



Facing the Global Auction: A Cut-Throat Business Case for the Green Economy

Mathis Wackernagel, Ph.D.

ISEE 2012 – Rio de Janeiro, June 19

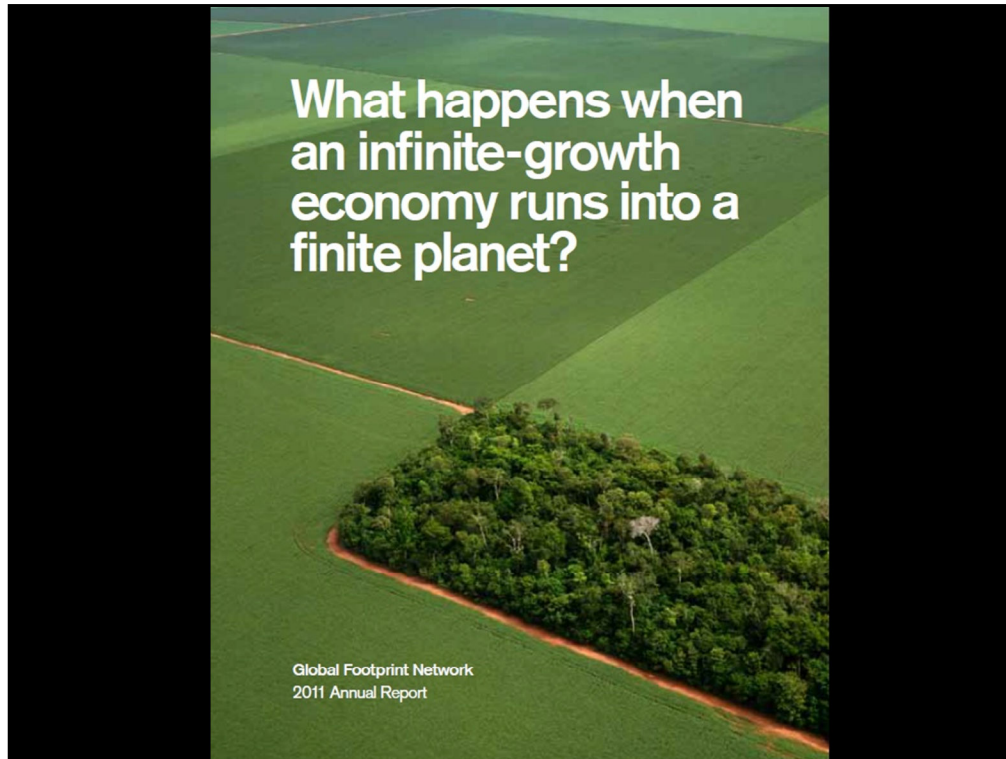
Kenneth Boulding Award Lecture



June 19, 2012

Contacts:

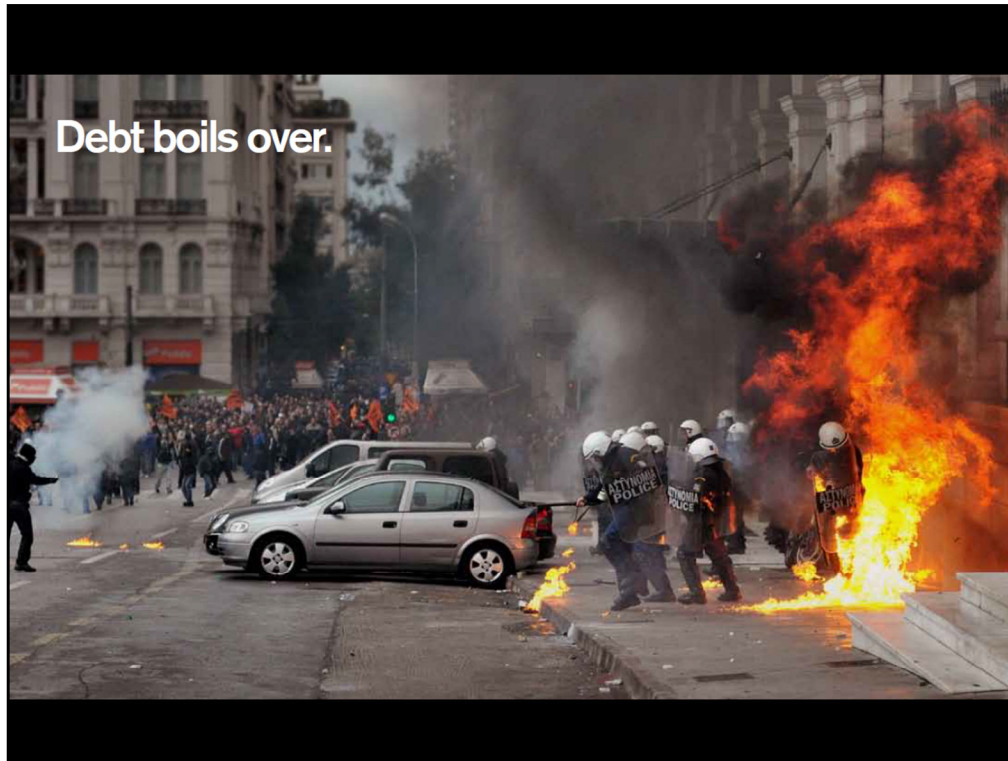
Dr. Mathis Wackernagel
Global Footprint Network
Oakland, CA, USA
+1 510 839 8879
mathis@footprintnetwork.org
www.footprintnetwork.org



I receive the Kenneth Boulding Award with enormous joy and gratitude. Thank you all. Both my dear friend, Bill Rees, and I are humbled, and we accept this magnificent honor with a great sense of responsibility. Humanity's growing resource hunger has moved us into global overshoot. Yet so many people in the world are deprived of sufficient opportunities for a dignified life. This spectacular double-challenge is confronting us – and there is little evidence that our past efforts have been effective in redirecting our destiny onto a sustainable path. Ecological Economics is the prime discipline that has taken on this challenge, and I am particularly indebted to the Ecological Economics family, starting with Herman Daly. He posed this simple scale question, and through his kindness, clarity and perseverance, he has inspired us all. Yet I am scared thinking about how few have taken up Herman's call to action, in spite of his charming and deeply convincing invitation. Today, I would like to thank members of this amazing family. Just to name a few of you – Elinore Ostrom, Charlie Hall, Hazel Henderson, Fander Falconi, Sigrid Stagl, Juan Martinez-Alier, and many, many more. You are the small group that Margret Mead was talking about when she wondered: Who is changing the world? This wonderful prize is truly a gift to a larger community, including many dedicated individuals at Global Footprint Network and its partner organizations across the globe, the indispensable community of funders, supporters, teachers, enablers, and all the others who have dedicated themselves to the most fundamental, and so utterly necessary, dream of flourishing lives for all on our great Planet.

Many younger people stand out, such as Kyle Gracey, with whom I am lucky enough to work with, or Nicola van Moon, a fifth-grader who, when asked during a presentation to her class how to measure nature responded: "Square miles?" "So why would you need to measure?" I asked. She replied, "So we know how much we have and if we have enough." She continued, "If we use more than what we have, all there is left are imaginary cookies."

In other words, ***what happens when an infinite growth economy runs into a finite planet?***



Debt boils over

One of the hidden drivers behind Europe's financial turmoil is the dramatic increase in resource prices over the last 10 years. Historically, cheap resources have helped fuel economic growth, but the situation has now changed. Increasing costs impose a burden on economic performance that is often reflected in rising debt levels. This, at a time when the ability of many countries to service this debt is being called into question.



The majority is left out.

As prices rise, many countries must spend larger portions of their budgets on essential resources from abroad, often forgoing expenditures on health, education, infrastructure or other productive capacity building. People find it more difficult to make ends meet. The socio-economic impact of ecological overshoot, including climate change, disproportionately affects the most vulnerable.



