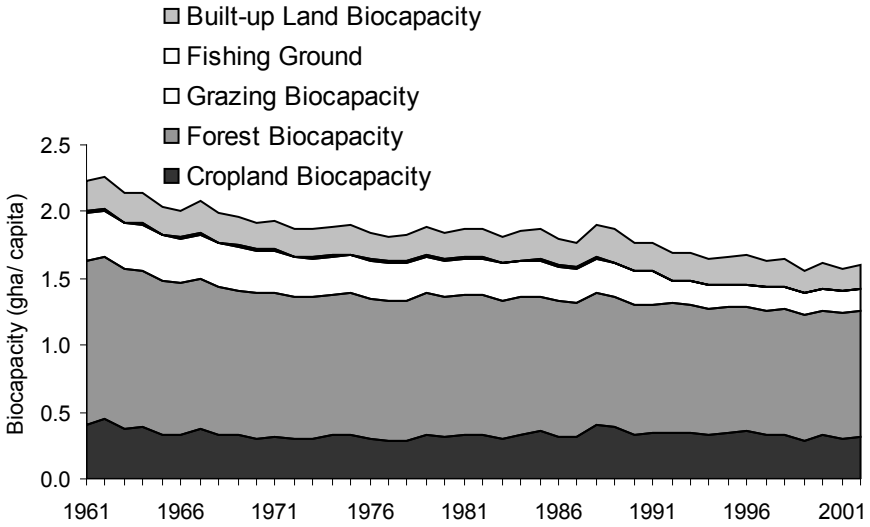


Figure 9.3.4: Biocapacity by Component (1961-2002)

Switzerland

Tanzania

9.1 Human Development Benchmarks

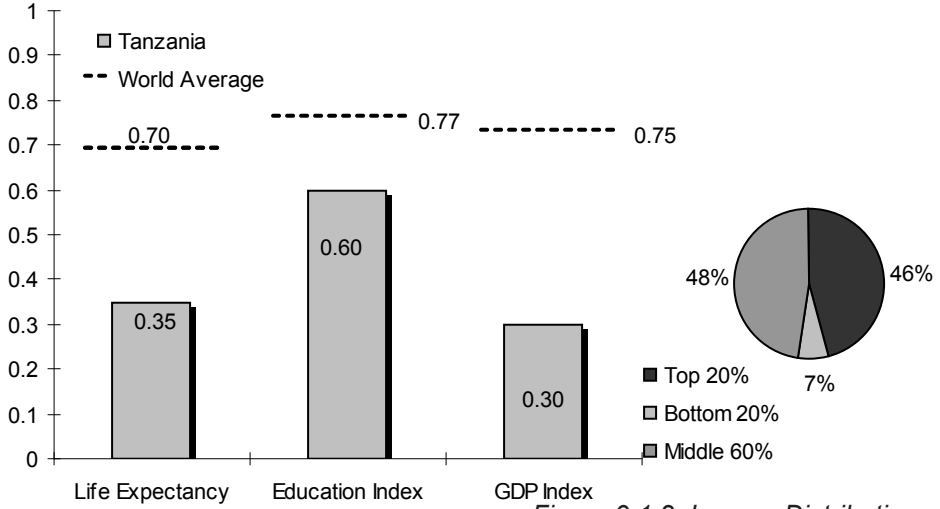


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	46
Gross Enrollment (%)	41%
Adult Literacy Rate (%)	69%
GDP per capita (PPP US$)	$621

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	62%
Male adult literacy rate (%)	78%
Female combined gross enrollment ratio (%)	40%
Male combined gross enrollment ratio (%)	42%
Female estimated earned income (PPP US$)	$516
Male estimated earned income (PPP US$)	$725

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	54%
Urban population with access to improved water source (%)	73%
Percentage of population undernourished (%)	44%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

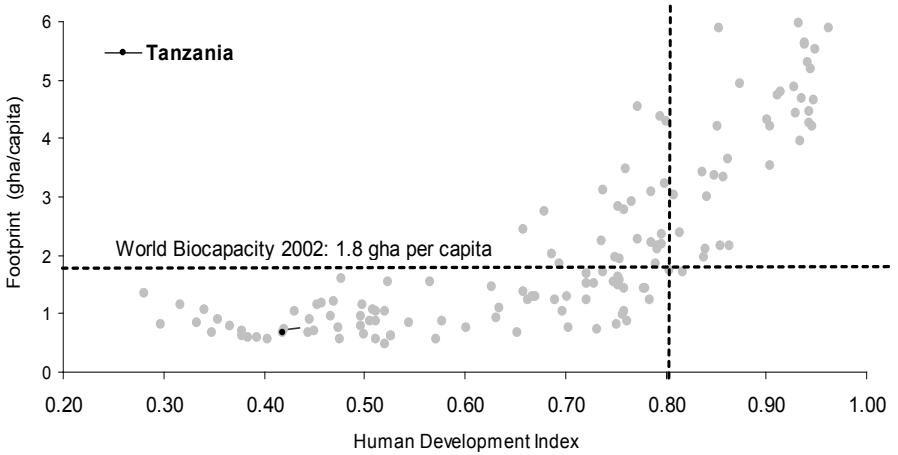


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1990 - 2003 (HDI data unavailable prior to 1990)

	Billion US$	Million gha	$/gha
Imports	$2.8	3.8	739
Exports	$1.9	1.5	1,242
Net (Exports - Imports)	-$0.9	-2.3	
ODA (% of GDP)	16.2%		
Debt Service (% of GDP)	0.9%		

Table 9.2.1: Trade and Debt

	World	Africa	Tanzania
Population (Millions)	6225	824	36
GDP per capita (US$)	$5,801	$794	$287
Footprint (gha/capita)	2.20	1.10	0.70
Biocapacity (gha/capita)	1.80	1.30	1.10

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

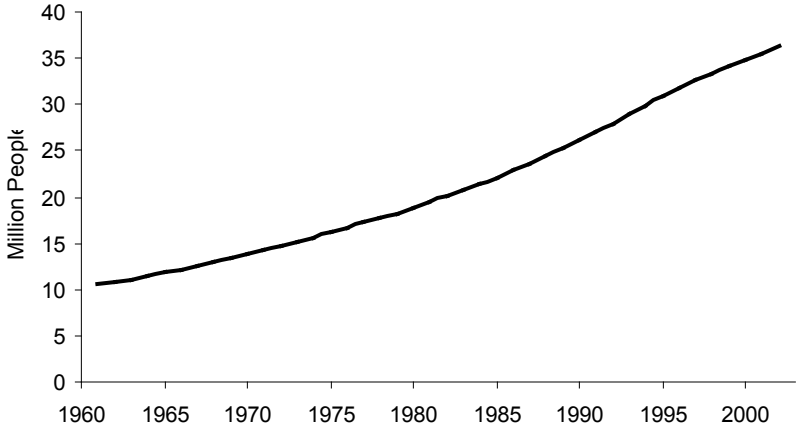


Figure 9.3.1: Population Trend

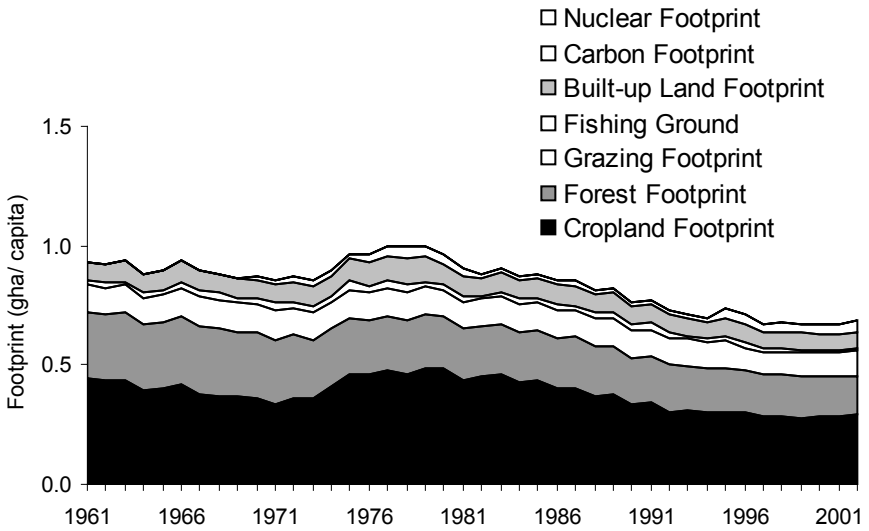


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

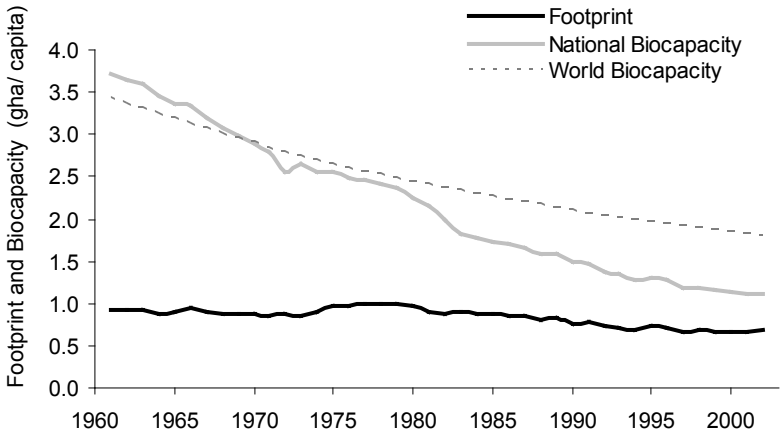


Figure 9.3.2: Footprint and Biocapacity Trend

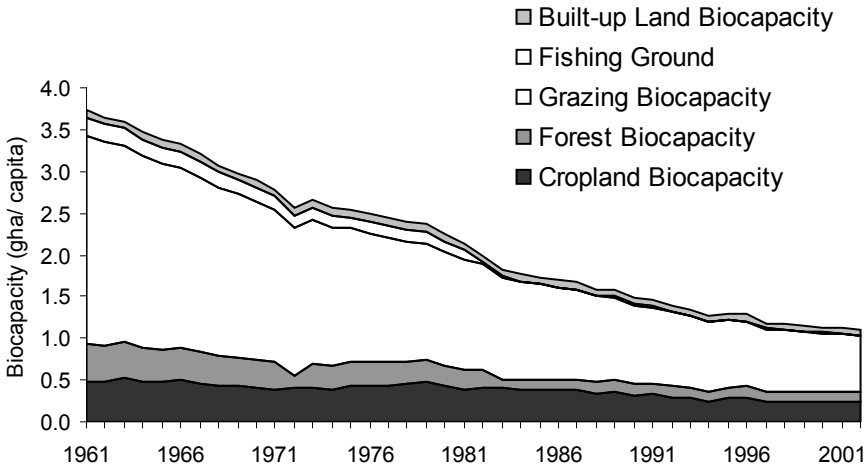


Figure 9.3.4: Biocapacity by Component (1961-2002)

