

GLOBAL FOOTPRINT NETWORK

Lighthouse Case Study

Humanity used the resources and services of 1.51 planet Earths in 2007, up 2.5 times since 1961.

This situation, known as “overshoot,” tells us that we are using up our planet faster than it can regenerate its resources. Global Footprint Network is addressing this challenge with the development and implementation of a measurement tool to track resource use in order to support the development of governance strategies to preserve the global ecosystem.¹

Table of Contents

| | |
|---|----|
| Case in Brief | 1 |
| Management of the “Commons” | 1 |
| Addressing the Knowledge Gap in Our Ecological Impacts | 2 |
| Establishing the Ecological Footprint | 3 |
| Building the Network | 4 |
| Drafting the Ecological Footprint Standard: Leveraging Decentralized Knowledge and Expertise | 5 |
| Implementing the Standard: Changing Government, Business and Individual Practices | 7 |
| Promoting the Standard: Communications and Content in a Productive Relationship | 9 |
| Defending the Standard: Showing Good Faith in Engaging Criticism | 11 |
| Governing the Standard from the Top Down So It Can Be Used from the Bottom Up | 12 |
| Implications for Network Leaders | 13 |
| Endnotes | 16 |
| About Global Solution Networks | 19 |





Case in Brief

Global Footprint Network (GFN) operates as a Global Standards Network, as defined by the Global Solution Networks taxonomy (see page 19). It provides data produced using a metric that it developed and continues to refine with which it measures the human demand on the global biosphere both for consumption and for waste absorption. It has applied the metric to more than 200 countries and to the globe as a whole to provide critical information to governments and organizations that are working to constrain careless misuse of limited global resources. Global “overshoot,” or the situation in which demand exceeds the supply, has already become an issue for the world’s populations and will haunt generations to come. By providing a tangible measurement tool, GFN is a critical player in the quest for a solution to the potential collapse of the biosphere.²

Management of the “Commons”

In 1968 Garrett Hardin, professor of biology at UC Santa Barbara, wrote a seminal article for *Science* titled, “The Tragedy of the Commons.” In it he concluded that the combination of an increasing human population and the behavior of that population when exploiting common resources works to the detriment of all.³ Recognizing that the globe provides a finite supply of resources, it appeared that individuals would exploit the resources in their own interest without consideration for the future impact on the global community until the system collapsed. He concluded that the problem had no “technical solution,” but required a social compact and a “fundamental extension in morality.” With this article an entire field of ecological research was launched.

In 2009 the Nobel Prize in Economic Sciences was awarded both to non-economist and Professor of Political Science at Indiana University, Elinor Ostrom, for her analysis of the economic governance of the “commons,” and to Oliver E. Williamson, Professor of Economics at UC Berkeley, for his similar investigation of governance and conflict resolution within the boundaries of the firm.⁴ Ostrom and Williamson, while they didn’t disagree with Hardin’s dire observations, proposed that the formula for resource conservation was more complicated than choosing, as he had proposed, between public or private governance. They suggested that remedies could be arrived at using a “social ecological system,” which would integrate the biology of the resources with the actions of the social framework to arrive at solutions.

When challenged about the translatability of these concepts from small and medium “resource jurisdictions” to the global issues of

“ *The challenge of preserving the planet falls to individuals, communities and nations, but in order for any governance solution to be effective, the first step is the acquisition of usable data.* ”

climate change and deteriorating oceans, however, Ostrom was less optimistic.⁵ The challenge of preserving the planet falls to individuals, communities and nations, but in order for any governance solution to be effective, the first step is the acquisition of usable data. That the earth's resources are being used up faster than they can be renewed is a widely accepted fact, so it is critical that we gain a clearer understanding of how much we are drawing from the public commons in order to develop effective strategies for the management of the commons.

Addressing the Knowledge Gap in Our Ecological Impacts

The Ecological Footprint tool developed by GFN measures human use of ecosystem elements that exist in bio-productive land and bio-productive oceans. This data is balanced against the bio-capacity, or the biosphere's ability to meet demand for consumption and waste disposal. The calculations are applied to six land use types: cropland, grazing land, fishing ground, forestland, built-up land and uptake land (to accommodate the carbon footprint and other waste).⁶

GFN is a Global Standards Network that has developed and continues to maintain the Ecological Footprint as a common standard in measurement and communications so that different uses of the information inherent in the Ecological Footprint can be clearly understood. GFN and its partners are bringing the Ecological Footprint standard to an ever widening array of organizations, improving the accuracy of Ecological Footprint measurements, and compiling and sharing the National Footprint Accounts, a set of resource-use datasets for over 150 countries. As the stewards of the integrity of the Ecological Footprint methodology, GFN uses consensus based decision-making to ensure that the current Ecological Footprint Standards include the latest research about how to more accurately measure the land required to support a human population.

Founded in 2003, the network consists of 90 partner organizations, 200 cities and 23 partner countries. GFN's partners are largely responsible for applying the Ecological Footprint methodology to different types of clients and users. In this sense, GFN is highly decentralized and relies on a variety of actors working with different but aligned motivations, but always towards the goal of disseminating increasingly concrete data about what different individuals and institutions are removing each year from the common stock of ecological productivity.