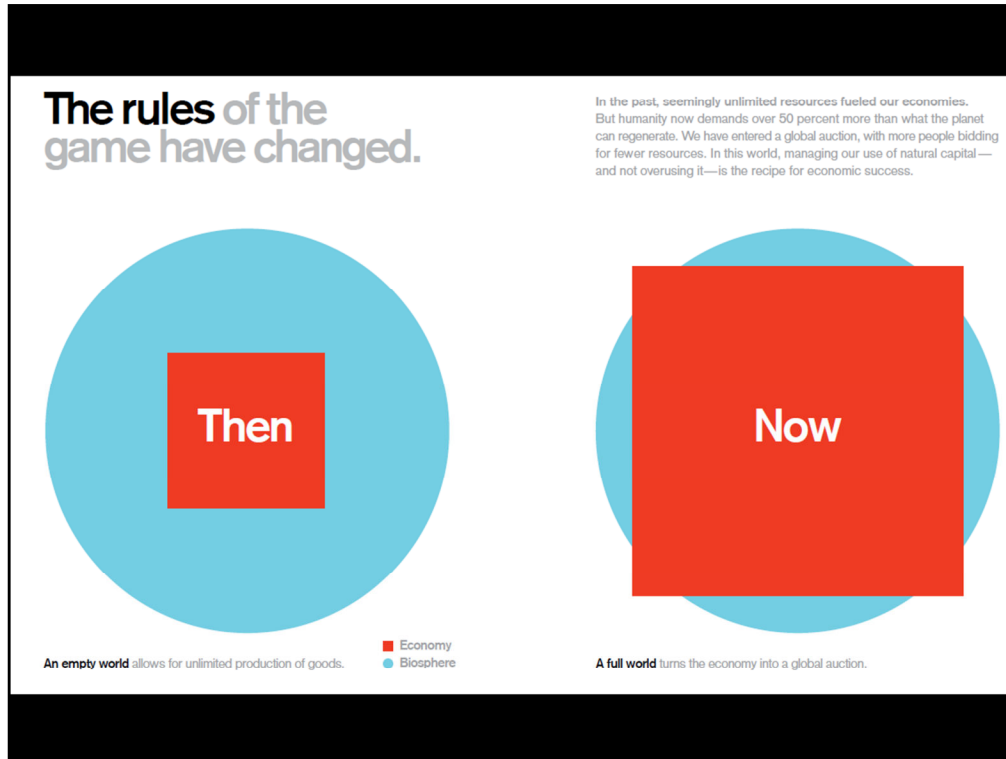
Biodiversity is for sale.

The threats facing plant and animal life on the planet are greater than at any time in recorded history. Human pressure in the form of overharvesting and habitat loss is driving down wildlife populations worldwide. In our economic system, wild species have little value. As long as trees, for example, are worth more cut than they are standing, the pressures to liquidate natural resources will be overwhelming.



Food turns into a luxury.

Soil erosion, rising fertilizer prices, and severe weather brought on by climate change have all contributed to the volatility of crop yields and food prices. This is particularly harsh in countries where most people depend on basic foods, such as unrefined grains and rice, which are more directly linked to global commodity prices than are the refined foods found in supermarkets.



Herman Daly called this new world we are entering the “full world.” Today, I would like to discuss the economic implications of living in a full world.

Essentially – it turns the global economy into a global auction, at best. “At best,” because not everybody has equal and full access. Many contracts are already signed, some countries have bigger armies than others, etc.

But this is the essence:

An empty world allows for unlimited production of goods.

A full world turns the economy into a global auction.

In the past, seemingly unlimited resources fueled our economies.

But humanity now demands more than 50 percent of what the planet can regenerate. We have entered a global auction, with more people bidding for fewer resources. In this world, managing our use of natural capital — and not overusing it—is the recipe for economic success.

Let me elaborate.

But first, how can we measure whether we are in a full or empty world? Let me give you a quick introduction to the Footprint.



How do we know? By using Ecological Footprint accounting

The Ecological Footprint is the area of land and water it takes for a human population to generate the renewable resources they consume and degrade the waste it produces in a given technological context. In other words, it measures the "quantity of nature" that we use, and compares it with how much we have (biocapacity). This accounting supports decision makers when it comes to making difficult choices, managing conflicts of objectives and placing themselves in an optimal situation for the future. The accounts can be applied to the global, country, region, individual or product.

Cropland: Cropland is the most bioproductive of all the land-use types and consists of areas used to produce food and fiber for human consumption, feed for livestock, oil crops, and rubber. Due to lack of globally consistent data sets, current cropland Footprint calculations do not yet take into account the extent to which farming techniques or unsustainable agricultural practices may cause long-term degradation of soil. The cropland Footprint includes crop products allocated to livestock and aquaculture feed mixes, and those used for fibers and materials.

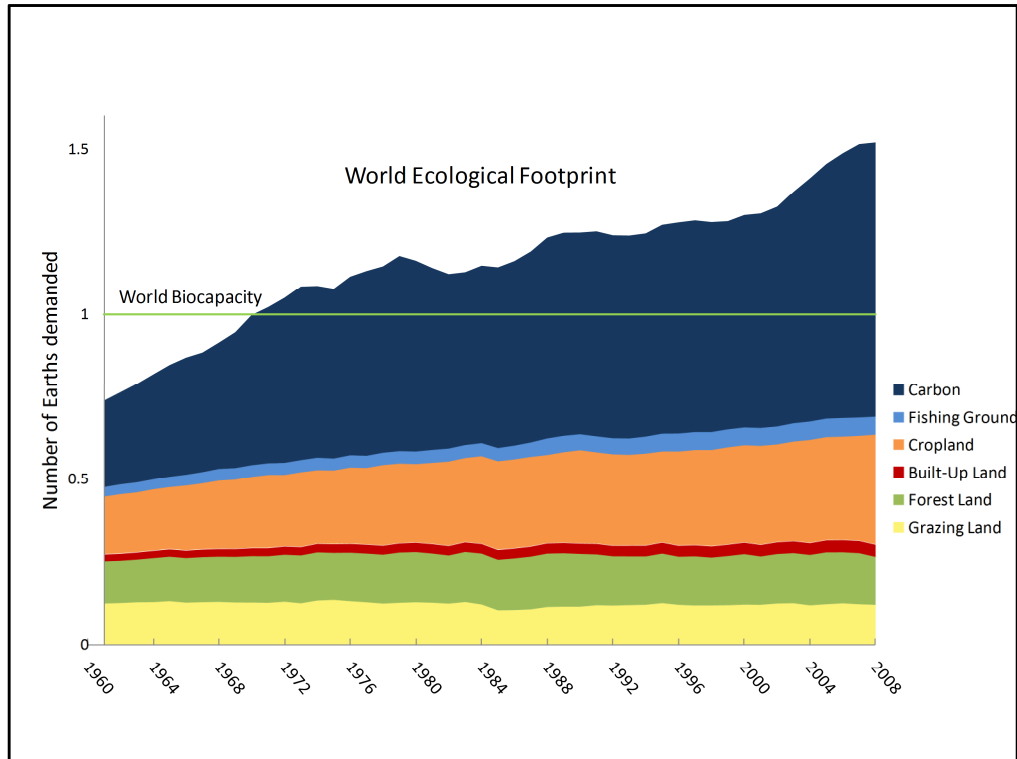
Forest land: The forest Footprint is calculated based on the amount of lumber, pulp, timber products, and fuel wood consumed by a country on a yearly basis.

Grazing land: Grazing land is used to raise livestock for meat, dairy, hide, and wool products. The grazing land Footprint is calculated by comparing the amount of livestock feed available in a country with the amount of feed required for all livestock in that year, with the remainder of feed demand assumed to come from grazing land.

Carbon Footprint: Carbon dioxide emissions from burning fossil fuels are currently the only waste product included in the National Footprint Accounts. The carbon Footprint includes embodied carbon in imported goods. The carbon Footprint component of the Ecological Footprint is calculated as the amount of forest land needed to absorb these carbon dioxide emissions. Currently, it is the largest portion of humanity's Footprint.

