REDEFINING PROGRESS

FOR PEOPLE, NATURE, AND THE ECONOMY

ECOLOGICAL FOOTPRINT
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ECOLOGICAL FOOTPRINT ACCOUNTS:

MOVING SUSTAINABILITY FROM CONCEPT TO MEASURABLE GOAL

The **ECOLOGICAL FOOTPRINT ACCOUNTS** compute sustainability in specific and understandable terms by using the best available scientific data. They allow individuals, policy analysts, organizations, and governments to measure and communicate the economic, environmental, distributional and security impacts of natural resource use.

CALCULATING THE ECOLOGICAL FOOTPRINT

Ecological Footprint Accounts document humanity's demands on nature. A population's Ecological Footprint is the biologically productive area needed to produce the resources used and absorb the waste generated by that population.

Since people use resources from all over the world, the Ecological Footprint Accounts calculate the combined size of these areas—wherever they may be on the planet.

Ecological Footprints (representing human demand) can be compared to the biological capacity (representing ecological supply) in a specific region or for the entire planet.

When human demands exceed ecological production, the natural capital (assets on which current and future generations depend) declines. This situation is called "overshoot," or the global ecological deficit.

Current calculations assess a nation's consumption in over 60 categories of resources by adding imports to, and subtracting exports from, domestic production. Each category includes primary products (such as milk or timber) and the manufactured products derived from them.

Resource use and waste emissions are expressed in global hectares *(or acres)* by calculating how much biologically productive space is required to provide these services using current technology.

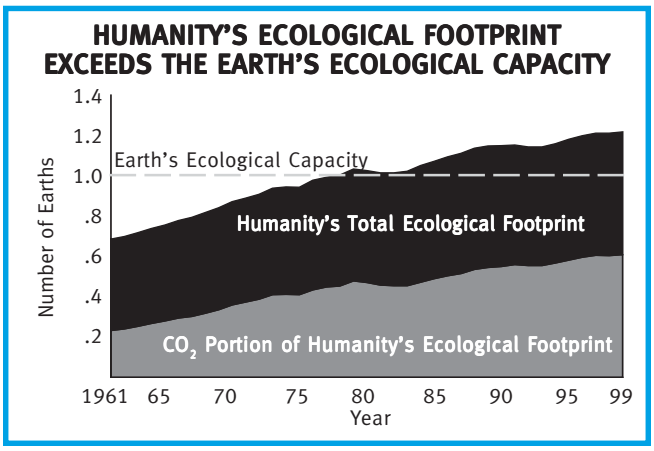
The average world citizen has an Ecological Footprint of 2.3 global hectares *(5.6 acres)*, the average German's is 4.7 global hectares *(12 acres)*, and the average American's is 9.6 global hectares *(24 acres)*. You can examine the figures for many countries in the table found on page three of this publication.

HUMANITY'S FOOTPRINT EXCEEDS THE EARTH'S REGENERATIVE CAPACITY

There are only 1.9 global hectares *(4.7 acres)* of biologically productive space available per person on the Earth. The world average Ecological Footprint of 2.3 global hectares *(5.6 acres)* per person means humanity is currently exceeding the biosphere's ecological capacity by over 20% using 1999 data, the latest available. *(Due to population increase, the capacity per person decreased by four percent from 1999 to 2002.)*

Leaving space untouched for other species makes the ecological deficit even larger. The biosphere needs about one year and two months to renew what humanity consumes in one year. Humanity, as a result, is depleting the earth's natural capital stock.

In many countries, the demand for ecological capacity exceeds its available biologically productive area. These nations are running a national ecological deficit. In this case, the country's area alone cannot provide sufficient ecological services to satisfy its population's current patterns of consumption. It must, as a result, rely on foreign sources or deplete its own capacity.



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"Wackernagel, et. al, put out the first quantitative 'overshoot' estimate I have seen for the human economy as a whole: 33% over sustainable limits."

—The Late Donella Meadows
Lead Author, "The Limits to Growth"
Founder, Sustainability Institute

"The calculations of ecological footprints will impress the world community and help politicians, business, engineers, and the public-at-large to find new and exciting paths towards sustainable development."

—Prof. Ernst Ulrich von Weizsäcker, MP
Founder and Former President of the Wuppertal Institute, and Member of the German Bundestag

A TOOL FOR SUSTAINABILITY

In numerous international forums, most prominently the 1992 United Nations Conference on the Environment and Development (the "Earth Summit") in Rio de Janeiro, national governments have embraced the concept of sustainability.