“Ninety-nine percent of planning is thought of right here, right now. It doesn't take into account the impact on all the elsewheres that are involved in supplying this region.”

Establishing the Ecological Footprint

The Ecological Footprint model represents an interdisciplinary marriage of academic work and also recognition by businesses, policy makers and individuals that better information on renewable resource consumption is required to assess the stresses that human populations and economic growth are putting on the planet's ecosystems. While isolated packets of resource consumption data were previously available within specific disciplinary contexts, there was no ability to link any person or company's consumption with the wider set of trade relationships which allow each of us to consume much more than could be produced where we live. On a more macro level, in the last 20 years, there has been a growing realization that standard methods of national accounting need to be supplemented by other measurements, such as income inequality (GINI—or Generalized Inequality Index—coefficients measure the extent to which income and consumption vary from perfectly equal distribution⁷), educational attainment (PISA—or Program for International Student Assessment—scores that measure reading, math and science literacy among 15-year-olds⁸), and resource dependency (GFN's Ecological Footprint).

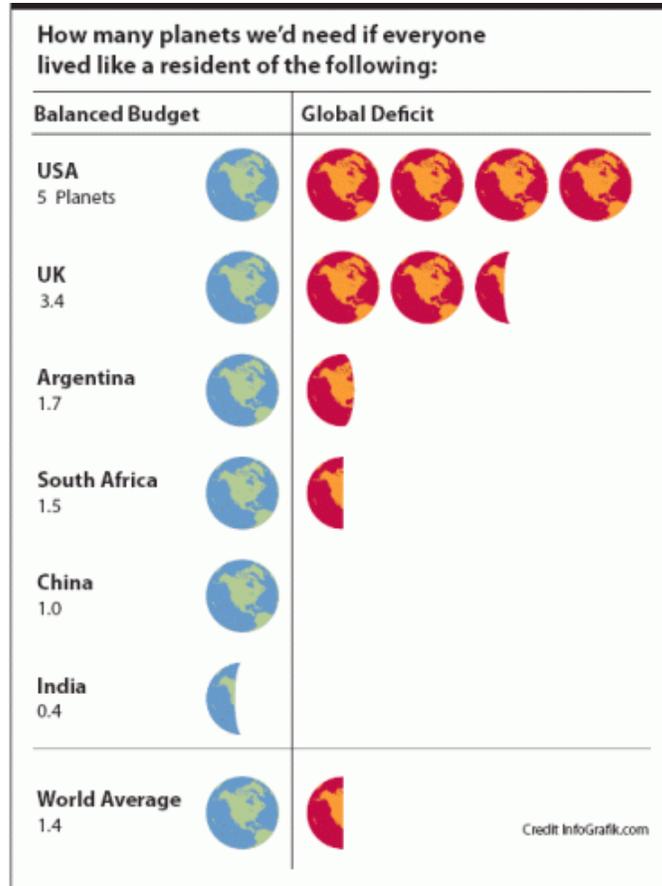
Two key breakthroughs enabled the creators of the Ecological Footprint and GFN to bring this tool to the public. First, there was a realization made by Dr. William Rees, then a newly minted ecologist working at the University of British Columbia. Rees was placed on an urban planning project with a team of researchers working on water-supply issues in the Lower Fraser Valley, and was surprised to discover that there was no academic discipline that dealt with carrying capacity, which ecologists define as: “the maximum average population of a species that can be supported in a particular habitat without permanent damage to that habitat.”⁹ Rees expanded the concept of carrying capacity to consider that human populations impact both their local habitat and remote sources of trade and technology. This was a subject in which he thought urban planners should take interest since excessive growth in one region can affect the carrying capacity of many regions. The potential for growth appears unlimited when considered in the immediate region, while global depletion is actually accelerating. “Ninety-nine percent of planning is thought of *right here, right now*,” he said. “It doesn't take into account the impact on all the *elsewheres* that are involved in supplying this region.”¹⁰

Finding that the carrying capacity of the Lower Fraser Valley was not sufficient to support the population of Vancouver, the next breakthrough was to consider the questions that could be asked if the carrying capacity concept were inverted. Rather than asking how many people could be supported on a given amount of land, Rees—later with the help of a PhD student, Mathis Wackernagel (who went on to found GFN with his wife, Susan Burns)—began to ask how much land would be necessary to support a given population of people. For the first time, it was possible to determine how much of the Earth's renewable resource capacity was being used by a city the size of Vancouver, or how many “Vancouver’s” the earth could support



“...it became clear that the concept would be rendered meaningless unless some concrete standard was created, ensuring that there was one consistent, internationally recognized standard for measuring ecological footprints.”

or, perhaps more urgently, how many earths would be needed to support a global population in which everyone lived like a Vancouverite.



How many planets' resources are being used by residents of Planet Earth?¹¹

Building the Network

Rees and Wackernagel allowed their methodology and branding to be widely used and, as a result, the Ecological Footprint concept caught on more quickly and widely than they could have hoped or expected. As the concept gained momentum, other organizations began incorporating it in their work—including NGOs, individuals and consulting firms helping businesses become more sustainable. However, it became clear that the concept would be rendered meaningless unless some concrete standard was created, ensuring that there was one consistent, internationally recognized standard for measuring Ecological Footprints.