Tanzania

Uganda

9.1 Human Development Benchmarks

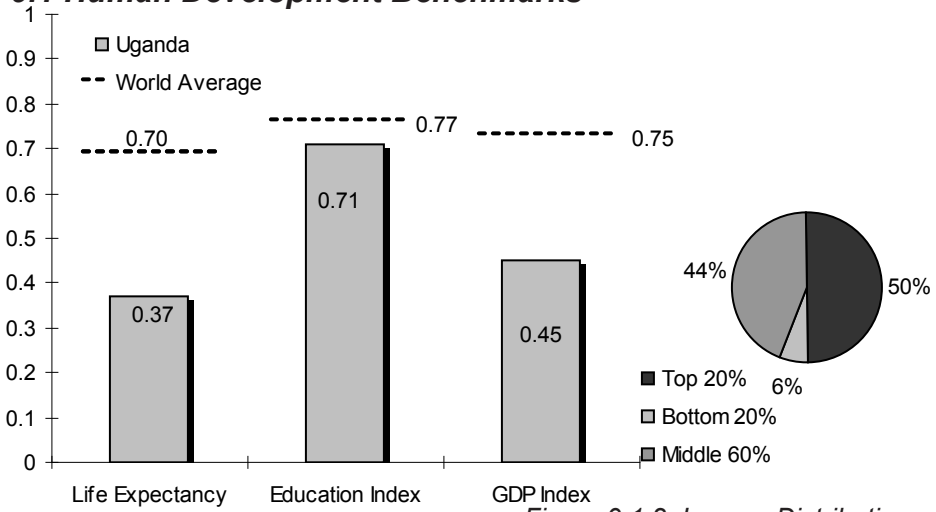


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	47
Gross Enrollment (%)	74%
Adult Literacy Rate (%)	69%
GDP per capita (PPP US$)	$1,457

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	59%
Male adult literacy rate (%)	79%
Female combined gross enrollment ratio (%)	72%
Male combined gross enrollment ratio (%)	75%
Female estimated earned income (PPP US$)	$1,169
Male estimated earned income (PPP US$)	$1,751

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	53%
Urban population with access to improved water source (%)	56%
Percentage of population undernourished (%)	19%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

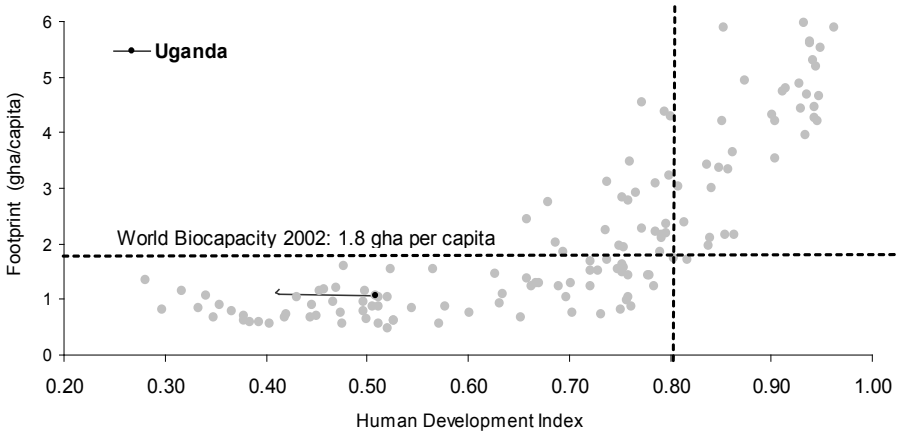


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1985 - 2003 (HDI data unavailable prior to 1985)

	Billion US$	Million gha	$/gha
Imports	$1.6	2.4	696
Exports	$0.8	1.0	762
Net (Exports - Imports)	-$0.9	-1.4	
ODA (% of GDP)	15.2%		
Debt Service (% of GDP)	1.3%		

Table 9.2.1: Trade and Debt

	World	Africa	Uganda
Population (Millions)	6225	824	25
GDP per capita (US$)	$5,801	$794	$249
Footprint (gha/capita)	2.20	1.10	1.10
Biocapacity (gha/capita)	1.80	1.30	0.80

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

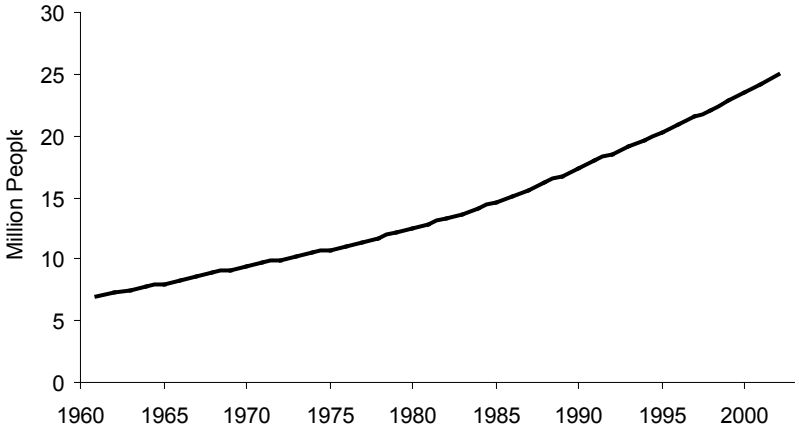


Figure 9.3.1: Population Trend

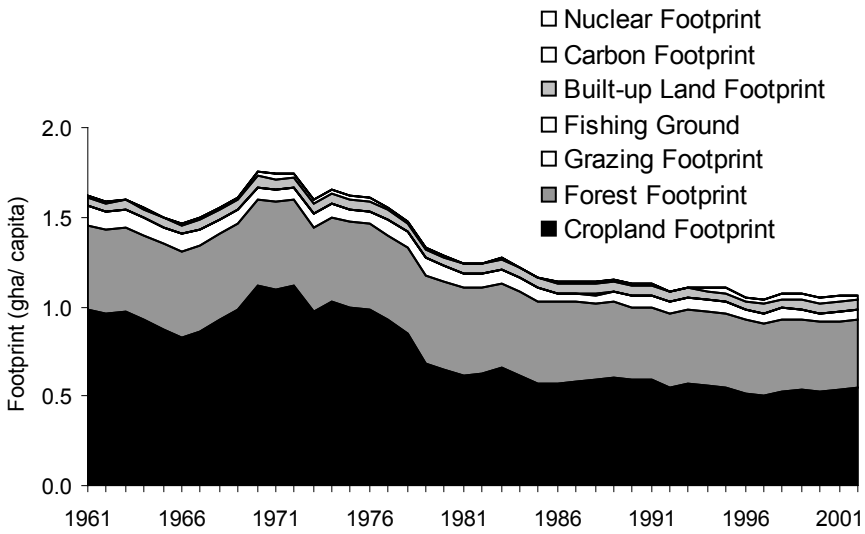


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

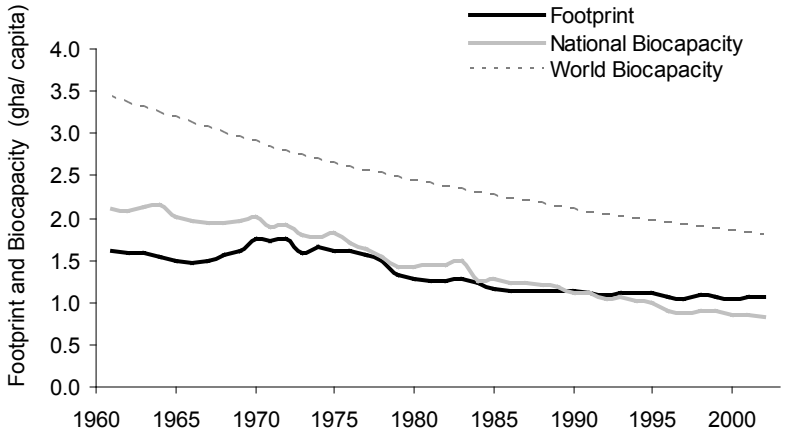


Figure 9.3.2: Footprint and Biocapacity Trend

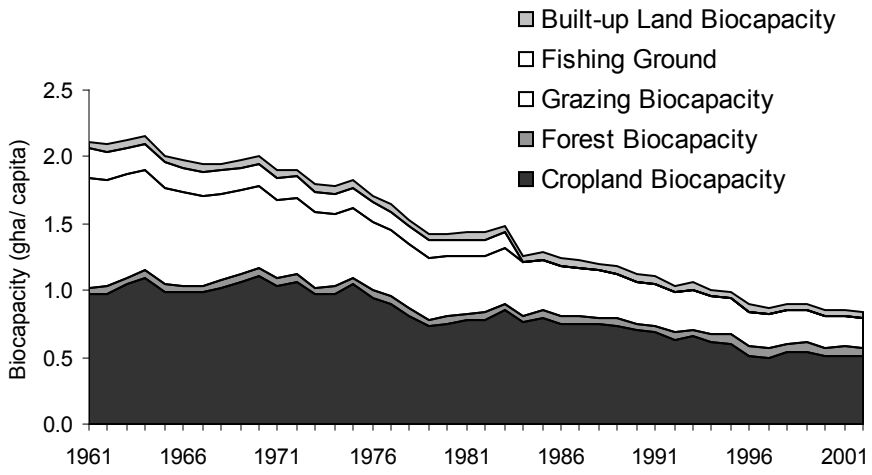


Figure 9.3.4: Biocapacity by Component (1961-2002)

Uganda

United Kingdom

9.1 Human Development Benchmarks

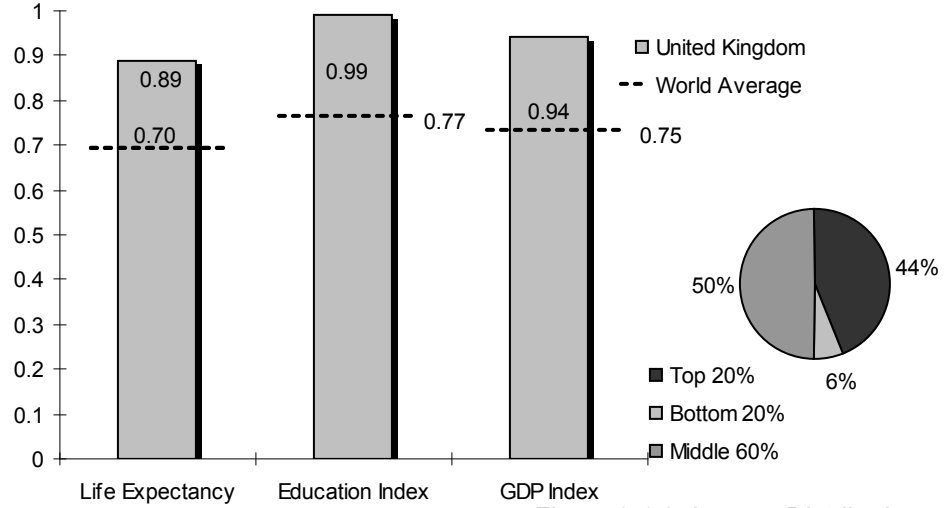


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	78
Gross Enrollment (%)	123%
Adult Literacy Rate (%)	NA
GDP per capita (PPP US$)	$27,147