Fishing grounds: The fishing grounds Footprint is calculated based on estimates of the maximum sustainable catch for a variety of fish species. These sustainable catch estimates are converted into an equivalent mass of primary production based on the various species' trophic levels. This estimate of maximum harvestable primary production is then divided amongst the continental shelf areas of the world. Fish caught and used in aquaculture feed mixes are included.

Built-up land: The built-up land Footprint is calculated based on the area of land covered by human infrastructure — transportation, housing, industrial structures, and reservoirs for hydro-power. Built-up land may occupy what would previously have been cropland.



In my short lifetime, resource demand has expanded dramatically. Today, humanity is using more than 1.5 planets. This means it takes more than one year and 6 months to regenerate what humanity uses in one year.

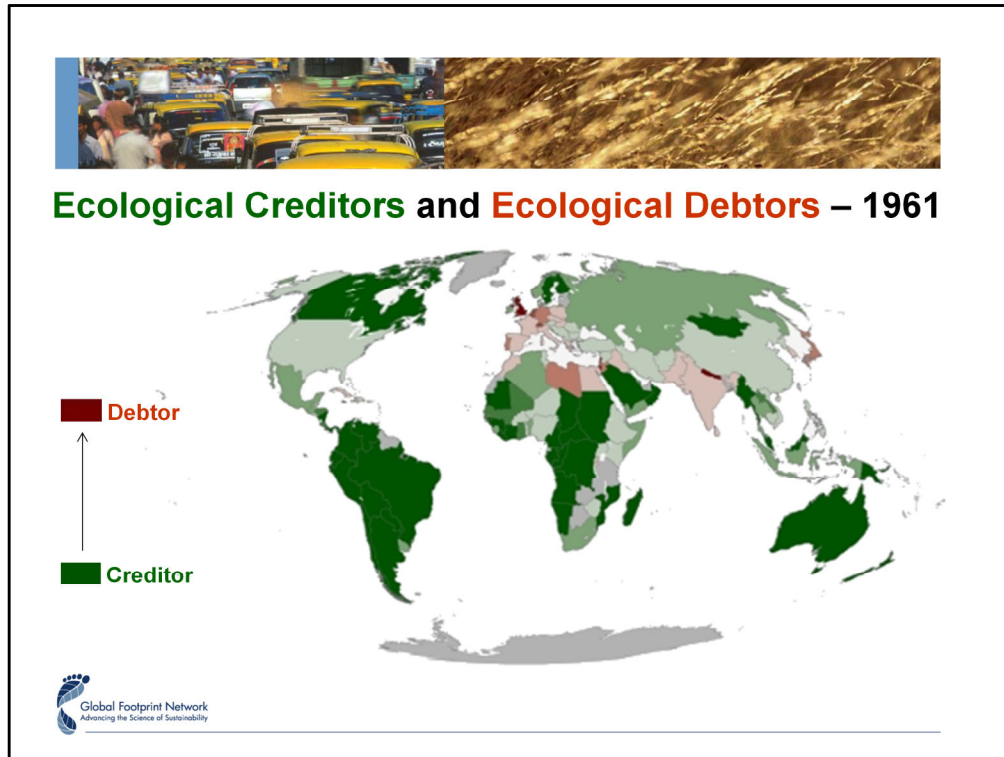
The carbon Footprint has grown particularly rapidly, allowing to contain the other areas by using them more intensively. Technology has also changed. The flat biocapacity line only indicates that it has consistently been one planet we have. But a changing planet. It is changing through climate change, technology and management practice.

The carbon Footprint is a unique singularity in human history, and while we currently do not dedicate areas for sequestering excess CO₂, it indicates how much capacity is required were it necessary to replace fossil fuel with biomass.

Looking at this trend, any computer would draw clear policy implications.

Shrink and share.

But for people and political leaders, these are among the most unattractive propositions. For politicians it turns into this challenging dilemma: Take on shrinking and sharing now and commit political suicide, or not take it on and commit (long-term) ecological suicide. The choice is obvious for politicians. Therefore, how can we reframe this same information to make it actionable?



Let's consider this:

Today, we are in a new era, defined by biocapacity constraints.

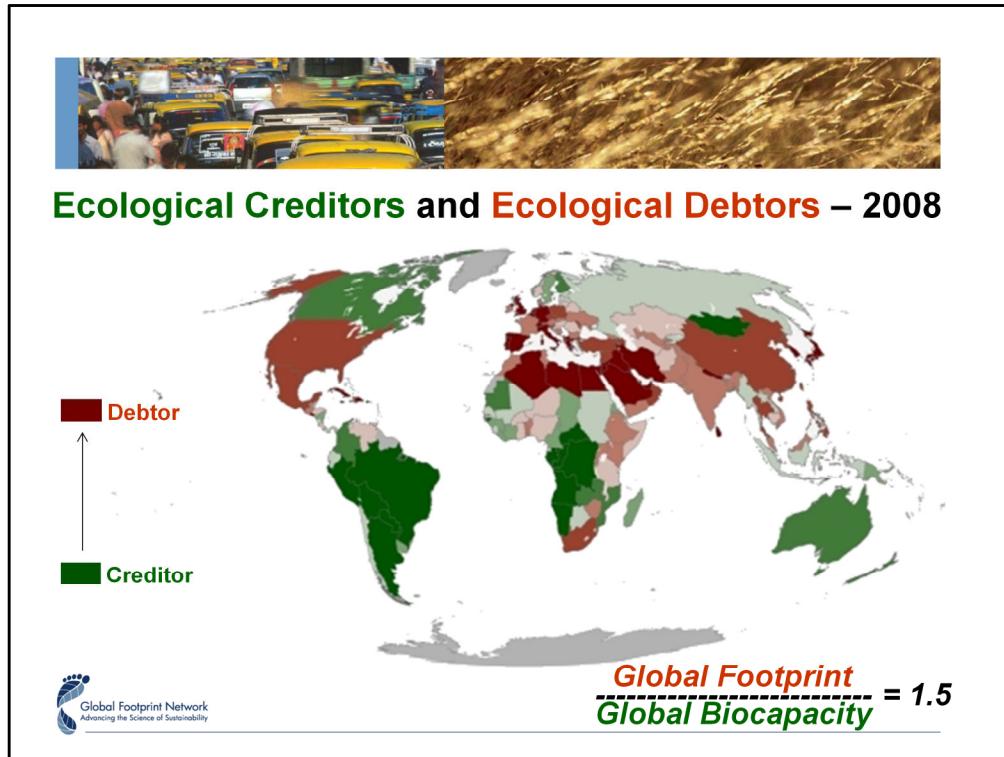
In the old era, as shown on this map here for **1961**, most countries were ecological creditors. Resources were not constraining economies. They seemed plenty.

Residents of **ecological creditor countries** consume on average less resources than their countries' ecosystems can regenerate (the darker the green the higher the ratio). Note: since there is trade among all countries, both demand and supply are calculated from the perspective of net imports (or net exports).

Ecological debtor countries are in the opposite situation. They run a biocapacity deficit. They use, in net terms, more than what their countries' ecosystems can renew.

FURTHER EXPLANATIONS:

- **Ecological Creditors:** Residents of ecological creditor countries use less ecological services than are available within their national borders, and therefore are endowed with a reserve of natural assets. This reserve, in an increasingly resource-constrained world, give those countries an economic advantage and strengthens their strategic positions.
- **Ecological Debtors:** In contrast, countries with ecological deficits depend on net imports of such resources, or on liquidating their ecological assets. Both are an economic drain on those countries.



