



# Why valuing natural capital can rewrite the economic script

*Sir Partha Dasgupta, who led a landmark review of the economics of biodiversity, tells Paul Wallace why it is vital that the financial sector puts biodiversity centre stage*

**B**iodiversity is the poor relation of climate change. That is despite the fact that conventions on both were reached at [the original 'Earth Summit' in Rio de Janeiro](#) three decades ago. Although the financial sector is increasingly engaged in trying to arrest global warming, there has been little commensurate effort to protect nature. But that is now starting to change, especially following [a landmark review in 2021 of the economics of biodiversity](#), led by Sir Partha Dasgupta of Cambridge University and commissioned by the UK Treasury.

The response to the review was beyond his expectations, Dasgupta told me when we met in September at St John's College, Cambridge. Now 80 years old, he was the perfect person to conduct the analysis, being an outstanding economist who has long straddled that discipline and the study of ecology. Over the best part of a morning, he shared his insights about the subject.

The review broke new ground by setting out a comprehensive economic framework to assess the harm being done to biodiversity, why that matters, and what to do about it. That framework should be familiar to any student of finance since it borrows from portfolio asset management. The portfolio in this context comprises three classes of assets. Two are familiar and their worth is routinely measured: capital goods that have been produced such as buildings, equipment and patents; and human capital accumulated through education and the acquisition of skills.

The third, natural capital, has been neglected and is largely unvalued. Recognising its true worth rewrites the economic script and brings biodiversity centre stage. That's because natural capital generates a vast array of crucial goods and services both for the economy and our very existence.

## A variety of ecosystems

Beyond its aesthetic and cultural benefits, nature provides two broad categories of services. One is 'provisioning' goods – from food and timber to medicines. Such natural resources have traditionally been the main interest of economists. But the other class is just as vital, although less obvious: 'regulating and maintenance' activities that, for example, pollinate crops, fix nitrogen in the soil or decompose waste.

"These processes are driving the entire system, creating the provisioning goods: without them nothing would be there for us," Dasgupta says.

Nature's services are delivered by a variety of ecosystems. The most high-profile are tropical rainforests, which as well as absorbing carbon emissions are extraordinarily rich in biodiversity. Rainforests, for example, are the habitat for half the world's bird species. Wetlands don't attract the same attention, but they play a crucial role in cleansing water. And, [according to the Wildfowl and Wetlands Trust](#), 40% of the world's plants and animals depend on them. Mangrove forests in coastal waters protect neighbouring villages against storms and flooding.

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The health of ecosystems such as wetlands depends upon biodiversity, as a range of species contribute complementary activities that generate their overall productivity. "It's mutualism between different organisms that leads to ecosystems creating the services we enjoy," explains Dasgupta.

That principle is clear. But working out what biodiversity means in practice is a journey of discovery. Estimates in Dasgupta's review put the number of species with a cell nucleus (eukaryotes) at between 8m and 20m, and maybe higher – an extraordinary range of uncertainty. These include the species we are more likely to notice, such as familiar animals and plants.

There is, in addition, as the review points out, "an unknown and much larger number of prokaryotes consisting of archaea and bacteria". These include organisms entirely outside our usual expectations of what is possible, such as the bacteria that carry out chemosynthesis at hydrothermal vents – hot springs on the ocean floors. [The discovery of life at such extreme temperatures and pressures was relatively recent](#), in the late 1970s.



“Our lack of knowledge is enormous,” the review says at the outset – and that lack of knowledge includes a full understanding of how the vast variety of organisms interact. But manifestly biodiversity is being lost, to the detriment of ecosystems whose importance is already clear. Extinction rates are now running at between 100 and 1,000 times their previous rates over millions of years. A quarter of the tropical rainforests have been cut down since the Rio summit in 1992.

## Nature should be priced in

Nature’s ecosystems do much of their work silently and invisibly. Think of soil. But precisely because of that, they are used without factoring in the cost of associated negative externalities. As an example, Dasgupta cites coastal-pond shrimp farms (many are built in waters that have been cleared of mangroves) in developing countries, which export the product to the west. “They pollute the neighbouring water,” he says. “That’s not included in the price of the shrimps exported, so that’s bad asset management because there’s a free good out there that should be costed – the free good being the contaminated water.”

Valuations of nature, Dasgupta argues, should also include their “option value”, which captures as yet unknown benefits that may emerge over time, provided they are not foreclosed by irreversible decisions. Plants, for example, have long been a source for drugs. The review reckoned that the option value of biodiversity, simply for potential new

pharmaceuticals, could be of the same order of magnitude as the known medicinal value of natural products.