Susan Burns, co-founder of GFN, recounts the undertaking to assemble relevant stakeholders into a network. “We reached out to the most active players and we had about 20 founding partners from the start,” she said.



“Many of them had a lot of experience and a lot at stake.”¹² One of the founding partners, a consulting firm called Best Foot Forward, had already centered their consulting practice around using the Ecological Footprint for businesses and for cities, and had already been in business for five years. The Worldwide Fund for Nature (also known as the World Wildlife Fund, WWF) had been using the Ecological Footprint as part of their Living Planet Report since 2000. According to Burns, the consensus among the organizations working in the field was that somebody needed to bring practitioners together with the scientific community to establish and document an agreed methodology for measuring Ecological Footprints.

Since that time, GFN has worked with 200 cities, 23 nations, and more than 90 partners (universities, corporations and NGOs) to deliver detailed information about the nature of each organization’s Ecological Footprint. GFN also publishes the National Footprint Accounts, a series of datasets for over 150 countries allowing researchers to do cross-national and inter-temporal comparisons of how quickly various nations are heading into ecological overshoot, and which countries have succeeded with efforts to slow that process. GFN is working toward the on-time completion of its “Ten-in-Ten” initiative—launched in 2005 with the goal of having ten nations institutionalize the Ecological Footprint in policy in ten years—by 2015. Thus far, Japan, Switzerland, UAE, Ecuador, Finland, Scotland and Wales have made official commitments to Ecological Footprint reduction. GFN has also been able to fill its advisory panel with esteemed scientific authorities including Thomas Lovejoy, University Professor in the Department of Environmental Science and Policy at George Mason University, E.O. Wilson, Pulitzer prizewinner and Professor of Entomology at Harvard University, and David Suzuki, long-time climate change activist and retired Professor of Genetics at the University of British Columbia, as well as Nobel Peace laureates Oscar Arias and Wangari Maathai. GFN and its founders have been recognized with numerous awards, including the Skoll award for Social Entrepreneurship (2006), being named one of the top 100 NGOs by Global Journal (2012), the Asahi Glass Foundation’s Blue Planet Prize (2012) and Swisscanto’s Prix NATURE Main Prize (2013).

Drafting the Ecological Footprint Standard: Leveraging Decentralized Knowledge and Expertise

The first set of Ecological Footprint Standards was published in 2006, developed by 16 representatives from GFN partners.¹³ There were several challenges to creating a standard methodology. For instance, should the



Ecological Footprint be measured using aggregate data about national consumption (as used in the National Footprint Accounts)? Or should it be measured by attempting to add up the specific components of consumption in a local area or for an institution (as many early Ecological Footprint studies did, resulting in inconsistent results)?¹⁴ A compromise was reached with a method of calibrating local data to the national average. Participants also debated whether Ecological Footprints should be measured using the actual productivity of land in the region in question, or according to average global productivity. In the end, global hectares were chosen in order to make interregional comparisons easier.

The examples of how GFN has developed based on the needs and expertise of its diverse partners are numerous, including their most comprehensive research on improving the metric to date: a paper published in 2009, credited to 26 different authors, including representatives of the private sector (Kevin Lewis from Best Foot Forward consulting), NGOs (Jonathan Loh from the World Wildlife Fund), government (Hans Messinger, former Director of Industry Measures and Analysis at Statistics Canada) and academia.¹⁵ This kind of progress in measurement tools could not have been developed had GFN only been able to rely on its internal resources and competencies.

The case studies that GFN publishes on its website are replete with examples of partners that have brought innovations in technique and created new areas of focus, as well as providing the empirical testing ground for better deployment of the Ecological Footprint as a measurement tool to guide business decisions or public policy. For example, Bank Sarasin, a Swiss bank that offers sustainability ratings on sovereign bonds, uses the Ecological Footprint in their work, and they have also enhanced it. The Ecological Footprint does not include a measurement of risks associated with nuclear energy and resources necessary to store nuclear waste, which Sarasin added to its analysis. Sarasin also includes measurements of water dependency, which the Ecological Footprint does not consider.¹⁶

Sometimes the application of the Ecological Footprint measurement reveals surprising empirical results. When GFN partnered with the City of San Francisco, they discovered a paradox of the ecological impact of cities. On the one hand, as economists such as Ed Glaeser¹⁷ predict, increased use of public transportation and reduced per capita infrastructural needs lowered the City's Ecological Footprint. On the other hand, the fact that San Francisco's residents were predominantly wealthier than average meant that they were consuming far more than their rural peers.¹⁸ Overall this means that density is associated with larger Ecological Footprints—a finding that contradicts conventional urban planning assumptions.



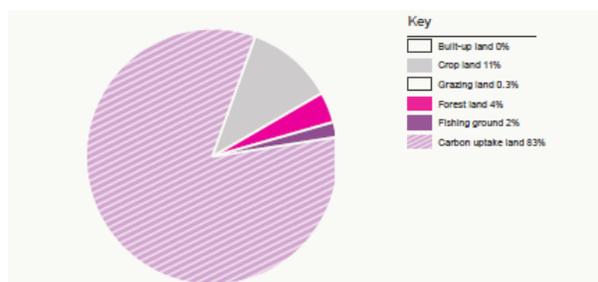
“...the UAE now devotes more money (\$15 billion annually) to research in alternative energy than does the United States. Meanwhile, its Masdar City Project has been heralded as ‘a global model for sustainable development.’ ”

Implementing the Standard: Changing Government, Business and Individual Practices

Although GFN has dozens of case studies to document its many partnerships, founder Susan Burns points to three that have reached maturity and are creating tangible results: Ecuador, the United Arab Emirates and the City of Calgary.