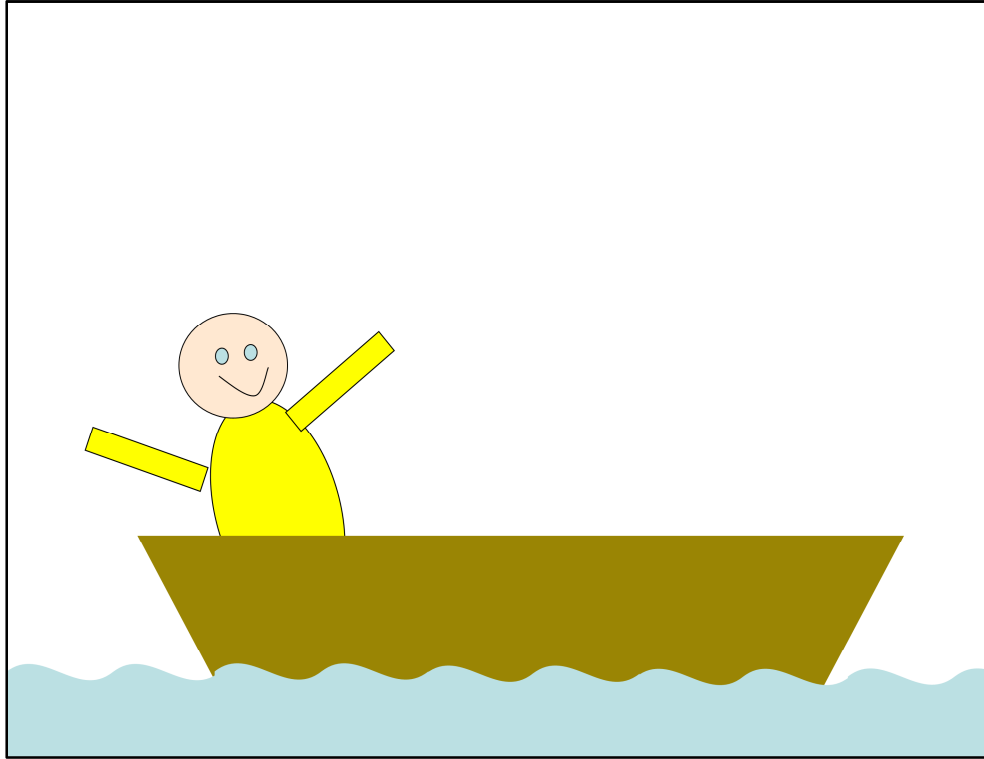
The new era has begun

With global overshoot, and rapidly increasing resource costs since 2000, the situation has shifted. As a whole, humanity's resource demand now exceeds the planet's supply by over 50 percent (2008 data). This ecological deficit means that it took a year and six months to regenerate what humanity used in 2008.

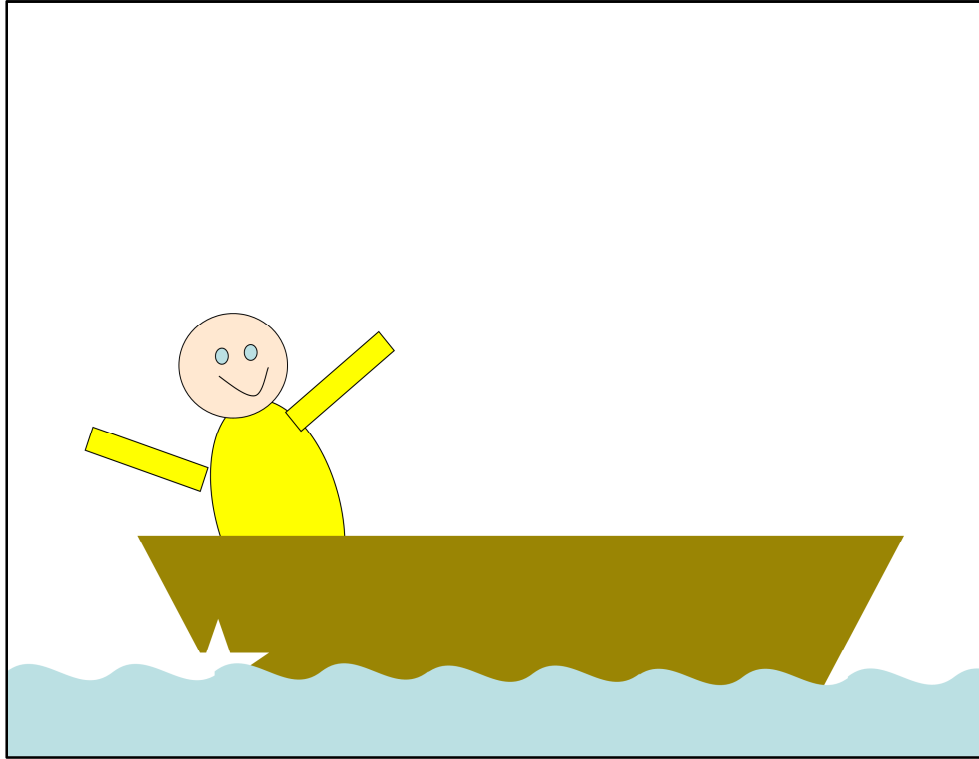
As global overshoot increases, the gap between ecological creditors – countries that have more biocapacity than they use – and ecological debtors – those using more biocapacity than they have – is becoming more pronounced, and is increasingly becoming an economically significant divide. Today, 83 percent of the world's people live in countries that run an ecological deficit.

As a result, Global Footprint Network focuses on the increasingly acute economic dilemma of **Ecological Creditors** and **Debtors**, which makes obvious why it is in the self-interest of countries to react to biocapacity constraints.

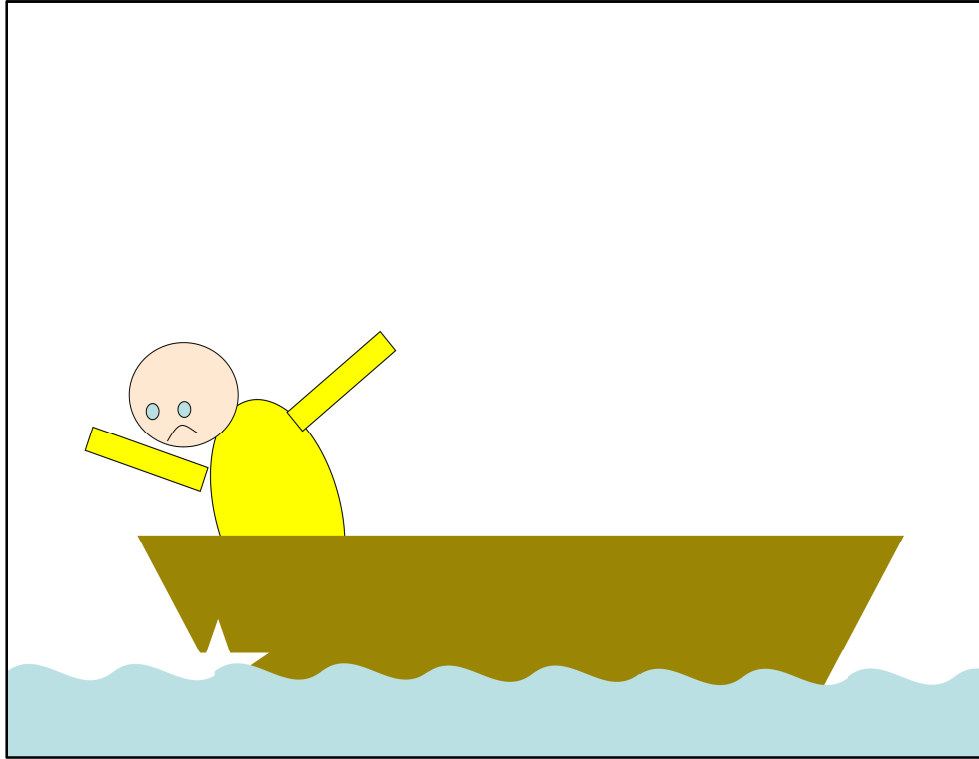
We are not facing a global problem but a global storm. The question is: Is your "boat" ready? In a resource-constrained world, can you, as a country, afford to run an ecological deficit? Can you afford not to fix your boat?



