



How Much Nature Do We Have? How Much Do We Use? Mathis Wackernagel | TEDxSanFrancisco | 1

Mathis Wackernagel is a Swiss-born sustainability advocate. He is President of Global Footprint Network, an international sustainability think tank with offices in Oakland, California; Brussels, Belgium, and Geneva, Switzerland.

Following is the full text of his TEDx Talk titled “**How Much Nature Do We Have? How Much Do We Use?**” at TEDxSanFrancisco conference.

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TRANSCRIPT:

Hello San Francisco.

This awesome planet is full with life and covered with diverse ecosystems. And the people living on this planet are technological wizards.

They have built spacecrafts to take the largest selfies ever of themselves. And if the resolution was a bit higher you would see them wave. And these people very much like you and me are incredibly voracious. To the extent that now it takes 1.6 planets to meet the demand that they put on nature.

In other words, their demand on nature is 60% more than what Earth can renew.

Or it takes 19 months to regenerate what they take in one year. How's that possible?

Now, I've heard of some people who can spend more than what they earn. Or we can cut trees more quickly than they regrow, or we can fish more quickly than fish repopulate, or we can emit CO₂ more quickly than the Earth can absorb that excess.

And like with money, if we continue to spend more than what we earn, the likelihood of financial bankruptcy is high, and the same thing is true with resources.

If we use more than what Earth can regenerate, over the long term, that means ecological bankruptcy, which means a very depleted planet with harsh life conditions.

My obsession is to avoid ecological bankruptcy through metric. Because how can we measure, how can we know, how much we use compared to how much we have available? And for that we developed an ecological accounting system, to tell us how big of a planet we have compared to how much we use. It's called the **Ecological Footprint**.

We borrow the thinking from farmers because they look at how much area is there that is productive, for grazing land, cropland, forestry, marine areas, that's what we have, we call that biocapacity.

And then we compare that with how much we use, the Ecological Footprint for food, for fiber, for absorbing CO₂ waste, for our urban areas, all areas that compete for space, and so we can add it up and know how much we use.

Then we can compare the two: how much do we use, how much footprint do we use compared to how much we have?

And when we do that, and we look at nations as if they were farms, this is how the world looked like when I was born.

Most countries here in green had far more biocapacity than what it took to support their population. And you could see some countries are already red: Europe, with the colonial heritage, they used more resources; Japan; United States is turning pinkish.

And in my lifetime it has changed to a world where now 85% of the world population live in countries that use more than what their own ecosystems can renew. And it's different for every country.

But there's an overarching trend, the global trend, and it looks like this: That the biocapacity, the amount available to regenerate, has actually increased over the last 50 years about 20%. How so? Because through more intensive agriculture we can now generate more stuff per acre.

Can we maintain that trend? We don't know. Maybe we can a little bit. Maybe if there will be a lot of climate change, that will reduce biocapacity. But we have increased it 20%.

But perhaps more importantly, our demand on nature, our ecological footprint has grown 2.5 fold, even more rapidly. So we moved from a world where we used less than what Earth could regenerate to one where we now use 60% more.

And every country is different. Let me just show you one. Spain: very rapid increase, particularly as they entered the European Union, they got money more cheaply, that they can build out the country, and the footprint grew, and then there was a financial crisis, and - boop - the footprint declined.

So how is it possible that a country can run an ecological deficit?

There are three mechanisms really. One is they can use their own

ecosystems more than what they regenerate; they can net import - that means the import of resources exceeds the export of resources; and they can also use the global commons, mainly through emitting CO₂ more than what their ecosystems absorb, so they send this beautiful gift of CO₂ to the world.

Now this contradiction between planetary boundaries and our growing appetite has been recognized for quite some time, particularly in the 70s, lots of books were published, etc, and my first experience with that contradiction was utterly pleasant.

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I was 11 years old when the first oil crisis hit. And the world economy nearly came to a standstill. And Switzerland, where I lived, had this great idea to counteract that with car-free Sundays. And for us children it was just fantastic.

We could bicycle and roller skate on the highways, we could roam through the city freely and safely, we had a great time.

And it took another 20 years until heads of state got together in Rio in 1992 to say maybe we should do something about that. And they came up with this idea of sustainable development. They weren't yet too sure what it meant.

And it took another 20 years - a day to remember: 25th of September 2015 - where 193 heads of state with the Pope got together and said, "Here, let's launch the largest plan ever for sustainable development," the Sustainable Development Goals. They span over 17 domains and have about 169 targets.

And so really, for the first time in history, actually, we have moved beyond just human rights. Now the new dream is human rights, but the bigger one, called sustainable development, that's the official dream of humanity.

Now what exactly do they mean with sustainable development?

If you cruise the web you will find hundreds of definitions, some of them deliberately vague because people don't want to be [hangible]. But the essence is very simple, these two words: sustainable development.

Development is the short hand of policy geeks to say, "We all want to have great lives." "We all want to have great lives." But if all want to have great lives, why do we say sustainable? Because we recognize the budget constraint that there's only one planet.

So that's really the essence, how can we all live well within the means of one planet? And really if I had a big wish, I wish all universities, all research institutions, all parliaments, all White Houses around the world, on their doorway they would say, "How can we all live well within the means of one planet?"