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female combined gross enrollment ratio (%)	113%
Male combined gross enrollment ratio (%)	113%
Female estimated earned income (PPP US$)	$20,790
Male estimated earned income (PPP US$)	$33,713

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	NA
Urban population with access to improved water source (%)	NA
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

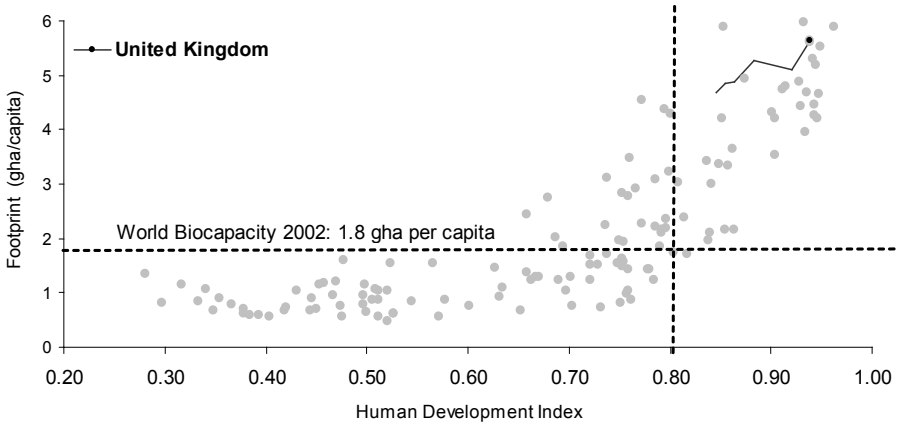


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$502.6	180.0	2,791
Exports	$448.7	81.8	5,486
Net (Exports - Imports)	-$53.8	-98.2	
ODA (% of GDP)	0.0%		
Debt Service (% of GDP)	0.0%		

Table 9.2.1: Trade and Debt

	World	Africa	United Kingdom
Population (Millions)	6225	824	59
GDP per capita (US$)	$5,801	$794	$30,253
Footprint (gha/capita)	2.20	1.10	5.60
Biocapacity (gha/capita)	1.80	1.30	1.60

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

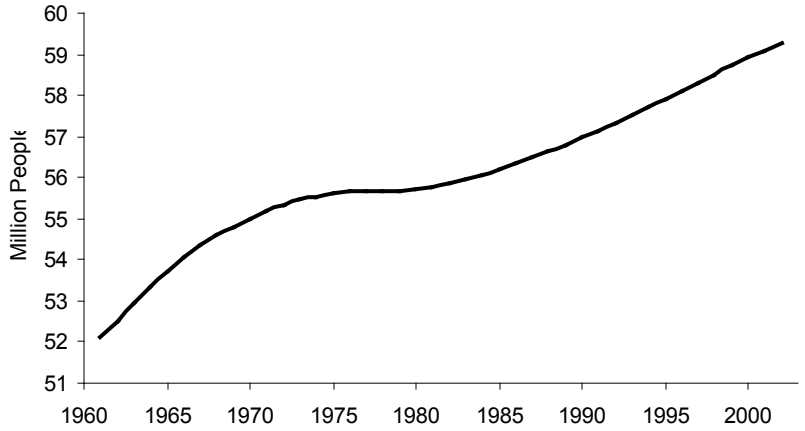


Figure 9.3.1: Population Trend

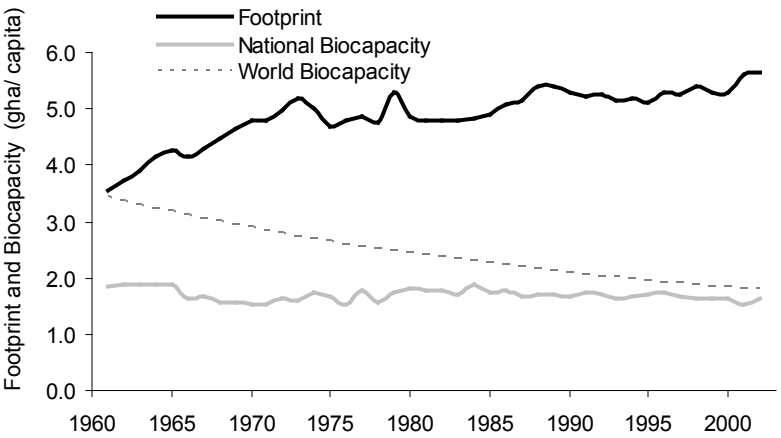


Figure 9.3.2: Footprint and Biocapacity Trend

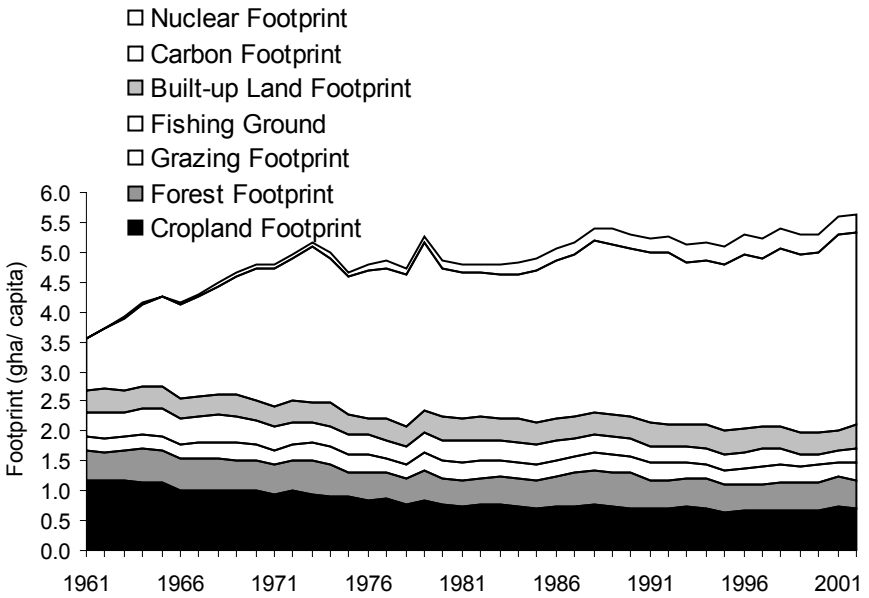


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

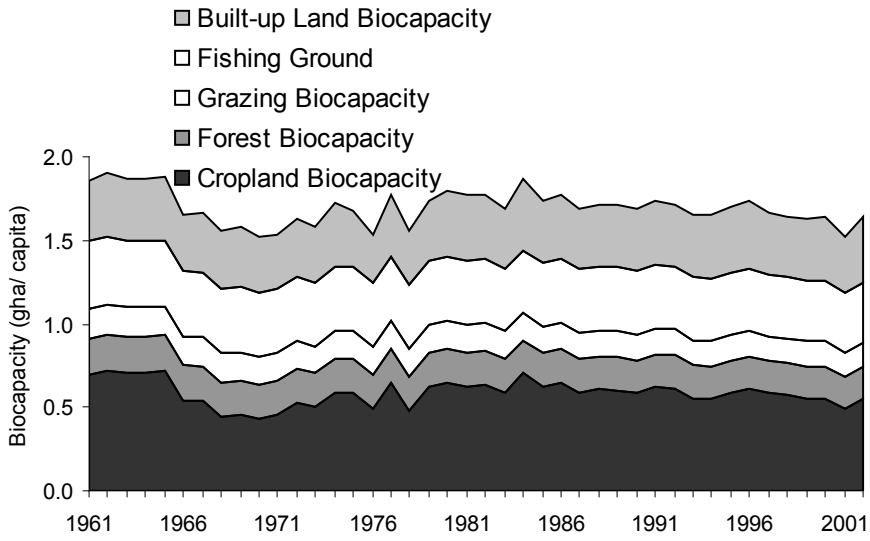


Figure 9.3.4: Biocapacity by Component (1961-2002)

United Kingdom

United States of America

9.1 Human Development Benchmarks

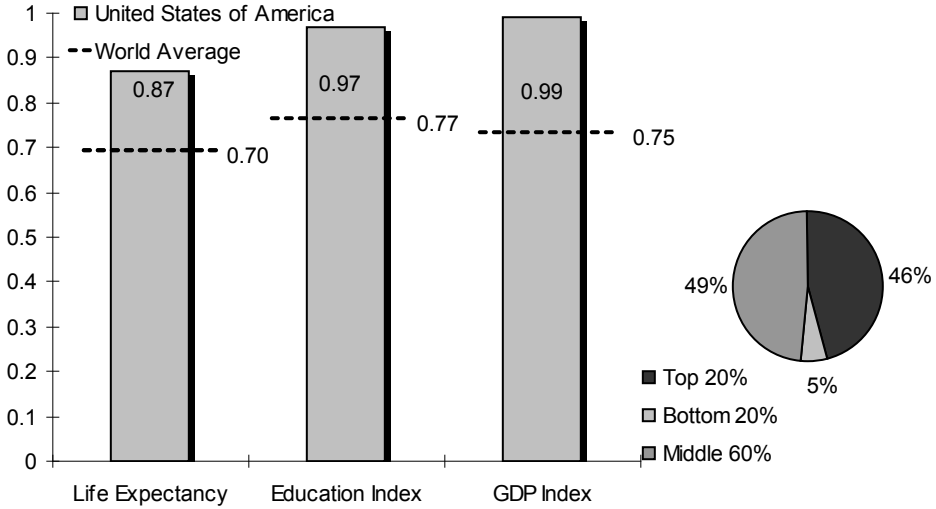


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	77
Gross Enrollment (%)	93%
Adult Literacy Rate (%)	NA
GDP per capita (PPP US$)	$37,562

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female combined gross enrollment ratio (%)	97%
Male combined gross enrollment ratio (%)	89%
Female estimated earned income (PPP US$)	$29,017
Male estimated earned income (PPP US$)	$46,456

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	NA
Urban population with access to improved water source (%)	NA
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