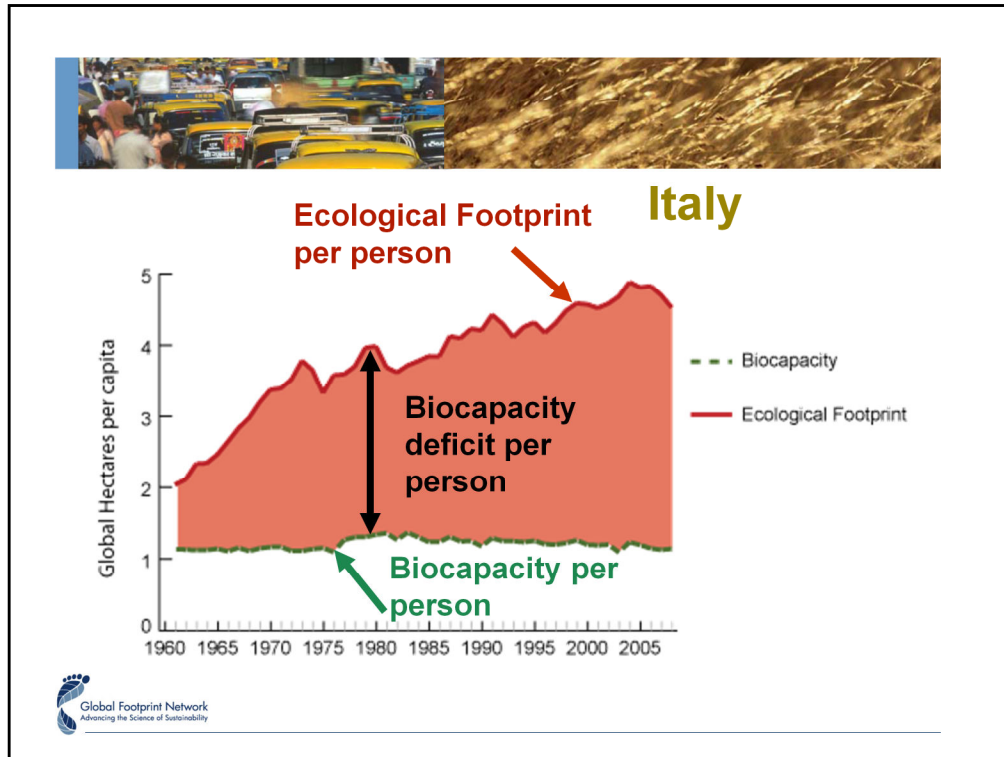
Rather than assuming we are sitting in one big global boat, we are in many different boats.
Think countries, or cities.



In reality, we are sitting in our own boat with our own hole. There is no advantage in waiting for all others to agree first to fix their own boat as well. What are we waiting for? Maybe we are waiting to get rescued? Good luck!



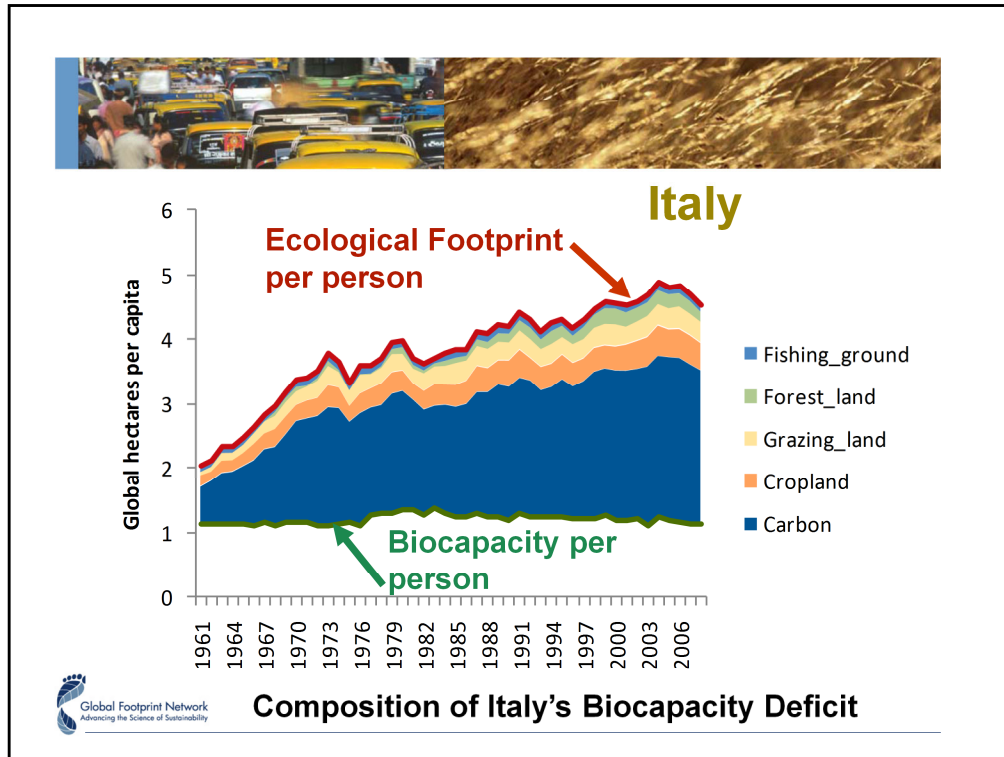
Here's the good news: All countries can win, but they must be responsible for turning their own fate around. Look at our resource trends. We do not need to wait for others. That's why we work directly with national governments.



Let's look at one country's situation

Since 1961 (when UN records started to become more consistent across nations), Italy has been in a biocapacity deficit situation. The average Italian has demanded more resources than can be renewably generated within the borders of Italy. In 1961, Italy had a per capita biocapacity deficit of 0.9 global hectares, meaning that Italians were in essence using 1.8 Italies. By 2008 this deficit had grown to 3.4 global hectares, which was the equivalent of using 4.0 Italies.

The next slide shows what this biocapacity deficit is made up of.



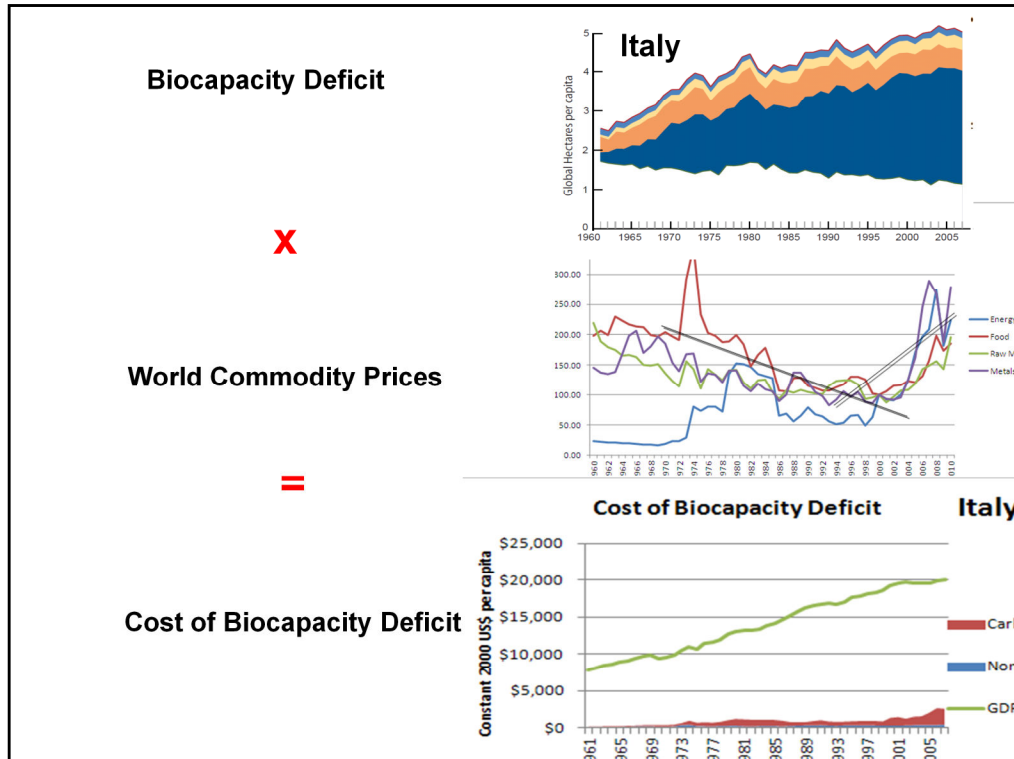
Biocapacity Deficit Breakdown for Italy

Italy's biocapacity deficit can be disaggregated into the individual land use type components that make up the Footprint. The majority of this deficit has been driven by the carbon Footprint, but the cropland and forest land deficits have also been growing in the last few decades.

