



The ecosystem services — and value — provided by mangrove forests range from coastal protection from storms to natural fisheries.

ENVIRONMENTAL ECONOMICS

Pricing the planet

Nick Hanley weighs up a study that probes the economic value of nature.

Can economics help to save us from environmental catastrophe? In *Natural Capital*, economist Dieter Helm offers a timely reminder of the contribution that his discipline can make to understanding and solving environmental problems. The book hinges on the economic value of gifts of nature, from oil fields to wetlands, which in combination with inputs such as labour and produced capital provide humanity with valuable benefits from ecosystem services. Helm's main message is that the apparent conflict between economic growth and environmental quality can be managed by preventing declines in this natural capital.

The concept of natural capital has quite a backstory, although Helm does not delve into it too deeply. The environment was of central concern to the classical economists of the nineteenth century. The scarcity of productive agricultural land and coal reserves, for instance, was seen as a brake on economic growth by pioneers such as David Ricardo and John Stuart Mill. Slightly earlier, Thomas Robert Malthus had famously predicted a gloomy future as a result of the conflict between an exponentially growing human

population and the fixed amount of farmland, which meant that food supplies could not keep up. However, disaster failed to materialize, population and average living standards continued to rise, and the environment largely disappeared from the thinking and writing of economists, give or take the contributions of Arthur Pigou on the economics of pollution in 1920 and Harold Hotelling on the management of non-renewable natural resources in 1931. By 1970, environmental problems were no longer the professional concern of economists.

Then everything changed. In 1972, environmental scientist Donella Meadows and co-authors published *The Limits to Growth* (Universe), commissioned by the Club of Rome think tank. This influential book used systems dynamics modelling to predict probable future paths for global population, food production and pollution. Some of these



Natural Capital: Valuing the Planet
DIETER HELM
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predictions recalled Malthus. This, along with the two oil-price peaks of the 1970s and growing public interest in the damaging implications of economic growth, returned the environment to centre stage in economics. *The Journal of Environmental Economics and Management* was founded in 1974.

The late, great David Pearce was perhaps the first academic economist to convince people outside the field of its relevance for understanding the relationships between people, money and the environment — and for developing tools to help to manage the apparent conflict between economic growth and environmental quality. The influence of his 1989 *Blueprint for a Green Economy* (Routledge), co-written with Anil Markandya and Edward Barbier, reached beyond academia and government to the informed public. Pearce had three main messages. First, economic benefits from the environment need to be measured and recognized. Second, economics could improve environmental policy by developing market-like mechanisms through which a price could be put on pollution. Third, national accounting conventions needed to show up the gains and losses in a country's natural capital over time.

CHRISTIAN ZIEGLER/GETTY

These ideas are all taken up and expanded in *Natural Capital*. This is important, because the empirical evidence is that most countries do not account for the economic value of depreciating natural capital; nor have they put in place measures to hold the line. Helm's arguments bring the main problem raised by Malthus into a sharp new focus. Given current rates of world economic growth, incredible numbers of people, demands for resources and levels of pollution now loom, increasing pressures on ecosystems and biodiversity. Evidence is growing of the importance of ecosystem services such as clean water and pollination, and of the erosion of human well-being that results when those services are disturbed. That does not mean that economic growth should be stopped (even if that were possible), but it does demand a fundamental change in government policies globally.

As Helm drives home, these changes relate most fundamentally to a new goal of economic policy: keeping natural capital from declining. Many of the assets that make up natural capital deliver benefits that the market does not value, but which are important for well-being. So adopting such a policy would mean that as a country depletes its oil reserves, for example, it would reinvest a proportion of the returns from this activity in promoting renewable alternatives.

That demands a number of moves. A country must change the way it undertakes its national accounting to reflect the year-on-year changes in the value of all of its assets, including natural capital; it must tax pollution while removing perverse subsidies for activities that deplete natural capital; it must enforce strict limits on the use of renewable resources to maintain them above critical thresholds; it must require general offsetting of the negative effects of infrastructure projects. Moreover, it must increase the provision of public goods such as national parks and green spaces.

These are not new ideas (most were discussed in *Blueprint for a Green Economy*), but *Natural Capital* provides a very useful update and pulls together the past 20 years of economic insight in language that non-economists will easily understand. For example, since 1989 economists have made great progress in estimating the values of ecosystem-service benefits. Helm has thought carefully about the practicalities of tracking changes in natural capital, of funding reinvestment in habitats, and of prioritizing actions through a focus on thresholds. As such, the book is a valuable contribution, written by an author who knows his subject and cares deeply about his message. ■

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LIBRARY SCIENCE

The word on our archival future

Michael Lesk assesses a work on the fate of the library at a time of economic and technological upheaval.

John Palfrey loves libraries and is optimistic about their future. In *BiblioTech*, he describes that future. In his vision, public libraries, as a mainstay of informed democratic societies, will share access to online material as well as to the physical books and spaces that resonate emotionally with users.

Palfrey — who helped to set up the Digital Public Library of America at Harvard University in Boston, Massachusetts — shows that most libraries are facing a “perfect storm”: waning use, inadequate resources and users satisfied with easy personal access to online information. Although the book does not focus on academic libraries, US research libraries saw a 69% decline in the number of queries handled between 1991 and 2012. US research librarians answer some 7 million questions each year; Internet search engines handle that many every two minutes. Academic-library budgets are shrinking: spending has dropped from 3.7% of the total budget of a typical US university in the early 1980s to 1.8% in 2011.

Roughly half of an academic-library budget is spent on acquisitions, and that is increasingly consumed by journal-subscription prices. However, open-access publishers such as the Public Library of Science (PLOS) provide information with no reader fee, changing the economics entirely.

As Palfrey notes, school libraries — which still have a key role in teaching scholarly habits and propelling children towards a life in science — are suffering, often losing their staff. The 2010 Google Map ‘A Nation Without School Librarians’ is a grim indicator of the trend, showing the districts that have eliminated certified school-librarian positions. As for public libraries, the Pew Research Center reports that only about half of people in the United States used one in 2013. Palfrey is fearful that in the future, not everyone will have access to reliable information, and he is unconvinced that poorer people and nations will

“The school library should be as important as the school sports team.”



BiblioTech: Why Libraries Matter More Than Ever in the Age of Google
JOHN PALFREY
Basic: 2015.

have equal access to information online. The increasing commercialization of information raises further barriers. Palfrey is especially concerned about the copyright status of out-of-print books. Nobody makes money from them, but legal problems such as the dilemma of ‘orphan books’ (volumes in copyright, but for which the owner is unlocatable) prevent libraries from providing such volumes online. Finally, Palfrey, echoing the concerns of Google vice-president Vint Cerf among others, feels that digital preservation of library holdings is riskier than traditional methods. In my view, this is not entirely accurate: a single paper copy can fade or go up in smoke, whereas multiple digital copies can stay safe and affordable.

At a time of austerity and belt-tightening, will governments recognize the importance of libraries and librarians? The school library should be as important as the school sports team, I feel. Political will is essential, as is innovative energy among librarians. Palfrey hopes that conventional and new library technologies will sit side by side. This is not common in technological change: car-rental companies do not run livery stables. I suspect that a more likely future is that libraries (and museums) will be divided into the ‘wholesalers’ that have large historic collections, such as the US Library of Congress or the British Library, and the ‘retailers’ such as university libraries, which serve faculties.

Anyone interested in the future of libraries — and whether there is one at all — will find much to mull over in this book. I hope its effectiveness will match its enthusiasm. ■

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