In 2010, Ecuador became the first nation to commit to specific Ecological Footprint targets through a National Development Plan which pledges not to exceed the nation’s own renewable resource capacity. Since then, members from the Ecuadorian ministries of Planning and the Environment have received technical training from GFN to improve the specificity of Ecuador’s National Footprint Accounts.¹⁹ The commitment also involves concrete policy action, including the decision not to develop the country’s largest oil reserve, which allowed preservation of over a million acres of rainforest.²⁰

In the WWF’s 2006 Living Planet Report, the United Arab Emirates was listed as the country with the world’s largest per-capita Ecological Footprint, based on National Footprint Account data. As a very wealthy country, in a hot climate, with an abundance of oil, the UAE faces considerable sustainability challenges. Following this announcement, the UAE government initiated Al Basama Al Beeiya (the Ecological Footprint Initiative) to better understand why they were such an outlier and what they could do to change their performance. The initiative has resulted in some innovative policy decisions. In an effort to reduce its dependence on oil extraction, the UAE, with a \$15 billion annual expenditure, now devotes more money to research in alternative energy than does the United States. Meanwhile, its Masdar City Project has been heralded as “a global model for sustainable development.”²¹ The \$22 billion clean-tech cluster and model city will be largely automobile-free, solar-powered and use architecture (wind channels, sunlight deflecting windows) to reduce energy usage.²²

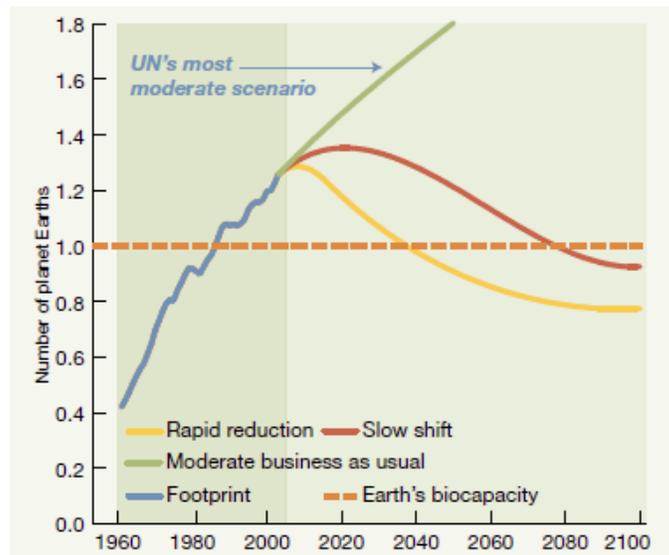


This chart illustrates the UAE’s Ecological Footprint broken down into the land types. The carbon footprint constitutes 83% of the UAE’s Ecological Footprint.²³



“As resource constraints tighten globally, countries that depend, in net terms, on levels of renewable natural resources and services beyond what their own ecosystems can provide may experience profound economic impacts as resources become more unreliable or costly.”

The City of Calgary, Alberta undertook an Ecological Footprint study in 2005, in the midst of a period of unprecedented economic and population growth. The study concluded that the average Calgarian had an Ecological Footprint 30% higher than the average for Canada as a whole.²⁴ Based on this study, Calgary has become the first city in Canada to announce precise Ecological Footprint targets, setting a goal to reach the Canadian average by 2036. The city has placed a moratorium on new greenspace developments and committed to bringing sustainability concerns into development decision-making. Calgary is also building Canada’s first light-rail system powered entirely by emissions free wind generated energy.²⁵



An estimate of the number of Planet Earths that would be required for all humanity to maintain the lifestyle of residents of the City of Calgary, Alberta²⁶

In addition to these projects, GFN is also working with the private sector to incorporate the Ecological Footprint into calculations of financial risk, particularly at the national level, in new sovereign debt credit ratings. For example, Environmental Risk in Sovereign Credits (E-RISC)—a collaboration between the United Nations Environment Programme, GFN and several of the world’s leading financial services firms, including Merrill Lynch, JP Morgan Chase, and Caisse de Depots—is using data from the National Footprint Accounts to calculate risks on sovereign debt. The underlying assumption is that differences in countries’ dependency on imported resources (and differences in vulnerability to fluctuations in the prices of those resources) can be measured using the Ecological Footprint and then used to price sovereign bonds more accurately than the models currently used by ratings agencies. According to the E-RISC report, co-authored by several researchers at GFN, “As resource constraints tighten globally, countries that depend, in net terms, on levels of renewable natural resources and services beyond what their own ecosystems can provide may experience profound economic impacts as resources become more unreliable or costly.”²⁷



Just as the financial crisis introduced new doubts about the predictive powers of markets to price the risks associated with complex financial assets, it introduced the opportunity for conversations about other situations where the indicators and measurements that were previously deemed sufficient to analyze risk might be incomplete. Susan Burns describes the confidence—since eroded—that people had in the credit rating agencies: “Before this happened, if you criticized the way risk was evaluated, people would say: ‘What’s the problem?’ There was no opening. Whatever you are saying must be fringe.”²⁸ Since that time, however, she finds that investors are much more open to the idea of different types of risks, and the possibility that valuable advice might come from ratings agencies beyond the “Big Three.”