This biocapacity deficit is due to three main causes: 1) Importing resources from external sources, 2) Degrading domestic biocapacity and 3) Placing pressure on the global commons, for example for carbon sequestration.

Such a deficit is not sustainable as humanity's demands on the planet are already requiring the resource supply equivalent to 1.5 planets. As such, many countries find themselves in a biocapacity deficit situation and are becoming more and more reliant on external sourcing to meet the demands of their residents.

What are the economic implications? Up to the year 2000, resource and commodity prices went down faster (according to World Bank pink sheet) than Italy's biocapacity deficit went up. Hence the net costs for Italy did not increase. The growing biocapacity deficit for Italy did not seem to be a problem. **But this has changed since 2000.** Resource costs have nearly tripled. Therefore, the costs for Italy are rising -- more precisely, the costs for resources Italy must import to make up for its own ecological deficit.



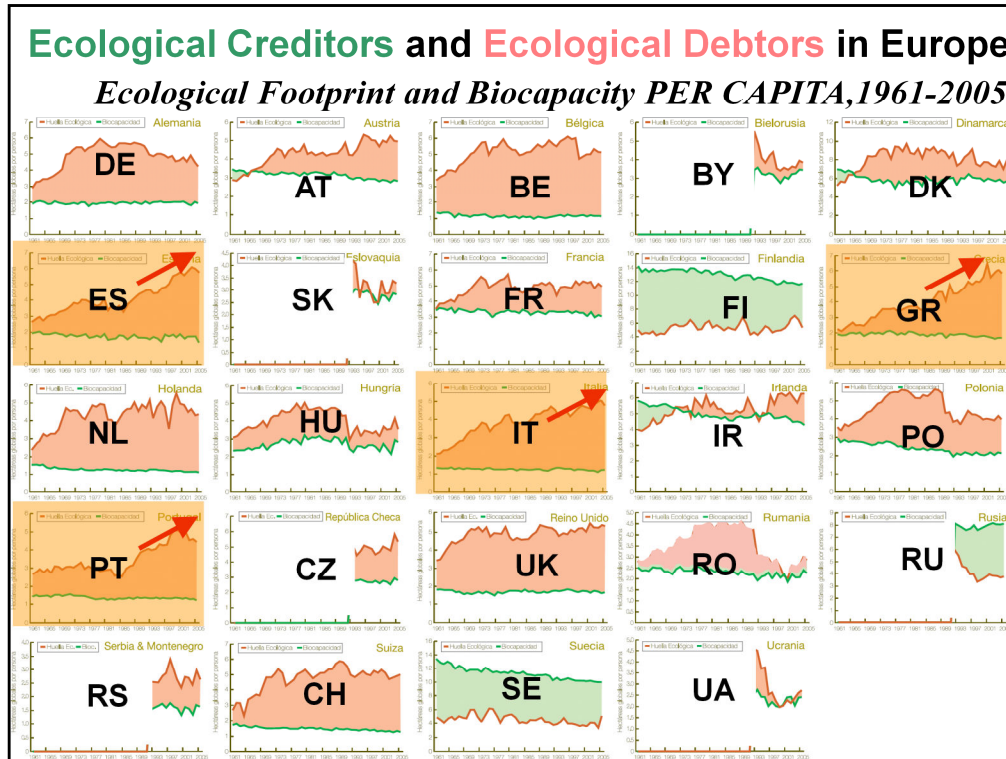
Global Footprint Network can calculate the net resource costs for Italy over time – and it shows a level of costs that even rapid economic expansion cannot overcome.

Essentially it is amounts times prices.

Recently, the resource costs have been growing so rapidly that Italy has not been able to compensate these rising costs through other means.

This financial pressure enticed Italy into deficit spending. It thereby can overcome the stress in the short-run, but it is leading to a debt crisis in the medium-run.

Is Italy alone? See next slide, which compares several European countries.



Italy is not alone – here are 24 European countries compared (Source: Global Footprint Network, National Footprint Accounts edition 2008 (1961- 2005). Note: newer data are now available).

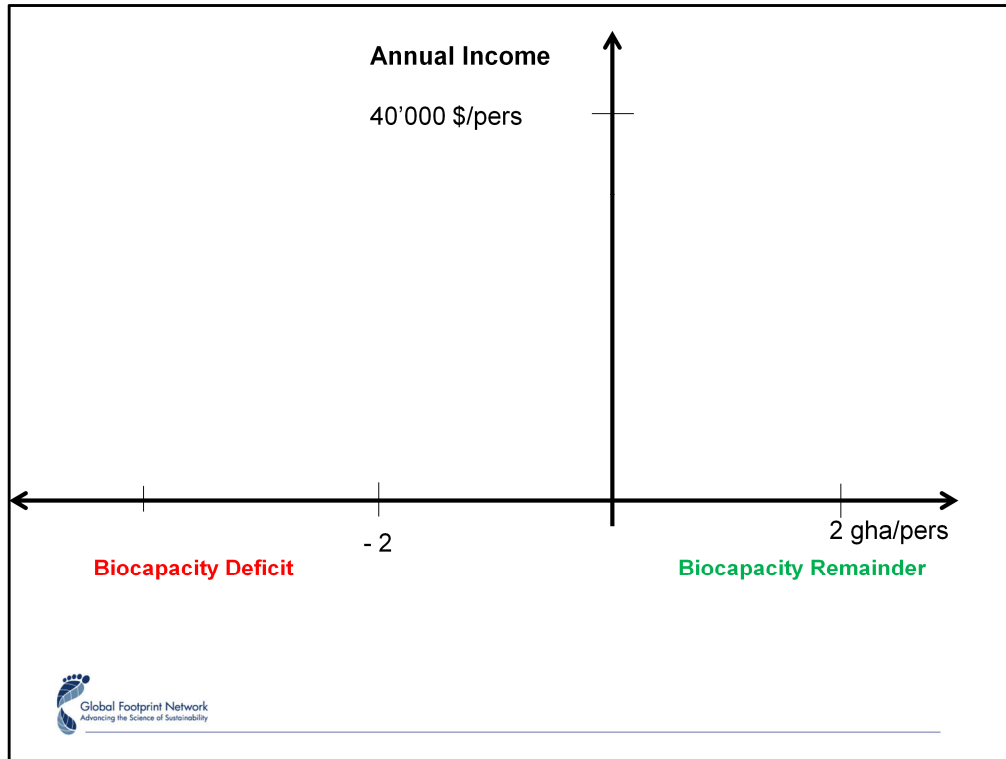
Why the Euro Crisis has been in the making for a while:

Here are 24 European countries, 19 of which are part of the European Union. All results are presented in PER CAPITA terms - on the same time scale, but the y-axis is different. Y-axis is adjusted to better show each country's historical path.

All 24 countries have their own paths. There are some similarities; for instance, many European countries run significant biocapacity deficits.

What is striking is that Spain, Greece, Italy and Portugal show quite similar dynamics: rapid increase of their biocapacity deficit over time. Combined with economic analysis, it becomes clear that this trend caused significant, and rapidly rising cost pressures on those four countries, making them more vulnerable than other countries to economic fragility.

