Spending our carbon budgets wisely

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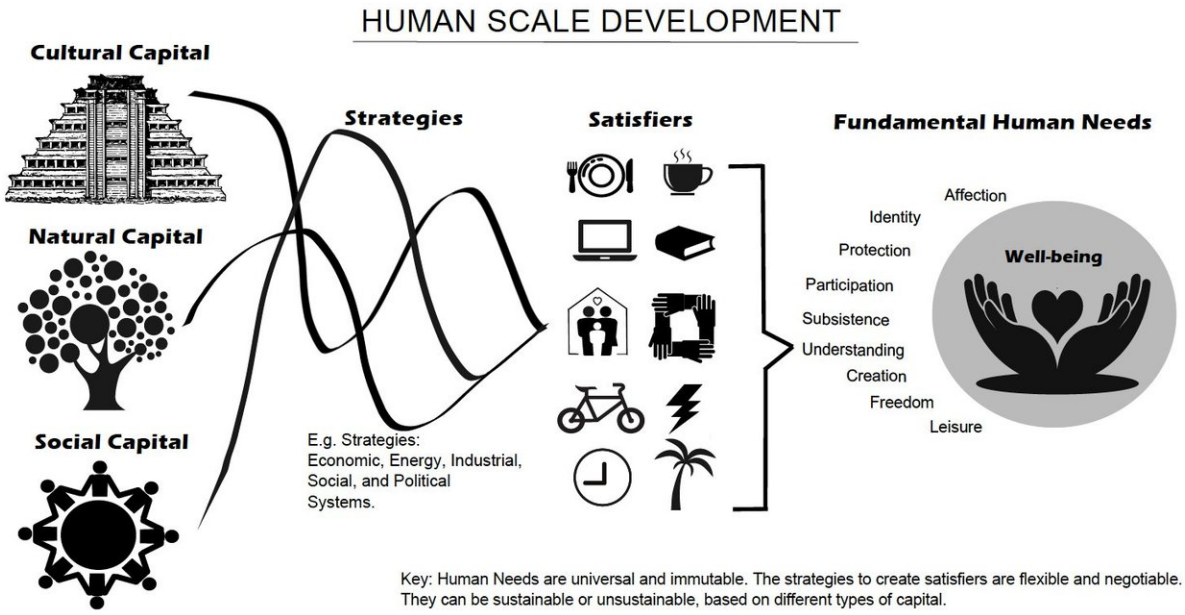

The Chilean economist Manfred Max-Neef proposed an alternative way of looking at progress by proposing society use the fulfilment of human needs as a measure of progress instead of economic growth or GDP. Credit: Gibran Vita, NTNU

The UN's Intergovernmental Panel on Climate Change (IPCC) sent a clear message to the world with its last report, issued in early October in South Korea: the world needs to act immediately to cut greenhouse gas emissions. The report says that human-caused emissions of carbon dioxide (CO_2) need to fall by about 45 per cent from 2010 levels by 2030, and by 100 per cent by 2050.

"Limiting warming to 1.5ºC is possible within the laws of chemistry and physics but doing so would require unprecedented changes," said Jim Skea, co-chair of IPCC Working Group III, in a press release issued with the report.

Researchers at the Norwegian University of Science and Technology's Industrial Ecology Programme say that making "unprecedented changes" in the global economy could be much easier if society radically changes the way it looks at economic growth.

"Society has to go to zero emissions pretty much overnight. Whether we like it or not, this challenge won't be met without the corresponding (overnight) changes in society," says Gibran Vita, a Ph.D. candidate in the program. "We need to start thinking, "Is the carbon footprint that comes from different economic activities actually worth it in terms of societal outcomes?" There is potential to live fulfilling lives with much less environmental impact."

They suggest that satisfying fundamental human needs with the minimum environmental cost should be the main focus of economies—not growth.

Vita and his colleagues have just published an article about their research in *Environmental Research Letters*.

More consumption doesn't necessarily mean happier people

Vita and his colleagues decided to look at the carbon footprints that would result from meeting people's fundamental needs. They used a system developed by the Chilean economist Manfred Max-Neef, who established categories of physical, emotional and intellectual needs, such

as subsistence, freedom, identity, leisure and creation.

What's different about this approach is how it differs from conventional assessments of prosperity, which generally measure money flows, such as GDP. "But people don't necessarily benefit from more of everything, all the time," Vita says. "A driving belief is that focusing on external prosperity through consumption equals progress. But that isn't working so well for the poor who suffer many other types of deprivation, or for the rich in terms of mental health, or for the environment."

So the researchers looked at the goods and services consumed to meet people's needs based on Max-Neef's categories and then calculated the footprint of each need. Then, to evaluate how well these "carbon investments" pay off in terms of quality of life, they used 35 objective and subjective indicators to measure how well people in different countries felt that eight different needs were met.