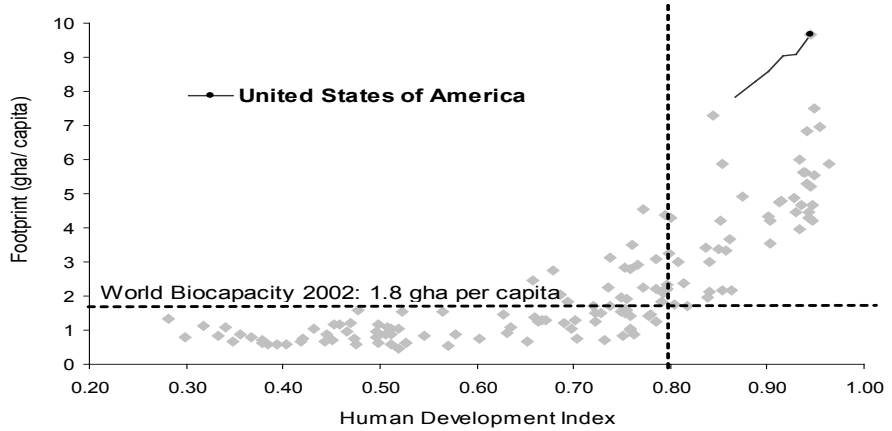


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$1,532.8	513.5	2,985
Exports	$1,094.9	559.1	1,958
Net (Exports - Imports)	-$437.9	45.6	
ODA (% of GDP)	0.0%		
Debt Service (% of GDP)	0.0%		

Table 9.2.1: Trade and Debt

	World	Africa	United States of America
Population (Millions)	6225	824	291
GDP per capita (US$)	$5,801	$794	$37,648
Footprint (gha/capita)	2.20	1.10	9.70
Biocapacity (gha/capita)	1.80	1.30	4.70

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

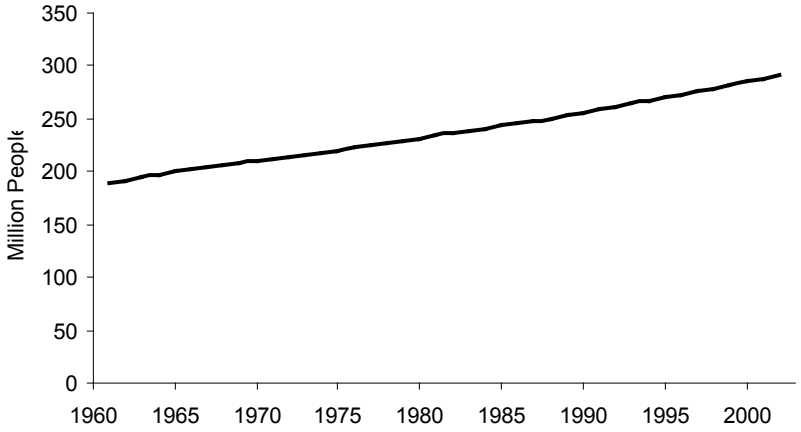


Figure 9.3.1: Population Trend

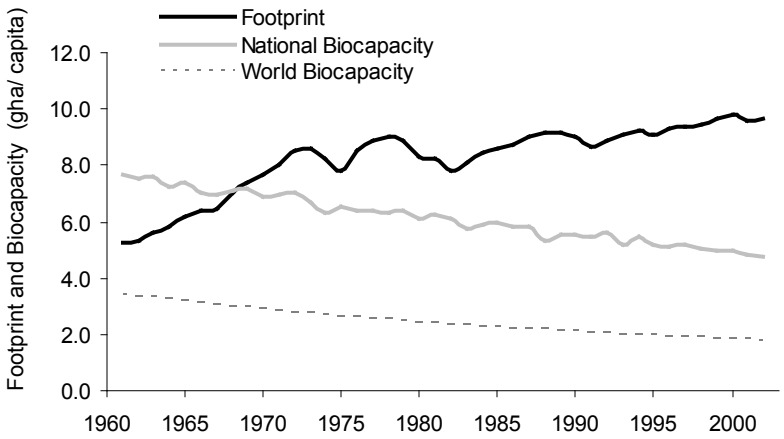


Figure 9.3.2: Footprint and Biocapacity Trend

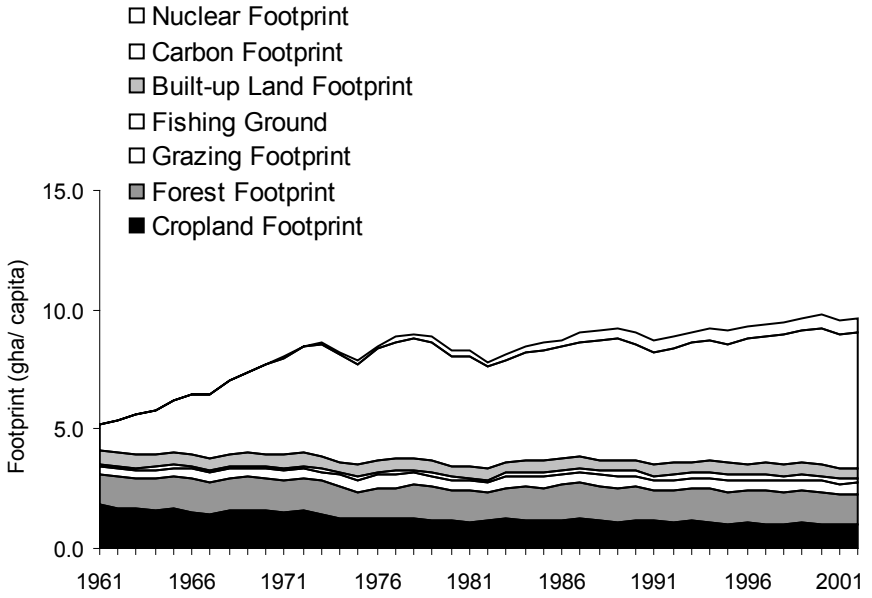


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

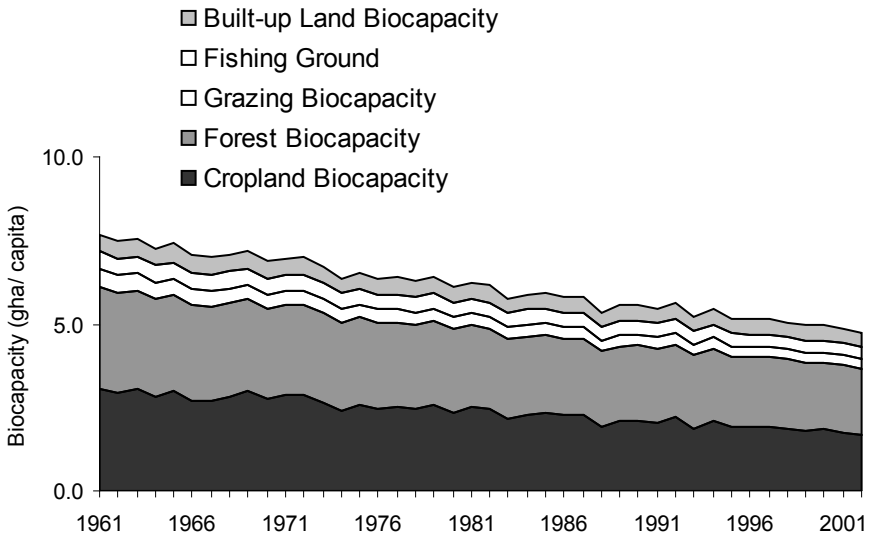


Figure 9.3.4: Biocapacity by Component (1961-2002)

United States of America

Zambia

9.1 Human Development Benchmarks

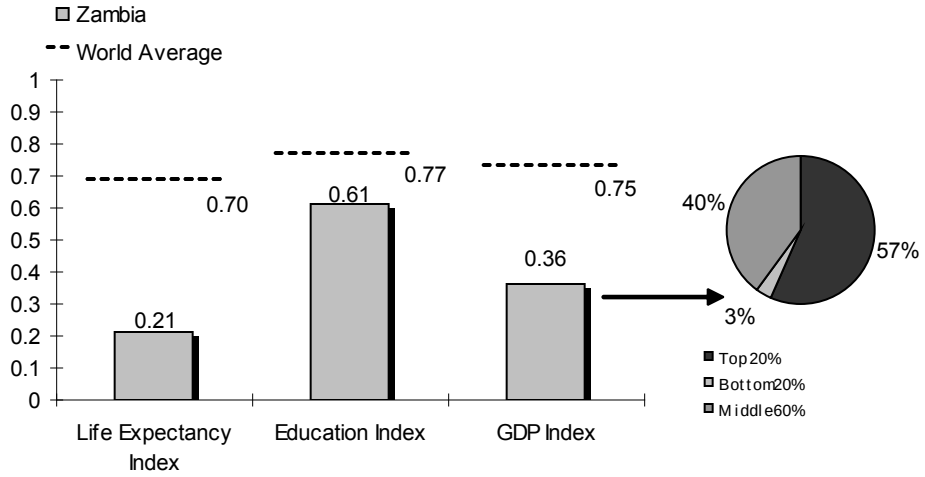


Figure 9.1.1: HDI Components, Indexed

Figure 9.1.2: Income Distribution

Life Expectancy (years)	38
Gross Enrollment (%)	48
Adult Literacy Rate (%)	68
GDP Per Capita (PPP US$)	$877

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	60%
Male adult literacy rate (%)	76%
Female Combined gross enrolment ratio (%)	45%
Male Combined gross enrolment ratio (%)	50%
Female estimated earned income (PPP US$)	$629
Male estimated earned income (PPP US$)	$1,130

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	55%
Urban population with access to improved water source (%)	45%
Percentage of population undernourished	49%

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

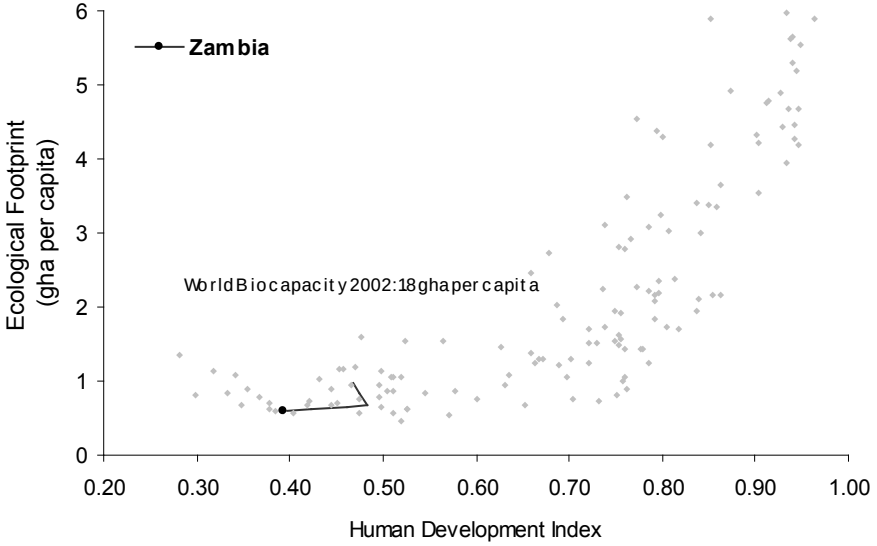


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$1.6	28.3	56
Exports	$1.2	3.4	353
Net (Exports - Imports)	-$0.4	-24.9	
ODA (% of GDP)	12.9%		
Debt Service (% of GDP)	9.0%		