Promoting the Standard: Communications and Content in a Productive Relationship

GFN has been able to exercise such wide-ranging influence as a Global Standards Network because of the conceptual simplicity and intuitive appeal of the Ecological Footprint concept. Even before GFN was founded, Rees and Wackernagel’s coinage, “Ecological Footprint” (along with its component, the “Carbon Footprint”) had entered the popular lexicon. The Ecological Footprint was a concept that people could understand, and being able to know something about its size (as an individual or part of an organization or community) made it more tangible than a collection of isolated statistics about resource use. It made people aware and, perhaps more importantly, it made people care.

High-profile partners of GFN now leverage the communications value of the Ecological Footprint concept in their own advocacy work. Each year, for example, the WWF promotes the concept of the Ecological Footprint through “Earth Overshoot Day,” the day on which humanity has collectively used up the full supply of renewable resources that the Earth is capable of producing during an entire year. In 2013, this fell on August 20th. The WWF puts an arresting emphasis on the fact that this is two days earlier than in 2012.²⁹

Over the years, GFN has worked hard to take advantage of Internet-based technologies, making efforts, in particular, to use the Internet to tap into the creative power of individuals and organizations to find intriguing and evocative new ways to visualize and disseminate data from its Ecological Footprint projects. Burns says that GFN makes a consistent investment in producing new infographics every year, but also relies on a broader network of individuals around the world—from reporters to NGOs to governments—to come up with imaginative new ways to display Ecological Footprint data



“ Good branding and good science can go together. When it comes to influencing policy makers, being able to appeal to the public is a necessary (if not quite sufficient) condition for achieving success.”

visually.³⁰ For example, using the 2010 National Footprint Accounts, blogger Jason Houtmann has put together an interactive map allowing users to compare the Ecological Footprints of various countries, as nations or per capita. Houtmann also disaggregates the data, showing visual comparisons of forest use or overfishing, for example.³¹ The WWF has also incorporated GFN data into visualizations for its advocacy campaigns, bringing Ecological Footprint data to its 5 million members.³²



The Earth “overshoot” as calculated through 2012³³

At the same time, the inherent simplicity of the Ecological Footprint standard has provided a target for critics who claim that simplicity must imply oversimplification. On the other hand, there is no need to make these easily digestible concepts more complex for the sake of complexity. Good branding and good science can go together. When it comes to influencing policy makers, being able to appeal to the public is a necessary (if not quite sufficient) condition for achieving success.

Having a truly compelling communications tool does present a challenge, however, in that superficial use of the brand could outpace actual tactical implementation. A 2010 study polled 55 experts whose work involves the Ecological Footprint on questions relating to its policy relevance. What the authors describe as “the overwhelming opinion of the experts” is that “[t]he Ecological Footprint is a strong communication tool and has a limited role within a policy context beyond this.”³⁴ This is not to say that GFN and its partners have not been working to make the Ecological Footprint an increasingly robust tool for building evidence-based decisions. Their respondents mentioned the continuing refinement of the indicator, including the use of input/output analysis to disaggregate the Footprint by individual industries, allowing governments more precise information about what parts of the economy were using resources. Indeed, an important element of



“*The key for network leaders is to decide which critiques are valuable and can improve how the network operates, which come from legitimate sources and should be debated, and which are purely rhetorical and can be put aside.*”

building legitimacy for GFN is not resting on the laurels of having a world-famous and compelling communications tool. To this end, GFN is continually engaged in both the methodological improvement of the measurement tool, and the scientific, economic and political debate over the usefulness of the concept for solving global ecological problems.

Defending the Standard: Showing Good Faith in Engaging Criticism

Any Global Standards Network dedicated to a particular problem-solving methodology will face a variety of critics and opponents—ranging from constructive criticisms, to competing paradigms in a scientific discipline, to ideologically motivated political opponents. The key for network leaders is to decide which critiques are valuable and can improve how the network operates, which come from legitimate sources and should be debated, and which are purely rhetorical and can be put aside. Some of the most vocal critics of GFN come from the field of economics and tend to be concerned less with the scientific validity of the Footprint measurement and more with the policy implications that might be drawn from the idea that people are over consuming. There have also been critiques of the limitations of the methodology itself. In both cases, GFN—including its founders and a wide assembly of partners—has worked to bring constructive criticism into the fold, and to answer legitimate opposition with reasoned arguments and evidence.