For the "subsistence" need, for example, they used indicators including good health, standard of living, and child survival rate. For the category "protection," they looked at access to sanitation and health care quality, among others.

Calculating carbon footprints and needs

To do their calculations, the researchers used an open access database called EXIOBASE 3, which contains information on economic activity and associated greenhouse gas emissions and resources for 200 goods in 44 countries and five rest-of-the-world regions. The 44 countries represent the world's largest economies and make up 91 per cent of global GDP with 65 per cent of the world's population.

They then used this information to figure out what the carbon footprint might be for different countries for different needs. Not all needs were

equally polluting, the researchers found. Meeting subsistence and protection needs took half of the global carbon budget, while leisure, identity, creation and freedom took most of the other half. Understanding and participation were the most modest, taking up less than 4% of global carbon emissions.

The researchers then wanted to see if they could determine if it was necessary to emit as much carbon as was being emitted to meet those needs. To figure this out, they had to find a way to objectively and subjectively assess how well fundamental human needs were met for the different countries. Here they used data sources such as the World Bank Indicators, the Central Intelligence Agency, the OECD Labour Force and Time Use, and the Human Development Report from the UNDP.

The combination of 12 databases allowed the researchers to calculate percentages that reflected how well citizens felt their human needs were satisfied in the 44 countries that were assessed.

The researchers then combined these two calculations—the percentage of the population for which a need was met in each country and the carbon footprint that resulted from meeting that need for each country—to plot graphs and compute statistics. For example, for access to sanitation or modern energy, which was one of the indicators under the "Protection" need, their assessment showed that places such as Norway, the United States and pretty much all Western countries had completely met this need. However, the carbon budget used to meet this need in these countries stretched far beyond the point of observable social benefits.

Much more carbon emitted than was needed

On average, the researchers found, meeting all of person's physical needs—from affordable housing and having good health to drinking

clean water—required per-person carbon emissions of just one to three metric tons a year. But when they compared this number to how much carbon countries actually emitted per person to provide protection and subsistence, they found many, many differences.

Some countries, like the United States and Australia, emitted more than six to eight metric tons per capita to meet physical needs. In contrast, the average that low-income nations used to meet these needs was near one ton per capita.

Nevertheless, Vita said, the numbers show potential for people in wealthy nations to be at least as happy and healthy as they are now with much lower carbon emissions.

"It means we are overdoing it in a way," he said.

Objective versus subjective

One important aspect of this assessment is that the researchers measured needs by combining subjective and objective information. For example, subsistence depends on good health, which is a subjective measurement, while child survival is an objective measurement. So when the researchers looked at the different graphs for the different needs, they found a pattern. When it came to objective measurements that were based on something physical, like electricity access, they found a threshold above which more carbon emissions didn't make a difference in the overall outcome. What that meant was "more consumption didn't match with greater satisfaction after a certain point," Vita said.

These are thus areas where countries could easily cut their carbon emissions without negatively affecting people's health and well-being. These are also areas where a little bit of more carbon has much more benefit for the very poor. In total, 14 of the 35 indicators the researchers

used to define needs showed this relationship.

For 20 indicators, however, they found no relationship at all. Most psychological and emotional measures of needs did not correlate with their carbon footprints, meaning that they are most likely linked to other factors that are not related to consumption, such as having free time, strong social relationships and enjoying daily activities.

The researchers interpreted this finding as meaning that many aspects that contribute to a person's quality of life are not improved by putting more material resources into them. "We could only discover this pattern by looking at 'human progress' in terms of specific needs rather than by looking at traditional measures of progress, like higher GDP," Vita said. "If we are going to make the fundamental changes called for in the IPCC report, this type of needs-centered view has to permeate institutions, businesses, households and individuals."

Rethinking society

So if the challenge of this century is to cut emissions while allowing people to thrive in their lives, what are the options? "Beyond technology fixes, the safest and probably quickest option is to be mindful of what we are using all of this carbon for," Vita said. "Policy makers could heavily incentivize sustainable lifestyles in order to cut carbon emissions without negatively affecting how people perceive their lives."

Vita pointed out that making this kind of fundamental change will be easier for wealthy countries, since they have already invested in housing, infrastructure and other basic needs that less-well-off countries don't yet have. But emerging countries could learn from the mistakes that wealthy countries have made, he added.

"The science points to the fact that we need to rethink society as soon as

we can...both for the planet and for our species," he said. "Emerging countries have the golden opportunity to leapfrog directly to a more sustainable vision of development -and escape ending up locked-in to emitting carbon where no one gets a (well-being) bang for their (carbon) buck."

More information: Gibran Vita et al, Connecting global emissions to fundamental human needs and their satisfaction, *Environmental Research Letters* (2018). DOI: 10.1088/1748-9326/aae6e0

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