Table 9.2.1: Trade and Debt

	World	Africa	Zambia
Population (Millions)	6225	824	11
GDP per capita (US$)	$5,801	$794	$417
Ecological Footprint (gha per capita)	2.20	1.10	0.58
Biocapacity (gha per capita)	1.80	1.30	3.41

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

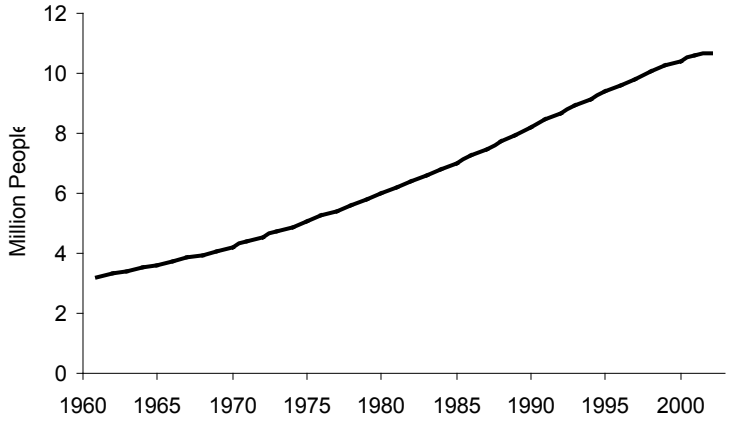


Figure 9.3.1: Population Trend

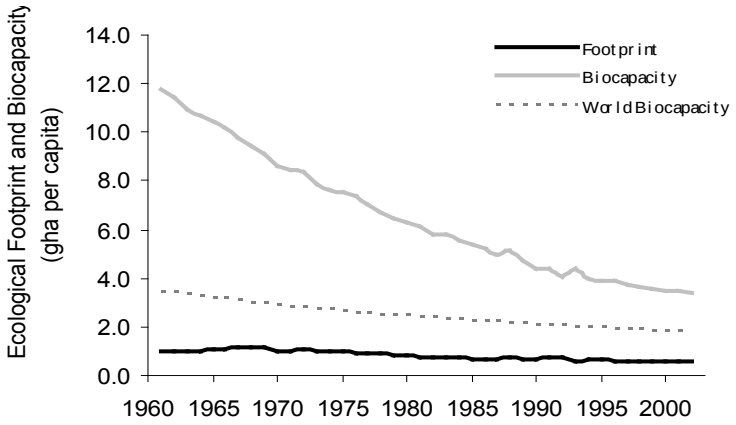


Figure 9.3.2: Footprint and Biocapacity Trend

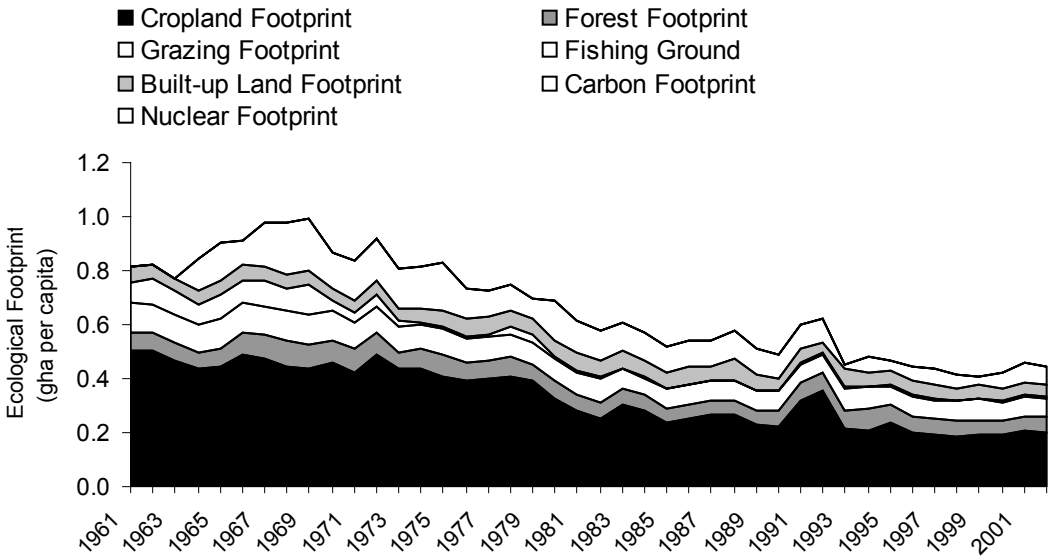


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

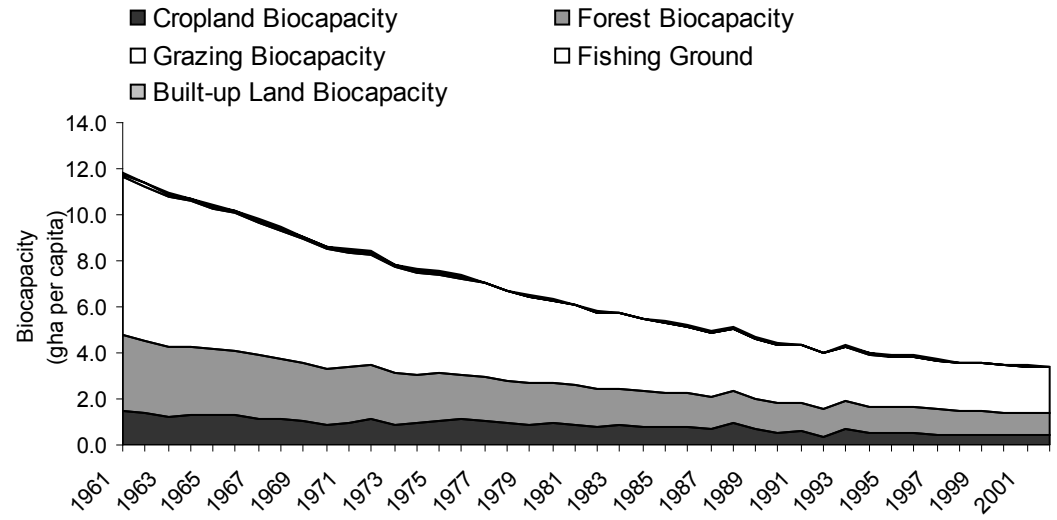


Figure 9.3.4: Biocapacity by Component (1961-2002)

Zambia

World

9.1 Human Development Benchmarks

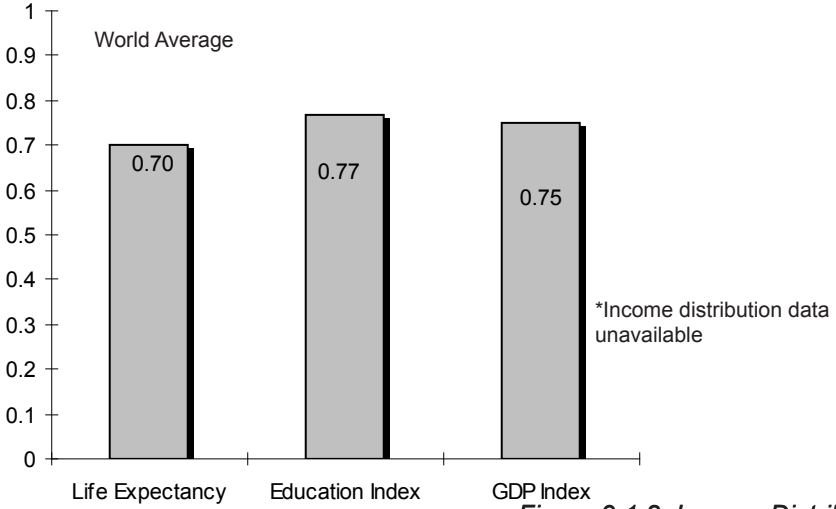


Figure 9.1.1: HDI Components, Indexed

*Figure 9.1.2: Income Distribution**

Life Expectancy (years)	67
Gross Enrollment (%)	67%
Adult Literacy Rate (%)	NA
GDP per capita (PPP US$)	$8,229

Table 9.1.1: HDI Components, Absolutes

Female adult literacy rate (%)	NA
Male adult literacy rate (%)	NA
Female combined gross enrollment ratio (%)	NA
Male combined gross enrollment ratio (%)	NA
Female estimated earned income (PPP US$)	NA
Male estimated earned income (PPP US$)	NA

Table 9.1.2: Gender Related Development

Urban population with access to improved sanitation facilities (%)	79%
Urban population with access to improved water source (%)	82%
Percentage of population undernourished (%)	NA

Table 9.1.3: Public Health

9.2 Human Development and Environmental Performance

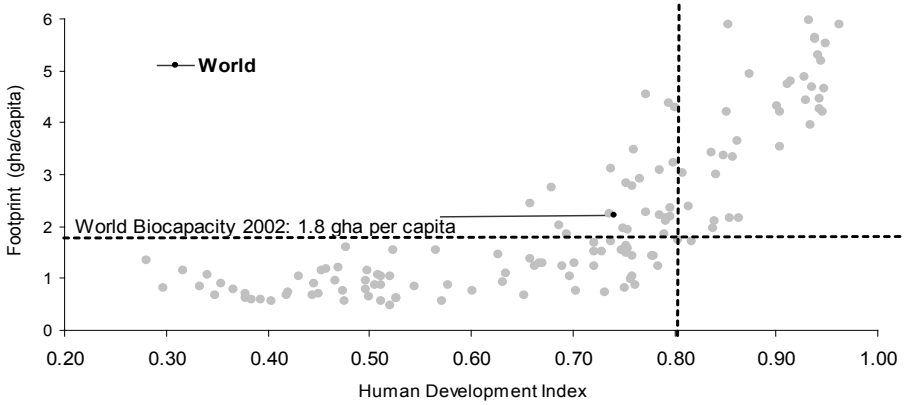


Figure 9.2.1: Human Development and Ecological Footprint of Nations, HDI Time Trend Line from 1975 - 2003

	Billion US$	Million gha	$/gha
Imports	$8,654	1,711	5,058
Exports	NA	NA	NA
Net (Exports - Imports)	NA	NA	
ODA (% of GDP)	NA		
Debt Service (% of GDP)	NA		

Table 9.2.1: Trade and Debt

	World	Africa
Population (Millions)	6225	824
GDP per capita (US$)	$5,801	$794
Footprint (gha/capita)	2.20	1.10
Biocapacity (gha/capita)	1.80	1.30

Table 9.2.2: Population, GDP and Ecological Footprint

Source: UNDP Human Development Report (2003 data)

