

# View of 'nature as capital' uses economic value to help achieve a sustainable future

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Rice terraces allow for productive agriculture while helping to protect against soil erosion on steep slopes in Longji, China. Credit: Stacie Wolny

Researchers today outlined in a series of reports how governments, organizations and corporations are successfully moving away from short-

term exploitation of the natural world and embracing a long-term vision of 'nature as capital'—the ultimate world bank upon which the health and prosperity of both the human race and the planet depend.

The reports, published in the *Proceedings of the National Academy of Sciences*, suggest that significant progress has been made in the past decade, and that people, policy makers and leaders around the world are beginning to understand ecosystem services as far more than a tree to cut or fish to harvest.

"Valuing nature means understanding the myriad ways in which our communities, health and economies depend on ecosystems," said Jane Lubchenco, a distinguished professor at Oregon State University, former director of the National Oceanic and Atmospheric Administration, and co-leader of this group of studies.

"There is now broad appreciation of nature's values and we are learning how to incorporate that knowledge into policy and management decisions by governments, financial institutions and businesses," she said. "In 10 years we've gone from very little specific understanding to powerful examples, where working with nature is benefitting people now and in the future."

The stakes are high. The world's [gross domestic product](#) has increased nearly 60 times since the start of the Industrial Revolution, the researchers point out, allowing a dramatic increase in the standard of living even as Earth's population surged.

But with global environmental threats in the future and a [world population](#) that may approach 10 billion by 2100, the health of [natural systems](#) will literally become a life-support system that no longer can tolerate systems that reward short-term production and consumption at the expense of natural stewardship. Disasters such as the 2010

Deepwater Horizon oil spill are being evaluated not just based on the immediate damage, but also the long-term costs such as lost water filtration, hunting and fishing.

Scientists say that just in recent years, we may be turning the corner toward approaches that could help the planet and all its natural inhabitants to live long and prosper.

In the U.S., some coastal restoration practices gained support as more people understood their additional value for carbon sequestration and storage. In Denver, a water board provided \$32 million for forest restoration work to avoid damage to water quality caused by large wildfires.

Costa Rica has transformed itself from having the world's highest deforestation rate to one of the few countries with net reforestation. South Africa has linked development and ecosystem service planning to better allocate water, reduce poverty and avoid disasters. China is creating a network of 'ecosystem function conservation areas' that focus conservation in areas with a high return on investment. In the Brazilian Amazon, environmental protection has helped reduce the incidence of malaria, acute respiratory infection and diarrhea.

The researchers said that sometimes, but not always, it can help to literally translate [ecosystem services](#) into a dollar value—what is something worth, and what would it cost if we lost it. Such approaches have helped set the stage for cap-and-trade of carbon emissions, taxes on activities with negative ecosystem impacts, and certification systems to help inform consumers and realign incentives in the private sector.

One notable success story, outlined today in a different publication co-authored by Lubchenco in the journal *Oceanography*, is fisheries policy and marine management in the U.S. and European Union.

The approach incorporates a commitment to end overfishing, complete with time tables and strict accountability, plus the option of using rights-based approaches to [fishery management](#). In the U.S., these are called 'catch shares,' and they give fishermen a say in the present and a stake in the future, within scientifically determined limits. Catch shares, plus the mandate to end overfishing, are turning fisheries around, to the benefit of fishermen, consumers and [ecosystems](#).

This approach has transformed U.S. fisheries. For example, the number of overfished stocks in U.S. federal fisheries has plummeted from 92 stocks in 2000 to 37 in 2014. The number of stocks that were previously depleted and have now recovered to a point where they can be fished sustainably has increased dramatically, from zero in 2000 to 37 in 2014.

Elsewhere in the world, other rights-based approaches to fisheries are also ending overfishing and protecting biodiversity. For example, so-called "TURF reserves" combine an exclusive right to fish in a particular area with no-take marine reserves. Under this system, fully protected marine reserves provide a wide range of ecological benefits while helping to produce larger and more diverse fish species that can 'seed' the areas around the reserve. Those areas can then be fished, using science-based harvest levels, by fishermen who have exclusive rights to certain areas, and gain a personal interest in protecting the sustainability of the system.

Such an approach can help protect natural systems in perpetuity while promoting economic health, and may be especially critical for food security in parts of the developing world, where nearly three billion people depend on fish for at least 20 percent of their animal protein intake.

"The challenges in fishery management are significant, but we also have good news to celebrate," Lubchenco said. "We can end overfishing at the

same time we return fisheries to profitability and sustainability.

"Much work remains to be done," Lubchenco said. "Our global economic, political and social systems depend on the world's natural resources, but many policy decisions do not yet explicitly incorporate natural capital into the decision-making process. However, these new results from around the world show what works. The real opportunity is widespread adoption of these ideas and approaches."

**More information:** Nature as capital: Advancing and incorporating ecosystem services in United States federal policies and programs, [www.pnas.org/cgi/doi/10.1073/pnas.1420500112](http://www.pnas.org/cgi/doi/10.1073/pnas.1420500112)

Provided by Oregon State University

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