The preponderance of criticism from economists has centered on the fact that the Ecological Footprint takes a snapshot of our demands on the earth at a particular moment in time. Economists—following the work of Julian Simon—have, on the contrary, emphasized the dynamic interactions of resource scarcity, prices and technological innovation.³⁵ In its most optimistic form, there are economic theorists who argue that rising market prices on scarce goods should be sufficient to promote innovations that will enable humanity to use resources more efficiently and to provide incentives to discover new supplies. Such incentives should make any static measurement irrelevant, since it will soon be displaced as technology allows us to do more with less. Wackernagel and GFN’s supporters have argued that the Footprint deliberately avoids projections into the future, as those would involve contentious speculation about future technology, preferences and discount rates.³⁶ The assumption of continuous technological progress has also come under attack from within economics itself, in the work of Tyler Cowan.³⁷



“There are decisions that every standards network needs to make about where to be rigid and where to be flexible, and there are trade-offs to prematurely fixing a wide-ranging standard, when there remain productive possibilities for experimentation.”

Governing the Standard from the Top Down So It Can Be Used from the Bottom Up

To become the definitive global standard that users voluntarily adopt, and which then transforms their practices, requires a considerable effort in building legitimacy. As mentioned above, the founding purpose of GFN was to impose some order on the chaotic proliferation of applications of the Ecological Footprint. Towards this end, GFN periodically publishes a set of standards, governing not only the methodology of making a Footprint assessment, but also communications norms so that Footprint data is consistent and comparable.³⁸ The Footprint Standards Committee is composed of representatives from GFN's partner organizations, and employs a consensus-based process to develop standards that are on the leading edge. The committee is made up of between 7 and 18 members, only one of which need be a member of the GFN staff. The others come from partner organizations of GFN and are meant to be globally representative.³⁹ The methodological best practices that the organization publishes, however, walk a thin line between prescription and opportunities for innovation. Director Susan Burns describes the costs and benefits of a common set of methodological best practices:

Because Footprint applications continue to evolve due to innovation and the development of new approaches, we don't publish a prescriptive methodological standard; rather we came together as a committee to articulate best practices in Footprint analysis. This increases the quality of Footprint analysis (in terms of data quality, definition of terms, transparency, communication of results, etc.), but does not lock the community of practitioners into a rigid method. The downside is that Footprint studies aren't always directly comparable to one another. But realistically, because of variation in data quality and availability study to study, this wouldn't be a realistic goal anyway. The upside is that it allows for continued innovation.⁴⁰

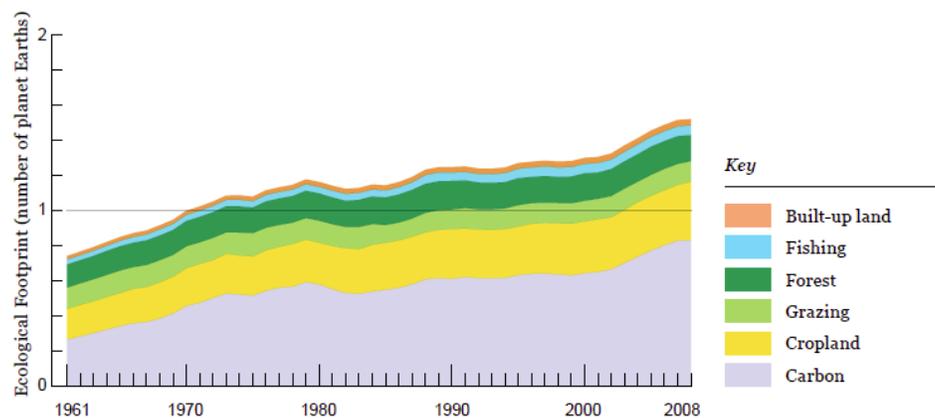
There are decisions that every Global Standards Network needs to make about where to be rigid and where to be flexible, and there are trade-offs to prematurely fixing a wide-ranging standard, when there remain productive possibilities for experimentation. In the case of GFN they have kept firm on a number of aspects of the communication and definition of the Ecological Footprint, but have allowed experimentation around a set of best practices in terms of measurement.



Implications for Network Leaders

Global Standards Networks forge order from chaos by bringing diverse practitioners together around shared goals and shared methods. Indeed, for the founding organizers of GFN, the risk of not acting was that the concept of Ecological Footprinting could be rendered meaningless by a proliferation of competing interpretations. The history of GFN thus far is a lesson in how different perspectives on information can yield new tools and products. GFN partners have brought the Ecological Footprint into domains as diverse as the creation of a sustainable university campus in Peru,⁴¹ and adding National Footprint Account data to Bloomberg terminals used by financial analysts.⁴² These innovations are only made possible, however, by GFN's work, ensuring that the Ecological Footprint continues to represent a unified methodology.

Gaining legitimacy on contested issues is a communications challenge. GFN has achieved widespread influence by having a measurement tool with enough intuitive appeal that it has become a gauge for the public dialogue on ecological issues. This, however, would not be enough were this strong communications advantage not buttressed with an equally strong commitment to scientific legitimacy, which has attracted a pantheon of global experts to the project. Nevertheless, despite the unimpeachable credentials they have put on the evidence, there are still political battles to be fought and justifiable concerns raised by economists on the policy implications of their work.