9.3 Ecological Time Trends

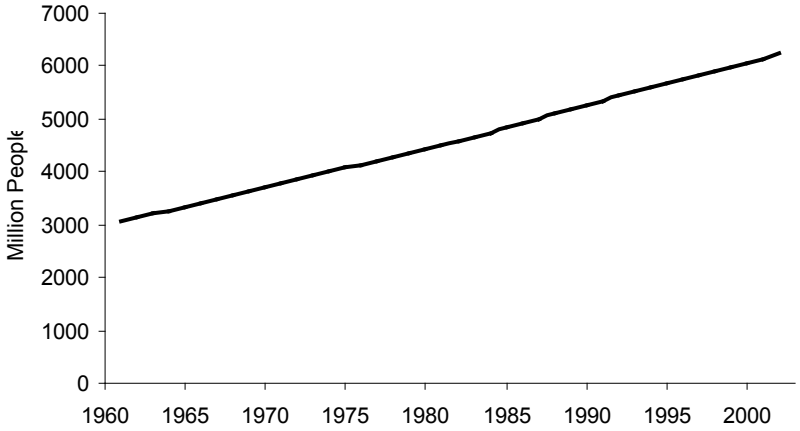


Figure 9.3.1: Population Trend

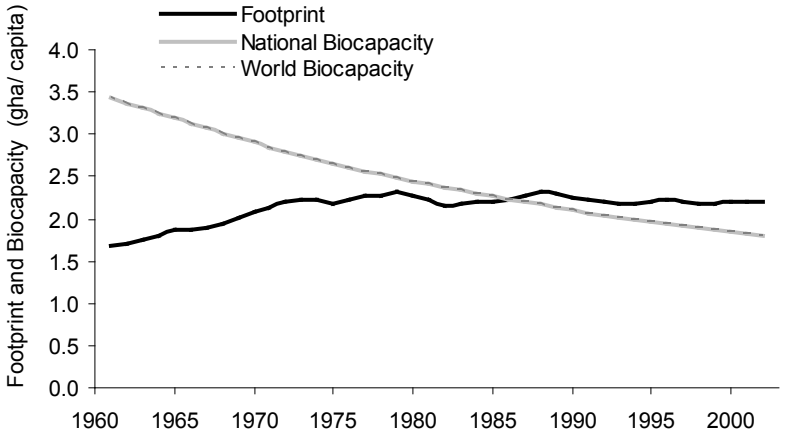


Figure 9.3.2: Footprint and Biocapacity Trend

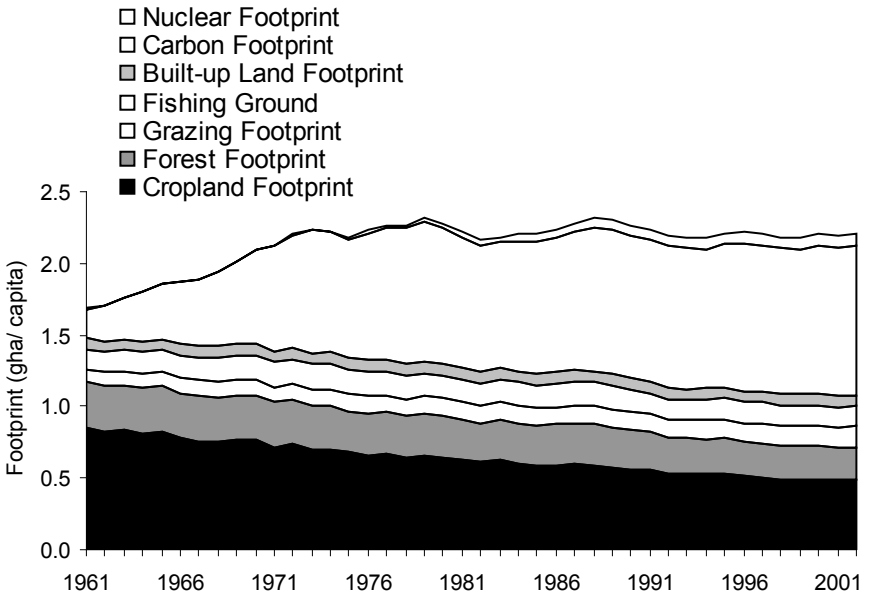


Figure 9.3.3: Ecological Footprint by Component (1961-2002)

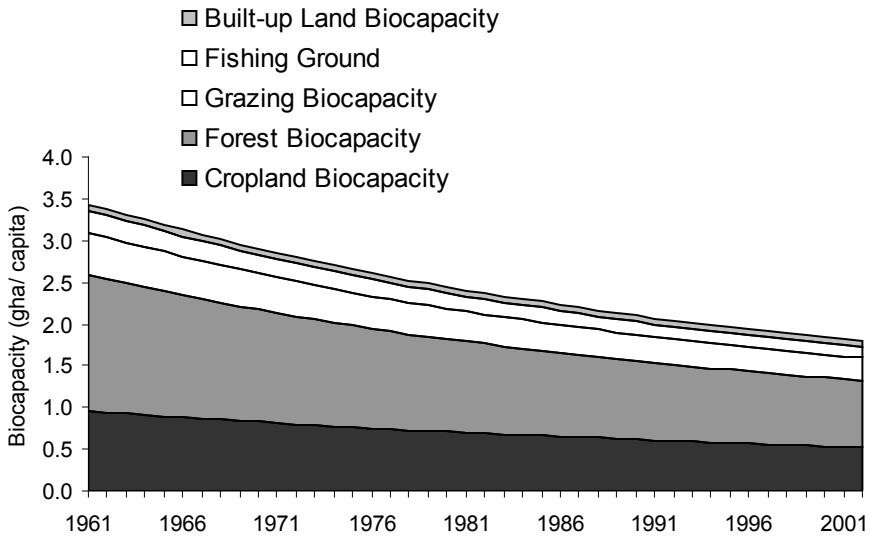


Figure 9.3.4: Biocapacity by Component (1961-2002)

Appendix I. Ecological Footprint and Biocapacity Table

2002 data	Popu-lation	GDP per person	Total Ecological Footprint	Total food, fiber, and timber Footprint	Included in food, fiber, and timber				Total energy Footprint	Included in total energy			
					Cropland	Forest	Grazing land	Fishing ground		CO2 from fossil fuels	Fuelwood	Nuclear	Hydro
	(millions)	(PPP $US 2003)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)
WORLD	6,225.0	8,200.0	2.2	0.9	0.49	0.17	0.14	0.14	1.2	1.05	0.06	0.09	0.00
High income countries	925.6	-	6.4	2.1	0.80	0.76	0.28	0.27	4.1	3.57	0.02	0.49	0.01
Middle income countries	2,989.4	-	1.9	0.9	0.48	0.11	0.17	0.11	0.9	0.85	0.05	0.03	0.00
Low income countries	2,279.8	-	0.8	0.5	0.36	0.02	0.04	0.03	0.3	0.20	0.08	0.00	0.00
AFRICA	828.4	2,400	1.1	0.6	0.43	0.05	0.09	0.04	0.4	0.26	0.13	0.00	0.00
Algeria	31.3	6,100	1.5	0.6	0.46	0.05	0.10	0.02	0.9	0.80	0.05	0.00	0.00
Benin	6.6	1,100	1.0	0.7	0.56	0.04	0.04	0.02	0.3	0.15	0.19	0.00	0.00
Burkina Faso	12.6	1,200	1.1	0.8	0.66	0.04	0.13	0.01	0.2	0.04	0.18	0.00	0.00
Burundi	6.6	600	0.7	0.4	0.33	0.04	0.03	0.00	0.3	0.02	0.25	0.00	0.00
Egypt	70.5	4,000	1.4	0.7	0.51	0.04	0.01	0.09	0.6	0.56	0.05	0.00	0.00
Ethiopia	69.0	700	0.8	0.4	0.29	0.03	0.13	0.00	0.3	0.03	0.27	0.00	0.00
Ghana	20.5	2,200	1.0	0.6	0.47	0.02	0.01	0.10	0.4	0.18	0.21	0.00	0.00
Kenya	31.5	1,000	0.8	0.5	0.24	0.04	0.20	0.01	0.2	0.12	0.13	0.00	0.00
Madagascar	16.9	800	0.6	0.4	0.26	0.00	0.14	0.02	0.2	0.04	0.12	0.00	0.00
Mali	12.6	1,000	0.8	0.7	0.43	0.02	0.24	0.00	0.1	0.01	0.08	0.00	0.00
Mozambique	18.5	1,100	0.6	0.4	0.28	0.04	0.03	0.04	0.2	0.00	0.18	0.00	0.00
Niger	11.5	800	1.3	1.1	0.93	0.03	0.14	0.00	0.2	0.04	0.15	0.00	0.00
Nigeria	120.9	1,000	1.2	0.8	0.69	0.06	0.05	0.04	0.3	0.17	0.10	0.00	0.00
Rwanda	8.3	1,300	0.7	0.5	0.41	0.04	0.04	0.00	0.2	0.03	0.12	0.00	0.00
South Africa	44.8	10,300	2.4	0.8	0.38	0.19	0.20	0.04	1.6	1.48	0.05	0.06	0.00
Tanzania	36.3	600	0.7	0.5	0.29	0.04	0.10	0.01	0.2	0.05	0.12	0.00	0.00
Uganda	25.0	1,500	1.1	0.7	0.55	0.09	0.05	0.00	0.3	0.03	0.29	0.00	0.00
OTHER NATIONS													
Brazil	176.3	7,800	2.1	1.5	0.54	0.32	0.58	0.05	0.5	0.33	0.16	0.02	0.02
China	1,302.3	5,000	1.6	0.8	0.42	0.09	0.12	0.14	0.7	0.70	0.03	0.00	0.00
France	59.9	27,700	5.6	2.0	0.89	0.53	0.30	0.27	3.4	1.94	0.01	1.48	0.01
India	1,049.5	2,900	0.7	0.4	0.34	0.02	0.00	0.04	0.3	0.26	0.06	0.00	0.00
Switzerland	7.2	30,600	4.7	1.3	0.52	0.42	0.29	0.12	3.1	2.33	0.02	0.77	0.00
United Kingdom	59.3	27,000	5.6	1.7	0.71	0.48	0.27	0.25	3.6	3.25	0.00	0.30	0.00
United States of America	291.0	38,000	9.7	2.9	0.97	1.27	0.46	0.20	6.3	5.71	0.03	0.57	0.01

Built-up land	Total Biocapacity*	Included in total Biocapacity*				Ecological Deficit or Reserve**	Human Development Index
		Cropland	Grazing land	Forest	Fishing ground		
(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	(global ha/person)	
0.1	1.8	0.52	0.27	0.80	0.13	-0.4	0.74
0.2	3.4	1.08	0.20	1.57	0.33	-3.0	-
0.1	2.1	0.51	0.30	1.07	0.13	0.2	-
0.0	0.7	0.30	0.18	0.10	0.05	-0.1	-
0.1	1.3	0.37	0.49	0.28	0.07	-0.2	0.50
0.0	0.6	0.24	0.34	0.01	0.01	-0.9	0.72
0.0	0.8	0.54	0.06	0.09	0.02	-0.3	0.43
0.1	1.0	0.60	0.23	0.06	0.00	-0.2	0.32
0.0	0.6	0.30	0.21	0.06	0.00	-0.1	0.38
0.1	0.4	0.29	0.00	0.00	0.03	-0.9	0.66
0.0	0.5	0.23	0.15	0.09	0.00	-0.3	0.37
0.1	1.3	0.49	0.34	0.36	0.05	0.3	0.52
0.0	0.6	0.19	0.34	0.04	0.01	-0.2	0.47
0.1	3.0	0.24	1.17	1.29	0.20	2.3	0.50
0.1	1.3	0.42	0.76	0.04	0.00	0.4	0.33
0.0	2.1	0.22	1.38	0.41	0.06	1.5	0.38
0.1	1.2	0.79	0.34	0.04	0.00	-0.1	0.28
0.1	1.0	0.57	0.23	0.09	0.02	-0.2	0.45
0.1	0.6	0.34	0.08	0.08	0.00	-0.1	0.45
0.1	2.0	0.59	0.71	0.47	0.20	-0.4	0.66
0.1	1.1	0.24	0.68	0.11	0.00	0.4	0.42
0.1	0.8	0.50	0.22	0.06	0.00	-0.2	0.51
0.1	10.1	0.79	1.17	7.97	0.09	8.0	0.79
0.1	0.8	0.35	0.12	0.17	0.07	-0.8	0.76
0.2	3.2	1.61	0.14	1.20	0.10	-2.4	0.94
0.0	0.4	0.27	0.00	0.02	0.03	-0.4	0.60
0.2	1.6	0.31	0.16	0.94	0.00	-3.1	0.94
0.4	1.6	0.55	0.15	0.19	0.36	-4.0	0.94
0.4	4.7	1.66	0.28	1.99	0.35	-4.9	0.94

Notes:

* Built-up land is included in both Total Footprint and Total Biocapacity (by definition, Footprint and Biocapacity are equal for built-up land).