Using Global Footprint Network data (including the cost analysis), it becomes quite obvious, that the Euro crisis in Southern Europe cannot be divorced from the resource performance of those countries.

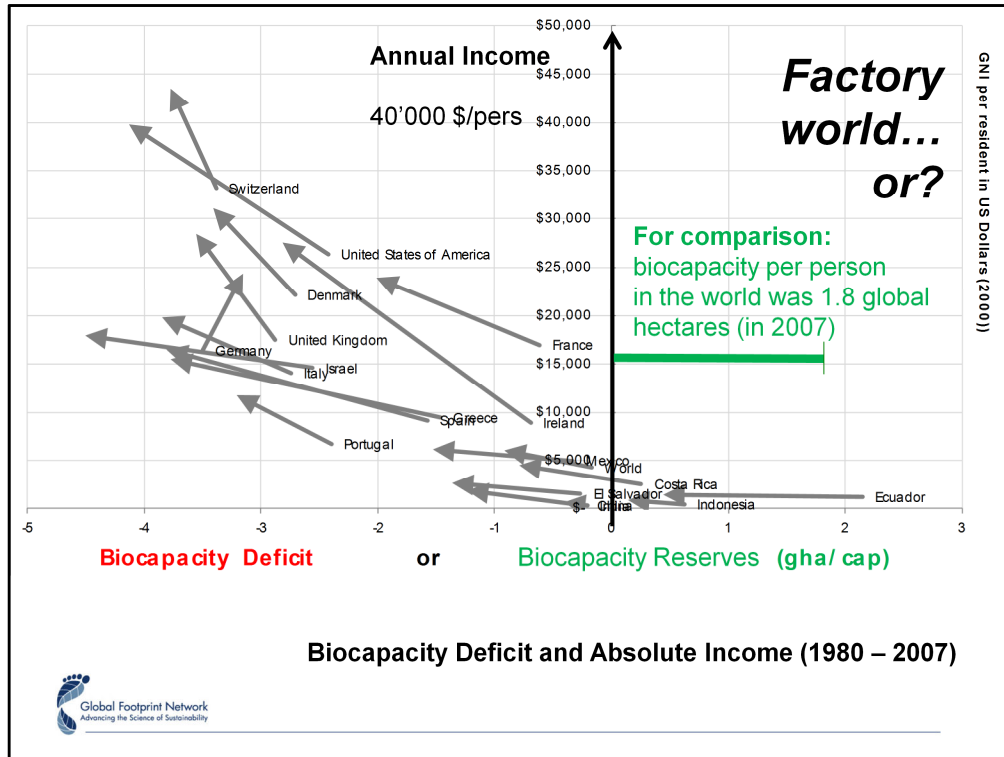


What to track in a resource-constrained world?

What is the situation of various countries around the world?

Y- AXIS: One key performance indicator is income. How much income are economies able to generate in a given year? Income is seen as a proxy for the potential to resolve any problem. More income opens more options. GDP (or GNI) is an approximation of how much income people are able to generate, on average, within an economy. (Note, GDP does not indicate how much income the country can produce in the future – it does not distinguish between regenerated income, and income from liquidation).

X- AXIS: In a resource-constrained world, resource performance is becoming another key indicator. Here the X-Axis tracks whether a country is in an ecological creditor or debtor situation.



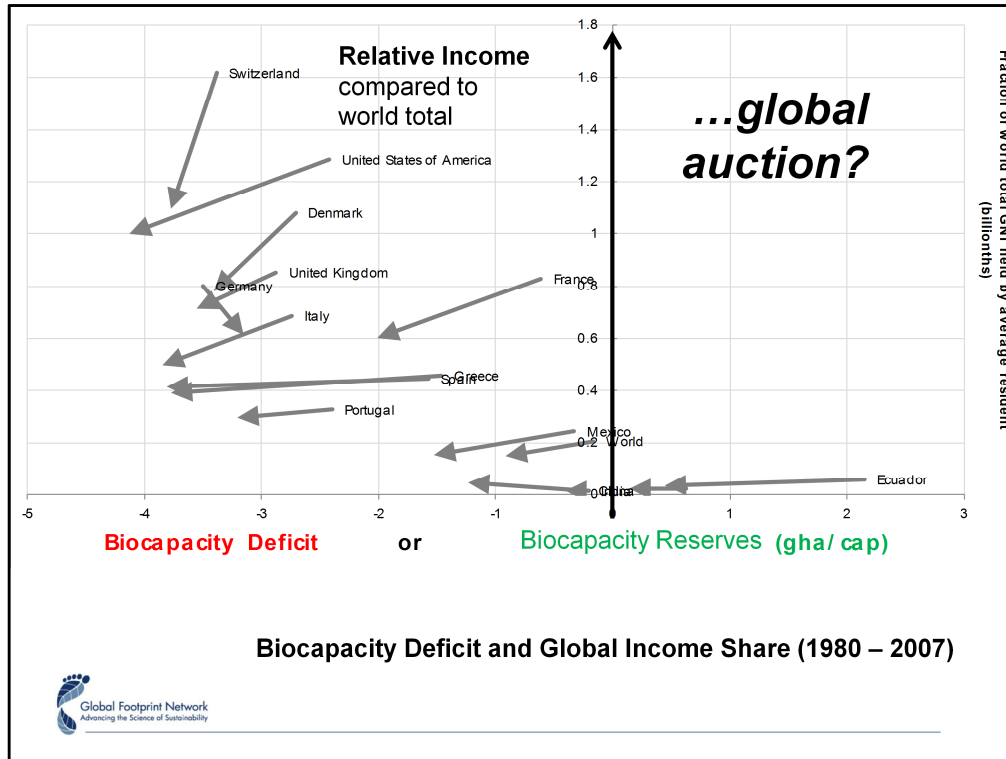
How have countries performed over the last 30 years?

This graph shows absolute income and an increase in biocapacity deficits of countries. For most countries, their income (measured in purchasing power adjusted income per capita or -ppp) has increased. At the same time, their biocapacity deficit has increased (or countries' biocapacity reserves have shrunk). (Note: The arrows stretch over a 27-year period – also note that 1.8 global hectares per person is the amount of biocapacity available per person in the world, or about as much as many featured countries have lost per person over this 27-year time span).

Many might interpret this graph as a sign that countries' residents have been able to increase their household consumption – as economies have used more resources. Is a growing biocapacity deficit just an unfortunate cost of business? Others may interpret that the growing biocapacity deficits may call in question these countries' abilities to expand their economies in the future. Maybe, larger biocapacity deficits is an unfortunate, but possibly necessary, part of doing business. This biocapacity deficit does not seem to impact the countries' income either. It may be seen as lamentable, but not fundamentally linked to economic performance. **Overall, this graph may give the (misleading) impression that it is inconclusive whether resource dimensions have anything to do with whether countries are on a fundamentally positive or negative track.** **Data source:** Income data from the World Bank ; Biocapacity deficit from Global Footprint Network.

But are we looking at this from the right angle?