Sustainability refers to ability of a system to continue and maintain a production level or quality of life for future generations. The goal is to ensure all people can live well within the means of nature. However sensible and appealing this idea may be, there has been no reliable, comprehensive method to evaluate progress towards this goal.

The Ecological Footprint Accounts are based on two simple facts. First, we can and do keep track of most of the resources we consume and the wastes we generate. Second, most of this consumption and waste can be measured in terms of corresponding land area of average biological productivity.

Now there is.

Ecological Footprint Accounts utilize advances in data collection and communication to transform "sustainability" from a vague concept into a measurable goal.

Following the Great Depression, governments understood that 20th century advances in economic prosperity required 20th century tools for measuring it. The Gross National Product (GNP), one of the most used economic measurements ever developed, was invented by Nobel laureate Simon Kuznets in response to these concerns.

Specifically, national governments needed a comprehensive, yet concise tool for measuring and comparing national economic output. The GNP was created to fulfill this need.

The drive toward sustainability in the 21st century will require a 21st century tool to measure our progress. ***The Ecological Footprint Accounts are one such tool.***

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A TOOL FOR NATIONAL SECURITY

In the 21st century, national ecological deficits are becoming an ever-increasing liability to the competitive position of national economies. This is particularly true as world trade eliminates or diminishes the importance of national industry protections and as costs of using limited resources or emitting waste increases.

Consider this example: a nation is a major importer of forest products that supply a vital manufacturing sector. Design and marketing inputs transform these imports into high-margin goods for domestic use and export.

This nation can use Ecological Footprint Accounts and combine them with assessments of social and political risk to shed light on relevant trends. It can also analyze the compounded pressures from resource consumption, fresh water use, population growth, urban land use, and other limiting factors within its own boundaries and among its trading partners.

This can provide a context for understanding issues like:

- *Security threats to the nation or its resource base;*
- *Voluntary and involuntary migration;*
- *Levels of freshwater supply; and*
- *Prices of strategic resources.*

Should this nation diversify suppliers, preserve or expand its forests, support fresh water conservation and sustainable urban land use in supplier nations, or be prepared to transition its manufacturing sector from forest product inputs?

Ecological Footprint Accounts reveal the tradeoffs involved. This allows national governments and their agencies to evaluate risks and formulate better policy.

KEY ADVANTAGES FOR POLICY MAKERS

Ecological Footprint Accounts provide key advantages to policymakers as they consider the issues raised by sustainability questions. The Ecological Footprint answers a significant question in a specific way: *how much of the biosphere's regenerative capacity is occupied by given activities?* Ecological Footprint Accounts are:

- **Comprehensive**: Ecological Footprint Accounts involve broad and expanding renewable and nonrenewable natural resource data sets. They analyze the compound effect of resource consumption pressures related to climate, ocean habitats, forests, farmland, and urban areas. They also compare consumption to the Earth's ecological capacity.

- **Credible**: Ecological Footprint Accounts are computed annually using the best scientific data from official government sources and reflect advancements in resource efficiency. The accounts are transparent and can be tested.

- **Conservative**: Speculative data, even if well grounded, is eliminated from the Ecological Footprint Accounts. Fossil fuel's impact on the accounts is calculated using Intergovernmental Panel on Climate Change's sequestration data. The alternative fossil fuel footprint based on replacement would lead to even larger ecological footprints.

- **Concise while Detailed**: Despite the comprehensive data inputs, the Ecological Footprint can be expressed in a single, readily understood number—the area required to support an individual. This single number is easily disaggregated into detailed supporting data.

- **Flexible and Scalable**: This analysis can be used on products, households, cities, nations, and the world. Applications include physical design; policy development; sectoral and trade analysis; and investment screening.

ECOLOGICAL FOOTPRINTS OF NATIONS (1999)