** Negative numbers indicate an Ecological Deficit, positive numbers an Ecological Reserve

Numbers may not always add due to rounding.

World total population includes countries not listed in table.

Table includes all countries with populations greater than 1 million for which sufficient data are available for Ecological Footprint calculations.

High income countries: Australia, Austria, Belgium/ Luxembourg, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Israel, Italy, Japan, Korea, Rep, Kuwait, Netherlands, New Zealand, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland, United Arab Emirates, United Kingdom, United States of America.

Middle income countries: Algeria, Argentina, Belarus, Belize, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Chile, China, Colombia, Costa Rica, Croatia, Cuba, Czech Republic, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Gabon, Georgia, Guatemala, Hungary, Indonesia, Iran, Iraq, Jamaica, Jordan, Kazakhstan, Latvia, Lebanon, Libya, Lithuania, Macedonia, Malaysia, Mauritius, Mexico, Morocco, Namibia, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, Serbia and Montenegro, Slovakia, South Africa, Sri Lanka, Syria, Thailand, Trinidad and Tobago, Tunisia, Turkey, Ukraine, Uruguay, Uzbekistan, Venezuela.

Low income countries: Afghanistan, Albania, Angola, Armenia, Azerbaijan, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Cameroon, Central African Rep, Chad, Congo, Congo Dem Rep, Cote Divoire, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Haiti, Honduras, India, Kenya, Korea, DPR, Kyrgyzstan, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Moldova, Rep., Mongolia, Mozambique, Myanmar, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Rwanda, Senegal, Sierra Leone, Somalia, Sudan, Swaziland, Tajikistan, Tanzania, Togo, Turkmenistan, Uganda, Vietnam, Yemen, Zambia, Zimbabwe.

Appendix 2. Technical Notes on the Ecological Footprint

The **Ecological Footprint** is a measure of how much biologically productive land and water area an individual, a city, a country, a region or humanity uses to produce the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management schemes. This land and water area can be physically located anywhere in the world. This report documents national, per person footprints for consumption. Footprints can be calculated for any activity of organizations and populations or for urban development projects, services and products.

The Ecological Footprint is measured in **global hectares**. A global hectare is 1 hectare of biologically productive space with world average productivity. In 2001 (the most recent year for which consistent data are available), the biosphere had 11.3 billion hectares of biologically productive area, corresponding to roughly one quarter of the planet's surface. These 11.3 billion hectares include 2.3 billion hectares of water (ocean shelves and inland water) and 9.0 billion hectares of land. The land area is composed of 1.5 billion hectares of cropland, 3.5 billion hectares of grazing land, 3.9 billion hectares of forest land and 0.2 billion hectares of built-up land. In this report, the Ecological Footprint of consumption is calculated for each country. This includes the embodied resources contained within the goods and services that are consumed by people living in that country, as well as the associated waste. Resources used for the production of goods and services that are later exported are counted in the footprint of the country where the goods and services are finally consumed.

The **global Ecological Footprint** is the area required to produce the material throughput of the human economy under current management and production practices. Typically expressed in global hectares, the Ecological Footprint can also be measured in number of planets, whereby one planet represents the biological capacity of the Earth in agiven year. Results could also be expressed, for example, in Austrian or Danish hectares (hectares with average Austrian or Danish productivity), just as financial accounts can express the same total value in different currencies. Ecological Footprint and biocapacity analyses are based primarily on data published by the Food and Agriculture Organization of the United Nations (FAO), the International Energy Agency (IEA), the UN Statistics Division (UN Commodity Trade Statistics Database – UN Comtrade), and the Intergovernmental Panel on Climate Change (IPCC). Other data sources include studies in peer-reviewed science journals and thematic collections.

Biocapacity and Bioproductivity

Biocapacity (biological capacity) is the total usable biological production capacity of a biologically productive area in a given year. Biocapacity can also be expressed in global hectares.

Biologically productive area is land and sea area with significant photosynthetic activity and production of biomass. Marginal areas with patchy vegetation and non-productive areas are not included in biocapacity estimates. There are 11.3 billion global hectares of biologically productive land and sea area on the planet. The remaining three quarters of the Earth's surface, including deserts, ice caps and deep oceans, support comparatively low levels of bioproductivity, too dispersed to be harvested.

Bioproductivity (biological productivity) is equal to biological production per unit area per year. Biological productivity is typically measured in terms of annual biomass accumulation.

Biocapacity available per person is calculated by dividing the 11.3 billion global hectares of biologically productive area by the number of people on Earth (6.15 billion in 2001). This ratio gives the average amount of biocapacity that exists on the planet per person: 1.8 global hectares.

Assumptions Underlying the Calculations

Ecological Footprint calculations are based on the following assumptions:

• It is possible to track the majority of the resources people consume and the wastes they generate.
• The majority of these resource and waste flows can be measured in terms of the biologically productive area necessary to maintain these flows.Those resource and waste flows that cannot be measured are excluded from the assessment. This approach tends to underestimate the true Ecological Footprint.
• By weighting each area in proportion to its usable bioproductivity, different types of areas can be converted from hectares to global hectares, land of average productivity. 'Usable' refers to the portion of biomass used by humans, reflecting the anthropocentric assumptions of the Ecological Footprint measurement.
• Since these different areas represent mutually exclusive uses and each global hectare represents the same amount of biomass production potential for a given year, they can be added up. This is the case for both the aggregate human demand (the Ecological Footprint) and the aggregate supply of biocapacity.
• Human demand expressed as the Ecological Footprint and nature's supply expressed in global hectares of biocapacity can be directly compared.
• Area demanded can exceed area supplied. For example, the footprint of forest products harvested from a forest at twice its regeneration rate is twice the size of the actual forest. Use that exceeds the regeneration rate of nature is called ecological overshoot.

What is not Counted

The results presented tend to underestimate human demand on nature and overestimate the available biocapacity by:

• choosing more optimistic bioproductivity estimates when in doubt (e.g. carbon absorption)
• excluding human demands on the biosphere for which there are insufficient data (e.g. acid rain)
• excluding those activities that systematically erode nature's capacity to regenerate, such as:
- uses of materials for which the biosphere has no apparent significant assimilation capacity (e.g. plutonium, polychlorinated biphenyls (PCBs), dioxins, chlorofluorocarbons (CFCs))
- processes that irreversibly damage the biosphere (e.g. species extinction, fossil-aquifer depletion, deforestation, desertification)

The national footprint and biocapacity accounts also do not directly account for freshwater use and availability, since withdrawal of a cubic metre of freshwater affects biocapacity differently depending on local conditions. Removing one cubic metre from a wet area may make little difference to the local environment, while in arid areas every cubic metre removed can directly compromise ecosystem production. Hence, water assessments require very specific data on local circumstances, and such data are not available for global comparison. The accounts reflect freshwater use and availability indirectly, however, since this affects biocapacity through changes in crop and forest yields.

For consistency and to keep the global hectares additive, each area is only counted once in Ecological Footprint and biocapacity estimates, even if an area provides two or more ecological services. Also, the accounts include the productivity of cropland at the level of current yields, with no deduction for possible degradation. If degradation takes place, however, this will be reflected as reductions in future biocapacity assessments.

Ecological Footprint calculations avoid double counting – counting the same area twice. Considering bread, for example, wheat is first farmed, then milled, baked and finally eaten. Economic data can track these sequential processes and report the amounts of materials and their financial values at each stage. However, the same wheat grain appears throughout the production process before finally ending up as human consumption. To avoid double counting, the wheat is counted at only one stage of the process, while energy consumed at each stage of the process is added to the footprint.

Methodology

The Ecological Footprint methodology is in constant development and continually incorporates more detail and better data as they become available. Coordination of this task is being led by the Global Footprint Network in Oakland, California. This report uses the most current national footprint and biocapacity accounts methodology, building on Monfreda et al. (2004). An electronic copy of a sample data sheet and its underlying formula along with a detailed description of the calculation methodology are available at www.footprintnetwork.org. New features in the 2004 edition include:

• A simplification of the pasture calculation that assumes full use of existing pasture areas unless livestock density is lower than half the carrying capacity of the pasture as calculated from net primary productivity estimates

• A refined calculation of CO2 sequestration and forest productivity using FAO's Global Fibre Supply Model (FAO 2000) and complementary FAO sources .

• A more complete data source for CO2 emissions (IEA 2003)

• New data sources for built-up area (FAO/IIASA 2000, EEA 1999)

This analysis reports the footprint of consumption for nations and the world. Although, globally, the footprint of all goods and services produced must equal the footprint of all goods and services consumed, this is not the case at a national level. A nation's footprint of consumption equals that nation's footprint of production plus imports and minus exports (assuming no significant change in stocks). Domestic production is adjusted for production waste and, in the case of crops, the amount of seed necessary for growing the crops.

The footprint of consumption is computed for all countries that are represented in UN statistical data from 1961 to 2001. The analysis uses approximately 3,500 data points and 10,000 calculations per country in each year. More than 200 resource categories are included, among them cereals, timber, fishmeal and fibres. These resource uses are translated into global hectares by dividing the total amount consumed in each category by its global average yield and then multiplying by the equivalence factor for the land type that produces those resources. Biomass yields, measured in dry weight, are taken from international statistics (FAO 2004b).