Which World Are We in? Are we really in a “factory world”? A world of unlimited resources? In such a world, additional demand will stimulate additional supply. If more books and chairs are purchased, more books and chairs are produced. The limit to supply is demand. All that matters is your absolute income – more income will give you access to more products and services. But the world we are in is a **different world...**



From “factory world” to a “global auction”

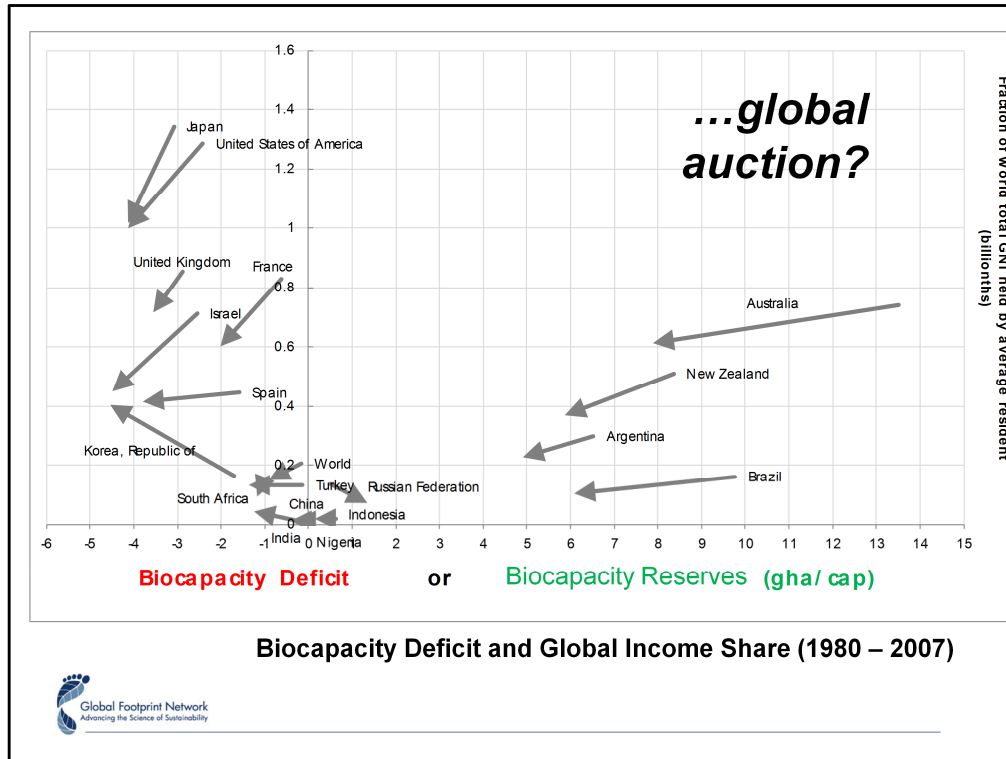
If we assume that we are in a world of resource limitations (as indicated by growing global overshoot), with all countries wanting more and more from the globally limited resource stock, then the “game we are in” can be more likened to a **global auction** of finite goods. In such an auction, what matters is not absolute ability to pay, but the relative ability compared to all the other bidding power in the auction room.

Therefore, we need to track relative income (What percentage share does an American get from the total global pie?) From that perspective, the same information looks like the diagram above.

For the residents of most countries, their relative income has decreased. At the same time, their biocapacity deficit has increased (or countries’ reserves have shrunk). If we truly are in an auction world, then this would mean that as countries depend more on other countries’ resources, their ability to bid for resources is vanishing. It points to a structural weakening of those countries’ economies. Without the global auction, declining relative income would not have affected countries’ economies. Take the era of plentiful resources, for instance.

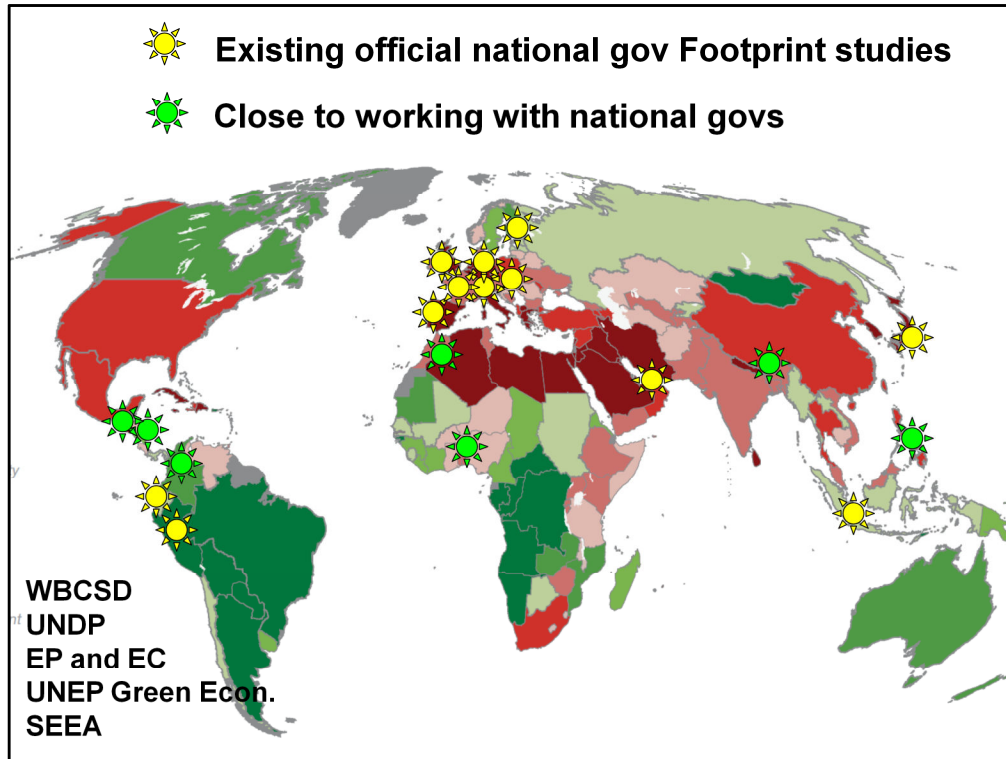
In a world where resource costs are becoming a significant factor, this double trap will become a key determinant of economic success – or failure.

Note: The **Y-axis** shows the fraction of the world’s GDP an average resident of a given country generates. Therefore, the world average resident’s share, per definition, is at (1/world population) or currently at about 0.14 of a billionths of total world GDP.



More countries in the “global auction diagram”

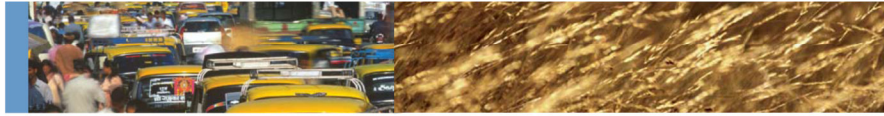
This graph includes more countries that have significant biocapacity reserves. They, too, have shown very rapid loss of biocapacity over the last 25 years. In other words, they have weakened their position as well, but it is less fatal to them, since they are not dependent on foreign resources. In the cases of ecological creditors, they are mainly losing out on opportunities.



Where Global Footprint Network works:

Yellow dots indicate countries where government agencies have performed reviews of Global Footprint Network's Ecological Footprint assessments. The green dots show where discussions towards a collaboration are well on their way.

Various international agencies have taken up the Ecological Footprint. The World Business Council for Sustainable Development has used the Footprint as the foundation for its "Vision 2050", UNEP's Green Economy initiative builds on Global Footprint Network's HDI-Footprint approach, and UNDP's *Human Development Report* (as well as *The Economist's World in Figures*) list the Footprint in their data tables.



New principles for success

- Nature has a budget. Do you know **how much biocapacity you have?** and **how much you use?**
- Biocapacity is the currency of the 21st century. Key to prosperity. If exposed to auction, relative GDP matters.
- Self-interest for countries, cities to reduce their resource deficit is overwhelming.



mathis@footprintnetwork.org

In summary:

For most of the 20th century, resources were relatively cheap and easily available. As a result, most countries have become increasingly dependent on large amounts of natural resources they do not have – both fossil fuels and biological resources. While resources are still relatively cheap, this increasing global demand is meeting a supply crunch. It now takes more effort to harvest fossil fuels and minerals, and, in some places, fresh water. Also, agricultural production is becoming increasingly fuel-dependent. As a result, basic commodities, such as food and fibers, are becoming costlier.

These resource dynamics are turning into an ever more significant driver of economic performance. Economic planners ignoring these trends may put their country's economy at peril.

Global Footprint Network has comprehensive risk assessment tools to document these changing trends and assess their economic impact for 200 other countries around the world, and by extension each country's trading partners. Some overarching trends are presented on our website at www.footprintnetwork.org. The Network's bio-physical assessment of countries' resource performance, coupled with economic analysis, can show structural challenges for countries that are already shaping present economic realities in many locations around the world – and opportunities for overcoming them.