

Using science to assign value to nature

The global economic crisis has captured the world's attention, with everyone waiting for the next piece of bad news. Not surprisingly, under these circumstances, there is a strong temptation to focus on immediate financial needs and push environmental issues into the background, to be dealt with "later". Yes, climate change is finally getting some attention, but no one should assume that governments being dragged kicking and screaming to deal with global warming is a great triumph for the environment. In fact, some still argue that the world cannot afford to address climate change now; it will have to wait until the economy recovers. Meanwhile, issues such as biodiversity conservation, shortages of clean water, losses in soil fertility, and imperiled ecosystems are not even on the radar screen.

Such a delay would be a mistake. We will eventually pay a huge price if we overlook nature, which provides the foundation for human prosperity – usually free of charge. For generations, we have had the luxury of treating nature's bounty as infinite. If we could talk to our great-grandparents, they would tell us stories of seas teeming with fish and forests filled with giant trees. That bounty has dwindled, and yet we still treat these resources as if they will always be there. We do not put a value on them and so they become valueless in our decision making, with no recognition of how much we need them, or what it would cost us if they were not there.

Even in addressing climate change, the most prominent environmental issue of our time, we risk causing serious ecological harm because our focus is so narrow. Massive infrastructure projects, monocultures of plantation trees, seawalls and levees, biofuels that ultimately accelerate land conversion – these are just some of the likely consequences of our current plans to confront climate change. But it does not have to be this way. If we look at the big picture, we will see that nature is not a luxury good but a necessary ingredient to our survival and an asset in our quest to adapt to the realities of climate change and the consequences of rapidly growing human populations.

The idea of "ecosystem services" – identifying and quantifying the resources and processes that nature provides for people – gives us a framework to measure nature's contribution to human well-being, and to understand the cost of its loss. It provides a credible way to link nature and people that goes beyond emotional arguments and points us toward practical solutions. This is why, now more than ever, we need to embrace ecosystem services as a basis for conservation and for making sure people are taken care of as we alter, exploit, manage, and protect nature.

That nature provides us with benefits – such as pollination, food, flood protection, clean water, and so on – is a simple and compelling notion. And yet, getting beyond the platitude of nature's value has proven to be a challenge for both science and policy. Why? Because we have not yet found a convincing way to talk about this issue to people who don't yet understand the value of those services. Because we do not have enough science to back up our hypotheses of how and when services are delivered. Because critical ecosystem services, such as the maintenance of soil fertility and the link between nature and public health, have not received adequate attention. Because we have not developed practical ways to bring these ideas into business practices and government policies. In short, because we have not proven, on the ground, that these ideas work. Our best successes deal with valuing water, yet even these successes are small, when what is really needed are efforts at the scale of entire nations.

In this Special Issue of *Frontiers*, we have assembled pioneering examples of the quantification of ecosystem services and nascent steps toward turning that quantification into a framework for better land and water management. Although it is, admittedly, only a small part of the challenge, "getting the science right" is essential if we are to claim that people benefit from ecosystem service projects – we cannot afford to promote forest protection for the sake of flood control in those cases where the local hydrology indicates that, in fact, forests will not help reduce the incidence of big floods. National governments around the world are taking note of ecosystem services. The time is right for integrating the value of natural assets into decision making. The following articles help move us down that path.



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