Manufactured or derivative products, for example furniture or bread, are converted into parent product equivalents, in this case raw timber or wheat, for footprint calculations. For example, if 1 tonne of bread is exported, the amount of cereals and energy required to produce this tonne of bread are estimated. These quantities of primary products are then translated into a corresponding biologically productive area, then subtracted from the exporting country's footprint and added to that of the importing country. Due to data limitations, a few categories of consumption activities, such as tourism, are attributed to the country in which they occur rather than to the consumer's country of origin. This distorts the relative size of some countries' footprints but does not affect the global result.

Area Types of the Ecological Footprint and Biocapacity Accounts

The accounts track six main bioproductive area types. Once the human impacts are expressed in global hectares for each area type, these components are added together to obtain an aggregate footprint or biocapacity estimate.

Cropland

Crops for food, animal feed, fibre and oil require cropland, the most productive land type. The FAO estimates that there are about 1.5 billion hectares of cropland worldwide. Using FAO harvest and yield data for 74 major crops, the cropland area corresponding to a given amount of crop production can be calculated. The accounts do not track possible decreases in long-term productivity due to degradation, however, as many impacts of current agricultural practices, such as topsoil erosion, salination and contamination of aquifers with agro-chemicals are not accounted for. Still, such damage will affect future bioproductivity as measured by these accounts.

Grazing land

Grazing animals for meat, hides, wool and milk requires grassland and pasture area. Worldwide, there are 3.5 billion hectares of natural and semi-natural grassland and pasture. The analysis assumes that 100 per cent of pasture is utilized, unless pasture is estimated to produce more than twice the feed requirement necessary for the grass-fed livestock. In this case, pasture demand is counted at twice the minimum area requirement. This means that the pasture footprint per unit of animal product is capped at twice the lowest possible pasture footprint per unit of animal product. This may lead to an underestimate of pasture demand since, even in low productivity grasslands, grazing animals are usually afforded full range and thus create human demand on the entire available grassland.

Diet profiles are created to determine the mix of cultivated food, cultivated grasses, fish products and grazed grasses consumed by animals in each country. Each source of animal food is charged to the respective account (crop feed to the cropland footprint, fish-based feed to the fishing area footprint, etc.). For imports and exports of animal products, the embodied cropland and pasture is used with FAO trade data to charge animal product footprints to the country consuming the livestock products.

Forest Area

Harvesting trees and gathering fuelwood require natural or plantation forests. The FAO's most recent survey indicates that there are 3.9 billion hectares of forests worldwide. Forest productivities are estimated using a variety of sources. Consumption figures for timber and fuelwood come from FAO data as well. The footprint of fuelwood consumption is calculated using timber growth rates that are adjusted upward to reflect the fact that more forest biomass than roundwood alone is used for fuel and that less mature forests with higher productivity can be used for fuelwood production.

The dividing line between forest areas and grasslands is not sharp. For instance, FAO has included areas with 10 per cent of tree cover in the forest categories, while in reality these may be primarily grazed. While the relative distribution between forest and grassland areas may not be precisely determined, the accounts are constructed to ensure no single area is counted in more than one category of land.

Fishing ground

Catching or harvesting fish products requires productive freshwater and marine fishing grounds. Most of the ocean's productivity is located on continental shelves, which, excluding inaccessible or unproductive waters, total 1.9 billion hectares. Although this is only a fraction of the ocean's 36.3 billion hectare area, continental shelves provide more than 95 per cent of the marine fish catch. Inland waters comprise an additional 0.4 billion hectares, making 2.3 billion hectares of potential fishing grounds out of the 36.6 billion hectares of ocean and inland water that exist on the planet. FAO fish catch figures are used to estimate demand on fishing grounds, which is compared with FAO's 'sustainable yield' figure of 93 million tonnes per year. The accounts include both fish catch for fishmeal and fish for direct human consumption. Adjustments for bycatch are added to each country's reported fish catch to account for discarded fish.

Built-up land

Infrastructure for housing, transportation and industrial production occupies built-up land. This space is the least documented, since low-resolution satellite images are not able to capture dispersed infrastructure and roads. Data from CORINE (EEA 1999), GAEZ (FAO/IIASA 2000), and GLC (JRC/GVM 2000) are used to estimate existing built-up land areas. Best estimates indicate a global total of 0.2 billion hectares of built-up land. Built-up land is assumed to have replaced cropland, as human settlements are predominantly located in the most fertile areas of a country. As such, the 0.2 billion hectares of demanded and supplied built-up land appear in the Ecological Footprint accounts as 0.44 billion global hectares.

Areas occupied by hydroelectric dams and reservoirs, used for the production of hydropower, are also counted as built-up land.

'Energy' land

Burning fossil fuels adds CO2 to the atmosphere. The footprint of fossil fuel consumption is calculated by estimating the biologically productive area needed to sequester enough CO2 to avoid any increase in atmospheric CO2 concentration. Since the world's oceans absorb about 1.8 gigatonnes of carbon every year (IPCC 2001), only the remaining carbon emissions are counted in the Ecological Footprint. To the extent that oceanic absorption negatively impacts the productivity of marine habitats, this approach underestimates the true footprint of carbon emissions.

The current capacity of world average forests to sequester carbon is based on FAO's Global Fibre Supply Model and corrected where better data are available from other FAO sources such as FAO/UNECE 2000, FAO 1997b and FAO 2004b. Sequestration capacity changes with both the maturity and composition of forests and with shifts in bioproductivity due to higher atmospheric CO2 levels and associated changes in temperature and water availability. Other possible methods to account for fossil fuel use result in larger footprint estimates (Wackernagel and Monfreda 2004, Dukes 2003).

Each thermal unit of nuclear energy is counted as equal in footprint to a unit of fossil energy. This parity was chosen to reflect the possibility of a negative longterm impact from nuclear waste. The hydropower footprint is the area occupied by hydroelectric dams and reservoirs, and is calculated for each country using the average ratio of power output to inundated reservoir area for the world's 28 largest dams.

Embodied energy is the energy used during a product's entire life cycle for manufacturing, transportation, product use and disposal. The net embodied energy in each product category is calculated with the COMTRADE database from the United Nations Statistical Department, classified by four-digit SITC code with 609 product categories. The energy intensities (embodied energy per unit) for each product category are drawn from a variety of sources (IVEM 1999, Hofstetter 1992).

Normalizing Bioproductive Areas

Cropland, forest, grassland and fishing grounds vary in bioproductivity. In order to produce Ecological Footprint results in a single unit, global hectares, the calculations normalize areas across nations and area types to account for differences in land and sea productivity. Equivalence factors and yield factors are used to convert the actual areas in hectares of different land types into their equivalents in global hectares. These factors are used to calculate both footprints and biocapacities.

Equivalence factors relate the average primary biomass productivities of different types of land (i.e. cropland, pasture, forest, fishing ground) to the global average primary biomass productivity of all land types in a given year. In 2001, for example, primary cropland had an equivalence factor of 2.19 (Table 7), indicating that primary cropland was more than twice as productive as a hectare of land with world average productivity. That same year, pasture had an equivalence factor of 0.48, showing that pasture was approximately half as productive as the average bioproductive hectare on Earth. Equivalence factors are calculated on a yearly basis, since the relative productivity of land-use types varies due to change in technology and resource management schemes. Yield factors account for the difference in productivity of a given type of land across nations. For example, a hectare of pasture in New Zealand produces more meat than a hectare of pasture in Jordan. To account for these differences, the yield factor compares the production of a national hectare to a world average hectare of a given land type. Each country and each year has its own set of yield factors.

To calculate the total biocapacity of a nation, each of the different types of bioproductive area within that nation's borders (cropland, forest area, inland fisheries, ocean fisheries, pasture and built-up land), is multiplied by the equivalence factor for that land type (the same for every country in a given year) and the yield factor for that land type (specific for each country in a given year). These conversions produce a biocapacity or footprint in terms of productivity adjusted area, or biologically productive area expressed in world average productivity.

The unit for productivity adjusted area in the accounts is the global hectare. Worldwide, the number of biologically productive hectares and the number of global hectares are the same.

Natural Accounting

Natural capital is the stock of natural assets that yield goods and services on a continuous basis. Major functions of natural capital include resource production (such as fish, timber or cereals), waste assimilation (such as CO2 absorption, sewage decomposition) and life support services (UV protection, biodiversity, water cleansing, climate stabilization).

An ecological deficit is the amount by which the Ecological Footprint of a population exceeds the biocapacity of the population's territory. A national ecological deficit measures the amount by which a country's footprint exceeds its biocapacity. A national deficit can be covered either through trade or offset by the loss of national ecological capital. A global ecological deficit cannot be offset through trade, however, and leads to depletion of natural capital – a global ecological overshoot.

Ecological debt is the accumulated annual global deficit. Debts are expressed in planet-years, with one planet-year equal to the annual production of the global biosphere.

Countries with footprints smaller than their locally available biocapacity have an ecological reserve, the opposite of an ecological deficit. This reserve is not necessarily unused, however, but may be occupied by the footprints of other countries through production for export.

Appendix 3. Glossary of UNDP Terms

See http://hdr.undp.org/reports/global/2005/pdf/HDR05_backmatter.pdf for more details

Education index
One of the three indices on which the human development index is built. It is based on the adult literacy rate and the combined gross enrolment ratio for primary, secondary and tertiary schools. For details on how the index is calculated, see above mentioned link to full report.

Enrolment ratio, gross, combined for primary, secondary and tertiary schools
The number of students enrolled in primary, secondary and tertiary levels of education, regardless of age, as a percentage of the population of official school age for the three levels.

GDP (gross domestic product)
The sum of value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output. It is calculated without making deductions for depreciation of fabricated capital assets or for depletion and degradation of natural resources. Value added is the net output of an industry after adding up all outputs and subtracting intermediate inputs.

GDP (US$)
GDP converted to US dollars using the average official exchange rate reported by the International Monetary Fund. An alternative conversion factor is applied if the official exchange rate is judged to diverge by an exceptionally large margin from the rate effectively applied to transactions in foreign currencies and traded products.

Human development index (HDI)
The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development:
• A long and healthy life, as measured by life expectancy at birth.
• Knowledge, as measured by the adult literacy rate (with two-thirds weight) and the combined primary, secondary and tertiary gross enrolment ratio (with one-third weight).
• A decent standard of living, as measured by GDP per capita (PPP US$).

Before the HDI itself is calculated, an index needs to be created for each of these dimensions. To calculate these dimension indices —the life expectancy, education and GDP indices—minimum and maximum values (goalposts) are chosen for each underlying indicator.

Life expectancy at birth
The number of years a newborn infant would live if prevailing patterns of agespecific mortality rates at the time of birth were to stay the same throughout the child's life.

Literacy rate, adult
The percentage of people ages 15 and above who can, with understanding, both read and write a short, simple statement related to their everyday life.

PPP (purchasing power parity)
A rate of exchange that accounts for price differences across countries, allowing international comparisons of real output and incomes. At the PPP US$ rate (as used in this Report), PPP US$1 has the same purchasing power in the domestic economy as $1 has in the United States.

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