Global Ecological Footprint by component, 1961-2008⁴³

Networks that deal in politically controversial areas have to be able to fight on three fronts at once: being excellent communicators to the wider public, gaining the support of leading scientists and wrestling with economists



“ *It may not always be clear which solutions are the most effective or which models of the world map are closest to reality, but organizations that value transparency, rigorous, evidence-based policy and that welcome the freedom of external and internal debate, will be increasingly distinguishable from those that do not.* ”

and policy researchers about the political consequences. Web-based communication only serves to increase the size of the audience for these debates, and the speed with which they take place. It may not always be clear which solutions are the most effective or which models of the world map are closest to reality, but organizations that value transparency, rigorous, evidence-based policy and that welcome the freedom of external and internal debate, will be increasingly distinguishable from those that do not.

Building a wide consensus acts as a bulwark against critics. GFN uses consensus-based decision making among its partners to design and update the Footprint standards. This assures that decisions made by the network are truly reflective of the diverse uses to which the Footprint is being put, and the variety of visions that different stakeholders have of the future. It maximizes the likelihood that a complete picture will emerge, but also acts as a bulwark against critics. While people might disagree with policies that take the Footprint into account, GFN's membership diversity and consensus based structure make it very difficult to paint them as a special interest, or the pawn of a single actor.

Global Standards Networks walk a thin line between prescription and opportunities for innovation. Standards, by definition, entail trade-offs: in the act of forging consistency the network risks curtailing experimentation and decentralized innovation. These goals, however, need not be mutually exclusive. GFN has been successful in expanding its capacities by bringing methodological outsiders (such as input/output analysis, and radioactive waste management) into the fold. This includes making practical use of criticisms leveled against the limitations of the Footprint—and sometimes publicizing such limitations themselves.⁴⁴ A rarity even among decentralized networks, GFN's website includes a “Common Criticisms” section.⁴⁵

Open data maximizes the potential for creative cross-pollination across disciplines and effective promotion of the standard. Sharing the Global Footprint Accounts data set with the world at large takes full advantage of the creativity of networked crowds. GFN itself cannot predict what productive uses emerge from their data, but the strides their partners are making in bringing the Ecological Footprint to new domains and the experiments in informative and moving visualizations are an auspicious beginning. This reflects a crucial but not always precise decision for every Global Standards Network: how to draw the line between maintaining the standard and allowing the widest ground for experimentation.

Never let a good crisis go to waste. In some ways this reflects an unavoidable element of serendipity in the world of global problem solving—moments when people become mobilized cannot always be foreseen. At the end of the last decade, GFN was able to take advantage of two of these simultaneously—both the increasing sense that national income accounts need to take into account a broader set of data, and the loss of confidence in the ability of bond ratings agencies to properly price risks. It was not that either issue was entirely unknown to experts before the moment of crisis, what matters is that at the moment when decision-makers were looking for new ways of thinking, GFN had the credibility to be part of the conversation.



Nimble networks need to be ready with solutions in advance of a crisis that presents a need. In the case of GFN, this meant concentrating on business, individuals and governments, but having the forethought to reach out to the financial sector at the advantageous time.

by Michael Stacey for Global Solution Networks



Endnotes

- 1 B. Ewing, A. Reed, A. Galli, J. Kitzes, and M. Wackernagel, "Calculation Methodology for the National Footprint Accounts, 2010 Edition," Oakland: Global Footprint Network. http://www.footprintnetwork.org/images/uploads/National_Footprint_Accounts_Method_Paper_2010.pdf
- 2 M. Borucke, D. Moore, G. Cranston, K. Gracey, K. Iha, J. Larson, E. Lazarus, J. C. Morales, M. Wackernagel, A. Galli, "Accounting for demand and supply of the Biosphere's regenerative capacity: the National Footprint Accounts' underlying methodology and framework," *Ecological Indicators*, Volume 24, January 2013. <http://www.sciencedirect.com/science/article/pii/S1470160X12002968>
- 3 Garrett Hardin, "The Tragedy of the Commons," *Science*, Vol. 162, 13 December 1968.
- 4 http://www.nobelprize.org/nobel_prizes/economic-sciences/
- 5 Fran Korten, "Elinor Ostrom Wins Nobel for Common(s) Sense," *yes! Magazine*, 26 February 2010.
- 6 Ewing, *ibid.*
- 7 <http://data.worldbank.org/indicator/SI.POV.GINI>
- 8 <http://nces.ed.gov/surveys/pisa/>
- 9 William Rees, Interview with Michael Stacey, Conducted 11 December 112013.
- 10 Rees, Interview, *ibid.*
- 11 http://www.footprintnetwork.org/en/index.php/newsletter/bv/humanity_now_demanding_1.4_earths
- 12 Susan Burns, Interview with Michael Stacey, conducted 13 December 2013.
- 13 Global Footprint Standards Committee, "Ecological Footprint Standards 2006," Oakland: Global Footprint Network. http://www.footprintnetwork.org/en/index.php/GFN/page/application_standards/
- 14 *Ibid.*
- 15 Justin Kitzes, Alessandro Galli, Marco Bagliani, John Barrett, Gorm Dige, Sharon Ede, Karlheinz Erb et al., "A research agenda for improving national Ecological Footprint accounts," *Ecological Economics* 68, no. 7 (2009): 1991-2007.
- 16 Magyar Balazs, "The World in a Dilemma Between Prosperity and Resource Protection," Bank Sarasin. www.longfinance.net/images/reports/pdf/prosperity_resource_protection_sarasin.pdf
- 17 Edward L. Glaeser and Matthew E. Kahn, "The greenness of cities: carbon dioxide emissions and urban development," *Journal of Urban Economics* 67, no. 3 (2010): 404-418.