		(in global hectares per capita)			*(in global acres per capita)*		
Country	2002 Population (in millions)	Ecological Footprint	Current Capacity	Deficit (If Negative)	*Ecological Footprint*	*Current Capacity*	*Deficit (If Negative)*
WORLD	**6,210.1**	**2.3**	**1.9**	**(-0.4)**	**5.6**	**4.7**	**(-0.9)**
Argentina	37.9	3.3	6.8	3.5	8	16.8	9
Australia	19.7	6.9	14.7	7.8	17	36.4	19
Austria	8.1	4.8	2.9	(-1.9)	12	7.1	(-5)
Bangladesh	134.0	0.6	0.3	(-0.2)	1.4	0.8	(-1)
Brazil	174.5	2.2	6.3	4.0	6	15.5	10
Canada	31.2	6.9	15.9	9.0	17	39.2	22
Chile	15.6	3.3	4.3	1.0	8	10.5	2
China	1,284.2	1.6	1.1	(-0.5)	3.9	2.7	(-1)
Denmark	5.4	6.7	3.3	(-3.5)	17	8.0	(-9)
Egypt	66.2	1.6	0.8	(-0.8)	4.0	2.1	(-2)
Finland	5.2	8.3	9.1	0.8	20	22.5	2
France	59.3	5.3	3.0	(-2.3)	13	7.5	(-6)
Germany	82.2	4.7	1.8	(-2.9)	12	4.4	(-7)
India	1,053.4	0.8	0.7	(-0.1)	1.9	1.7	0
Indonesia	217.3	1.2	1.9	0.7	3	4.6	2
Italy	57.7	3.8	1.3	(-2.5)	9	3.2	(-6)
Japan	127.2	4.6	0.8	(-3.9)	11	1.9	(-10)
Korea, Rep.	48.1	3.4	0.7	(-2.7)	8	1.8	(-7)
Malaysia	24.4	3.0	3.3	0.3	7	8.2	1
Mexico	100.8	2.4	1.8	(-0.6)	6	4.4	(-2)
Netherlands	16.1	5.7	0.8	(-4.9)	14	2.0	(-12)
Norway	4.6	8.0	5.9	(-2.1)	20	14.5	(-5)
Pakistan	144.8	0.7	0.4	(-0.3)	1.6	1.0	(-1)
Philippines	78.3	1.3	0.6	(-0.7)	3.2	1.4	(-2)
Poland	38.6	3.5	1.7	(-1.9)	9	4.1	(-5)
Russian Federation	144.2	4.2	5.1	0.9	10	12.5	2
South Africa	44.2	4.0	2.6	(-1.3)	10	6.5	(-3)
Spain	39.5	4.8	2.2	(-2.6)	12	5.6	(-6)
Sweden	8.9	6.4	7.9	1.5	16	19.4	4
Switzerland	7.3	4.3	1.9	(-2.4)	11	4.6	(-6)
Thailand	61.7	1.7	1.4	(-0.2)	4.2	3.6	(-1)
Turkey	67.2	2.0	1.2	(-0.8)	4.9	2.9	(-2)
United Kingdom	60.2	5.5	1.7	(-3.8)	14	4.1	(-9)
U.S.A.	288.3	9.6	6.0	(-3.6)	24	14.9	(-9)

(numbers may not add up due to rounding)

KEY DEFINITIONS

Natural Capital refers to all the biosphere's assets that provide essential ecological services such as renewable and nonrenewable resources, waste absorption, and stable climate conditions.

Overshoot or ecological deficit, occurs when human consumption and waste production exceed the capacity of the earth to create new resources and absorb waste. During overshoot, natural capital is liquidated to support current resource use. Consequently, the earth's ability to support future life declines.

Ecological Footprint Accounts document a given population's consumption and waste production expressed in biologically productive land and ocean areas necessary to maintain these services. The accounts provide detail to support resource specific calculations and aggregate the compounding effects of resource deficits.

"Measuring progress towards sustainability is a complex, but important process. The ecological footprinting approach is a promising step forward."

—Alexander de Roo, MEP
Vice Chair of the Environment, Public Health, and Consumer Committee, European Parliament

"In a world of shrinking resources, those who first recognize the need for sustainability and adopt appropriate strategies will succeed best in future global competition."

—Yves Manfrini
Union Bancaire Privée, Switzerland
(Fund Manager using Ecological Footprint Accounts for investment analysis)

"There have been a number of innovative research initiatives to help us get a grip on what is meant by Sustainable Development. Among the most substantive and illuminating, if not the single most helpful of all, is the work by Mathis Wackernagel and his colleagues on 'ecological footprints.'"

—Professor Norman Myers
Visiting Fellow, Green College
Oxford University, United Kingdom

"I got [the "Ecological Footprints of Nations" report] which I love and will cite voraciously in our book. It will look like a carcass in the desert, stripped of every morsel of insight. It is great."

—Paul Hawken
The Natural Capital Institute

ACKNOWLEDGMENTS

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FOR ADDITIONAL READING

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REDEFINING PROGRESS is a nonprofit organization that develops policies and tools that reorient the economy to value people and nature first.

Redefining Progress does this by developing policies and tools to internalize the economy's hidden social and environmental costs (the **Accurate Prices Program**), to transform the human use and distribution of the Earth's natural resources (the **Sustainability Program**), and to restore the value of shared social and natural assets (the **Common Assets Program**). These three goals come together in Redefining Progress's advocacy of fair and low-cost policies to reverse climate change (the **Climate Change Project**).

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