That's the most profound, overarching, mother-of-all-research questions that we still don't know about, and we need talent to find out.

But once we define it, we can start to measure it, and that's going to be the core of my gift to you, I hope.

When we say how can we measure sustainable development, let's start with development. How do we measure that? It's not that easy, but the United Nations came up with a very simple index, recognizing that people, yes, they do like income. So they say, yes, income's one piece, but not only.

People also like to have long, healthy lives. So the second pillar is

longevity. They say, “we want to have long lives.”

And then they added a third pillar recognizing that in order to cooperate well, to work well together, to participate actively, we need to have access to education, we need to be able to read and write, be able to communicate with each other. So they have this index that goes from 0 to 1, and 0.7 would be the threshold to high human development - that’s on your right.

So that’s the development part.

But then the sustainable part. The question: How many resources does it take to support this kind of development? How much planet does it take? And for that, we have the Ecological Footprint. But it’s not just how much it takes, but also how much we have.

So there’s this horizontal line that shows how much capacity is available per person. That’s this number, 1.7. What does it mean? Very easy. You may remember from high school that we live on a round, spherical planet, and it is 40,000 kilometers to go once around the planet.

And with a bit of geometry you can calculate the surface of this planet. And then you look at the map, and you recognize not every part of the surface is highly productive. There’re the deep oceans, the ice fields, the deserts, not very productive.

But a quarter is highly productive: forests, grazing land, marine areas, you just add them all up, there are about 12 billion hectares of ecological productive space. And we are 7.3 billion people, so you have an easy division.

And what you see is 1.7 global hectares, average hectares per person, exist on this planet.

Now, one little detail: How many species are we? One. And there may be up to a hundred million wild species out there that also like to eat, wine and dine.

So maybe this budget needs to be shared to some extent, maybe we don't want to use the entire budget for ourselves, maybe. But still we have these two lines that define high human development, and we want to be under that budget.

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This gives us this box, this box where on average we would want to be to have great lives within an amount of resources that is available over the long run.

Really, I don't know if I'm allowed to say it in Silicon Valley - it's an invitation to think inside the box. You may wonder where do countries lie, and I won't lie to you, I will show you the cloud in colors, color coded by continents, and what does this cloud tell us? Two things: One is, there's this trend, it seems like the more higher development there is, the more we use resources.

But also what is extremely interesting at any level of development, the spread of resource demand is quite high. That means there's no physical law in itself that dictates how many resources are needed for a certain level of development, so there's a lot of spread possible.

And people may say, "Oh, is it hard to get into the box?" Maybe it is hard, but what's the alternative? And that's why I admire particularly research initiatives that try to find out how we can get into this box.

I just want to mention two: One from foggy, cold London, and the other one from hot and dry Abu Dhabi.

The one in London, is driven by an organization called Bioregional. They said we need to find out how we can have one-planet living. And they started the development for about 40 households where people could have better lives than the UK on average, and at the same time, would fit within what one planet can provide.

And they succeeded with having great lives, people love to live there. It's called BedZED. Their footprint is substantially lower than what the UK uses, but not yet at 1.7. And so they're now trying with 10 more communities around the world, one in Sonoma county, quite an interesting initiative.

Another one in Abu Dhabi called Masdar. There, it's actually government sponsored; they know in the long run, somehow we have to live on this planet. They said we have to look at the city's scale. Can we build an entire city that operates on few resources, and people can have a great life, even in a harsh climate like in Abu Dhabi?

And they have started first elements of the city, and it's still far away from their goal. But they also have coupled it with one of the most prestigious research institutions in Abu Dhabi to really find out: can they get there?

And if these two experiments haven't really gotten there, it's not really their problem, it's really our problem that we have been able to do that worldwide because as a worldwide average, can we move ourselves into this box?

Having the metric, what's the conclusion for us? And I would like to give you just three.

The first one, very simple: measure. There's an old saying: you can manage what you measure. Now we can measure sustainable development. If you don't know how much footprint you use compared to

how much biocapacity you have, it's a bit like flying a plane without a fuel gauge – gets a bit dangerous after a few hours in the air.

Second point: having a measure, you gain a voice. You can say what you want; you can tell where we need to get; and you can keep accountability where they actually move in this direction. Having the metrics, you can ask your mayor, your city council, your representatives, your president, your national leaders to build a sustainable future, and track whether we're moving in this direction.

What does that mean? How do we need to refurbish our cities? How do we need to change our transportation systems? How do we need to shift our power system to a solar power system possibly, very rapidly?

Do we need to empower women more? Do we need to encourage smaller families, perhaps? All that we can measure and find out, is it moving in this direction.

Third thing: your life. Does it help you to design your own life? Sweat the big things.

What are the big things? Through the metrics you can think, how do you want to invest? Where do you want to live? How do you want to live? How resource-dependent do you want to be?

What projects do you want to be engaged in? Do you want to be in projects that will be the long-term winners as they gain value in a world of resources constraints? Or, are you investing your life in stranded assets?

So what I hope is that through this metric, what I gave you is a compass. But in the end, the path is yours.

Thank you very much.



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[Green Giants: How Smart Companies Turn Sustainability into Billion-Dollar Businesses](#)

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