- 18 David Moore, "Ecological Footprint Analysis San Francisco—Oakland—Fremont," Global Footprint Network and San Francisco Planning + Urban Research Association, 30 June 2011. http://www.footprintnetwork.org/images/uploads/SF_Ecological_Footprint_Analysis.pdf
- 19 Global Footprint Network, "Ecuadorian Colleagues Undertake Footprint Technical Training," Footprint Network News, Issue 32, 18 July 2013. http://www.footprintnetwork.org/en/index.php/newsletter/det/global_footprint_network_hosts_ecuadorian_colleagues_for_technical_training
- 20 "Ecuador," Global Footprint Network. http://www.footprintnetwork.org/en/index.php/GFN/page/ecuador_case_story/ Last updated 14 September 2012.
- 21 "United Arab Emirates," Global Footprint Network. http://www.footprintnetwork.org/en/index.php/GFN/page/uae_case_story/ Last updated 13 March 2012
- 22 Bryan Walsh, "Masdar City: The World's Greenest City?" *Time Magazine*, Tuesday, 25 January 2011. <http://content.time.com/time/health/article/0,8599,2043934,00.html>
- 23 United Arab Emirates, *ibid.*
- 24 "Calgary," Global Footprint Network. http://www.footprintnetwork.org/en/index.php/GFN/page/case_stories/#calgary Last updated 19 April 2013
- 25 *Ibid.*
- 26 City of Calgary, "Toward a Preferred Future, Understanding Calgary's Ecological Footprint," Fall 2007.
- 27 United Nations Environment Programme, "A New Angle on Sovereign Credit Risk: E-RISC: Environmental Risk Integration in Sovereign Credit Analysis," 2012.
- 28 Burns, interview, *ibid.*
- 29 World Wide Fund for Nature, "Earth Overshoot Day: August 20," <http://worldwildlife.org/pages/earth-overshoot-day-august-20>
- 30 Susan Burns, email communication to Michael Stacey, 18 December 2013.
- 31 Jason Houtmann, "Ecological Footprint and Biocapacity," Data Alchemist. <http://www.dataalchemist.com/projects/ecological-footprint-and-biocapacity/>
- 32 Global Footprint Network, National Footprint Accounts, 2011 edition.
- 33 "Footprint Interactive Graph," World Wide Fund for Nature. http://wwf.panda.org/about_our_earth/all_publications/living_planet_report/living_planet_report_graphics/footprint_interactive/
- 34 Thomas Wiedmann and John Barrett, "A review of the Ecological Footprint indicator—perceptions and methods," *Sustainability* 2, no. 6 (2010): 1645-1693.



- 35 Nathan Fiala, "Measuring sustainability: Why the Ecological Footprint is bad economics and bad environmental science," *Ecological Economics* 67, no. 4 (2008): 524.
- 36 Kitzes et al., (2009).
- 37 Tyler Cowen, "*The Great Stagnation: How America Ate All The Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better*," A Penguin eSpecial from Dutton, Penguin.com, 2011.
- 38 "Application Standards," Global Footprint Network, last updated 18 January 2012. http://www.footprintnetwork.org/en/index.php/GFN/page/application_standards/
- 39 "Committees Charter," Global Footprint Network, 4 August 2006. http://www.footprintnetwork.org/en/index.php/GFN/page/committees_charter/
- 40 Burns, email to Michael Stacey, *ibid*.
- 41 Global Footprint Network, "Partner Network: Pontificia Universidad Catolica del Peru," http://www.footprintnetwork.org/en/index.php/GFN/page/partner_network/pontificia_universidad_catolica_del_peru
- 42 Global Footprint Network, "The Financial Risks of Ecological Limits." http://www.footprintnetwork.org/en/index.php/newsletter/bv/the_financial_risks_of_ecological_limits/
- 43 World Wildlife Fund and Global Footprint Network, "Living Planet Report 2012, Biodiversity, biocapacity and better choices," 2012.
- 44 Justin Kitzes, Audrey Peller, Steve Goldfinger and Mathis Wackernagel, "Current methods for calculating national Ecological Footprint accounts," *Science for Environment & Sustainable Society* 4, no. 1 (2007): 1-9.
- 45 Global Footprint Network, "Common Criticisms." http://www.footprintnetwork.org/en/index.php/GFN/page/responses_to_published_criticisms/



About Global Solution Networks

Global Solution Networks is a landmark study of the potential of global web-based and mobile networks for cooperation, problem solving and governance. This research project is a deliverable of the GSN program, offered through the Martin Prosperity Institute at the Rotman School of Management, University of Toronto.

Program Management

Don Tapscott, Executive Director
Dr. Joan Bigham, Managing Director
Anthony Williams, Executive Editor

GSN Program Membership

Membership in Global Solution Networks offers unlimited access to gsnetworks.org program deliverables including project plans, research publications and multi-media presentations, all posted for member use, review and feedback. Webinars on current research are held quarterly. Please visit our web site at www.gsnetworks.org or contact info@gsnetworks.org for information on participation.



Ten Types of Global Solution Networks