## Natural limits on growth

By extending the boundary of accounting to encompass all forms of natural capital, Dasgupta exposes the risks of current patterns of growth and development. One way of highlighting this is the ecological ‘impact inequality’, the ratio of our demand for nature’s services to their sustainable supply, which rose from 1 in 1970 to 1.7 in the pre-pandemic year of 2019. As a consequence, the stock of natural capital is being depleted rather than increasing, as is the case for produced and human capital.

“*The current scale of ecological harm is all the more worrying because of an underlying fragility in ecosystems*”

Consistent with that finding, the Millennium Ecosystem Assessment in 2005 recorded large-scale biodiversity losses in a wide range of ecosystems: 15 out of 24 were either already degraded or being exploited at unsustainable rates. More recently, IPBES, a science-policy platform on biodiversity and ecosystem services, documented in 2019 a decline in 14 out of 18 categories of nature’s services, including water purification and air quality.



The current scale of ecological harm is all the more worrying because of an underlying fragility in ecosystems. These are subject to what scientists call ‘non-linearities’, meaning that they can reach a tipping point where a gradual decline abruptly becomes outright collapse. Restoring a defunct ecosystem is far harder than conserving it in the first place.

The UK, like other developed economies, is complicit in this damage to biodiversity. Dasgupta points out that a sixth of the carbon footprint of the average diet in the EU can be directly linked to deforestation in tropical countries. [The UK is fifth highest among developed economies in terms of its biodiversity footprint from imports of primary products.](#) In other words, the UK lives well in part because it is harming biodiversity elsewhere, having already damaged its domestic ecosystems. “The west has outsourced its need for biodiversity,” says Dasgupta.

“ **Take biodiversity seriously and start working on it now. As a first step, banks should begin hiring ecologists** ”

The Cambridge economist’s framework is useful not just for understanding the problem but also in the search for possible solutions. At the biodiversity summit in Montreal, Canada late last year, [countries agreed that by 2030 at least 30% of land and the oceans would be safeguarded](#) (currently 17% of land and 10% of marine areas are under protection). A weakness in that policy, as Dasgupta argues, is that without further restrictions it will put “[tremendous pressure](#)” on the remaining 70 per cent. Moreover, as he explains, “the trouble is, they are connected, they diffuse.”

## The role of regulators

Dasgupta advocates a new international institution that would charge ships for the use of the oceans, raising tens of billions of dollars a year. The funds could go to pay countries with globally vital biodiversity resources to conserve them. In effect, this would be an extension of national “payment for ecosystem services” policies, which are now commonplace. ‘Whenever we think in terms of reducing our pressure on nature, it’s always seen as a cost whereas it would actually raise money because it’s a free good. It should not be free and it belongs to all of us,’ Dasgupta says.

Geopolitics means that’s not going to happen, as he concedes. But can lenders and investors help, as they are now being asked to do in combating climate change?

Dasgupta says it is vital for the financial sector to act on biodiversity: “Take it really seriously and start working on it now. As a first step, banks should hire ecologists to work with them.”

Financial regulators are taking note. A pioneering joint report from the Dutch central bank, which also supervises financial institutions, together with the environmental agency in 2020 highlighted the financial exposure of the Netherlands to nature-related risks. [It found that more than a third of investments held by Dutch banks, insurers and pension funds were highly or very highly dependent on one or more ecosystem services](#), especially those providing surface water.

But no country is an economic island and the financial sector in western economies is increasingly exposed to the ecological risks in importers’ supply chains. Since such risks are typically correlated, companies find it hard to insure against them.

Dasgupta argues that compulsory disclosure of compliance with environmental standards in sourcing from primary producers would help. Action by governments is now crucial: “All the evidence is showing this huge ecological overreach, externalities are fundamental and markets can’t cope with it,” he says.

## Conserve and protect nature

There is plenty for mainstream economists to disagree with in Dasgupta’s approach. He stresses our lack of knowledge about the biosphere. For example, only a small proportion of the 8m to 20m species have been recognised and named. But one could argue that his framework does not sufficiently take into account the dynamic growth in human knowledge, not just about the environment but much else besides.

Even so, there is mounting pressure to conserve and protect nature in all its dimensions. Bankers and insurers will be expected to play their part in this effort. In that collective endeavour, economists and ecologists will need to learn from one another and combine forces. That’s the central and welcome thrust of Dasgupta’s pioneering work. ■



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