

Earth science offers key to many United Nations Sustainable Development Goals

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A composite image of the Western hemisphere of the Earth. Credit: NASA

A group of ecologists at Oregon State University argue that scientific "business as usual" will fall far short of what is needed to achieve the 17 Sustainable Development Goals that are expected to be adopted by the United Nations General Assembly this month.

In an article published today in *Nature Geoscience*, the researchers suggest that these goals, which are designed to guide national and international actions for the next 15 years, can only be met if the Earth science community becomes more engaged and begins to "deliver on its social contract with society."

"The world's current approach to dealing with its multiple demands and needs is not adequately based in science, and it's unsustainable," said Jane Lubchenco, lead author, and the OSU University Distinguished Professor and Adviser in Marine Studies, former NOAA administrator and U.S. Science Envoy for the Ocean.

"Our international leaders are now committing themselves to alleviating poverty, enabling smart development, and ensuring opportunity for all," said Lubchenco, an environmental scientist in the OSU College of Science, "while at the same time, tackling climate change, protecting biodiversity, achieving food and water security and stopping pollution.

"These are enormous, difficult, but not impossible challenges," said Lubchenco, who also serves on the United Nations Sustainable Development Solutions Network Leadership Council. "Earth scientists are needed if the goals are to be met.

"The golden opportunity for scientists is to focus research efforts on real-world problems," she said, "to create new knowledge that is useable and responsive to society's needs, to share knowledge widely, and demonstrate how sustainability based on science will ultimately benefit everyone.

"With this approach, seemingly intractable problems may actually be solvable," she said. "Scientists are good at problem-solving, so we hope they will become more engaged."

The OSU researchers said that the goals being considered by the United Nations contain a solid balance of environmental, social and economic issues, and in this paper they made a number of recommendations to help best achieve them. These include:

- Consideration of the environment must not be delayed while more socially urgent goals demand attention.
- Earth scientists could produce more useful and relevant science, and also share it more broadly with non-scientists.
- Science that addresses issues ranging from water management to resource extraction and disaster mitigation needs to be made more accessible and understandable to potential users - policy makers, resource managers and the general public.
- Scientists should not assume they know what users want and need, but rather must listen and work closely with civil society, industry, business and political leaders to create relationships built on trust, and devise solutions to big challenges.
- The academic structure, which now often acts as an impediment to scientists engaging with society, must create systems that recognize, enable and reward such engagement.

The best place to start with many of these efforts, the researchers said, is with cutting-edge research that can help address needs relevant to the development goals, and identify practical solutions.

In their commentary, the scientists cited examples where such successes have occurred in the field of marine sciences.

One success focused on reforming small-scale fisheries in developing

countries. These fisheries are a key to achieving multiple sustainable development goals such as food security and poverty alleviation. Yet they are notoriously difficult to reform, the researchers said, threatening the livelihood, health and well-being of millions of small-scale fishers and their communities.

Recently, researchers from ecology, economics, sociology and anthropology collaborated with each other and with local communities to devise solutions that ended overfishing, rebuilt depleted stocks and protected key habitats and biodiversity. Community and local fishers are now continuing to use the approaches that brought these social, economic and environmental benefits.

Engagement of scientists was key, but so too was their engagement with [local communities](#) to co-define problems and solutions, the researchers said. More cooperative solutions like these that are grounded in science, but owned by communities and that can be replicated elsewhere are urgently needed.

The development goals being considered by the United Nations, if properly executed, could help meet needs of people around the world and enable development while safeguarding Earth's life support systems on which humanity depends, the researchers said, and good science is critical to this mission.

"The challenge is how to use the planet's resources fairly without using them up," they wrote in the commentary.

More information: *Nature Geoscience*, [DOI: 10.1038/ngeo2552](https://doi.org/10.1038/ngeo2552)

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