

Working with nature

We all know that technology is a vital weapon in our efforts to tackle climate change, but as Caro Cowan argues, we are forgetting about a key technology that is cost effective, readily available and tested over hundreds of years: nature's technology.

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Climate change is the greatest long-term threat to global biodiversity. Against a background of degraded habitats, increasing species loss and growing levels of habitat loss, climate change will only serve to make these problems worse. It's a stark message. And it gets worse – climate change is already affecting biodiversity. The IPCC found that 89 per cent of observed biological changes in Europe were consistent with global warming. In the UK we have seen the leafing date of oak trees advance by three weeks. In Costa Rica the golden toad is being held up as the first climate change extinction. As conservationists we know that we need urgent action to prevent the worst damage if we are to retain the richness and variety of biodiversity that currently exists.

But it is not just the conservationists who should be acting on this stark warning. Without healthy and resilient ecosystems society will fail in its efforts to adapt to the consequences of climate change. Increasing the ability of ecosystems to cope with climate change in turn increases the resilience of society in the face of climate change.

Economics of ecosystems

Our knowledge of the role ecosystem services play in supporting human wellbeing

has increased immeasurably over the past few years, in large part due to the work of the 'Millennium Ecosystem Assessment' and more recently 'The Economics of Ecosystems and Biodiversity'. These studies have demonstrated the huge value, culturally, socially and economically, that biodiversity provides to society. And this value is increasing as society starts to experience the effects of climate change. Drier summers and changing rainfall patterns means more droughts. More intense precipitation is causing increased flooding. Warmer temperatures will reduce water quality. Soil erosion and greater run-off will affect water and agriculture. Changes to ecosystems caused by climate change will have impacts on people's everyday lives.

Nature's technology

In the climate change debates we continually hear calls for new technologies to 'save' us from climate change. Technology is one of the fundamental pillars of the new UNFCCC agreement. There is clearly a role for technology in adaptation – we wouldn't want to see London or the Netherlands without their flood defences or nuclear power stations left to fall into the sea. But in many cases the technology is expensive, inaccessible to the poorest

or doesn't even exist yet. But there is one technology that is cheap, readily available to all and has been shown to do the job over hundreds, if not thousands of years. Nature's technology (known as ecosystem-based adaptation) provides us with a simple way to tackle the commonest consequences of climate change. By managing ecosystems effectively and sustainably we can reduce flooding, increase water supply and quality, cool our cities (see page 40) and at the same time contribute to the reduction of greenhouse gases. And these aren't the only benefits. A healthy natural environment also reduces air pollution, provides habitat for plants and animals, improves health and wellbeing and provides places for recreation and tourism. Over the past year there has been a growing awareness and development of this concept of 'ecosystem-based adaptation'. Twelve months ago it was a virtually unheard of term, although many conservation organisations have been talking about the role the environment can play in helping us adapt for some time. Work by IUCN, The Nature Conservancy and individual country organisations such as Natural England has ensured that discussions of adaptation, and in particular adaptation strategies, include ecosystem based options.



It is widely recognized that working with nature to protect, enhance and restore ecosystems can increase societal resilience to the effects of climate change. This concept was given high level support through the CBD's Ad Hoc Technical Expert Group (AHTEG) on biodiversity and climate change held in late 2008/early 2009. The group's report highlighted the role that managing biodiversity and ecosystem services can play in supporting societal adaptation. They stated that "maintaining natural ecosystems (including their genetic and species diversity) is essential to meet the ultimate objective of the UNFCCC because of their role in the global carbon cycle and because of the wide range of ecosystem services they provide that are essential for human well-being". There are now efforts underway to ensure that ecosystem-based adaptation is recognized in any new agreement that emerges from the UNFCCC meeting at Copenhagen, allowing access to funding in particular for the most vulnerable countries.

Ecosystem-based approaches in Europe

But nature's technology is not just a solution for developing countries. A recent



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workshop of European Nature Conservation Agencies identified a number of examples of ecosystem-based approaches which are already taking place across Europe – even if they haven't been labelled as such. Working with nature can bring similar multiple benefits for European countries and citizens, potentially reducing adaptation costs as well as enhancing mitigation efforts.

For example, as we worry about increased coastal erosion and sea-level rise it may seem sensible to build bigger concrete defences. But these are expensive, they damage habitats and they can in some cases make the problem worse by stopping natural processes which both dissipate tidal energy and allow coastal recharge down the line. Although we recognize that some places must be defended by concrete walls, it is not a sustainable national response in all locations. An alternative is to (re)create more salt-marsh and restore coastal floodplain habitats, which provides cost-effective protection against flooding, improves water quality and provides wetland habitats for everything from birds to commercially valuable fish nurseries and, of course, high quality landscapes for people to enjoy.

This is a sustainable adaptive response centred around a healthy natural environment. There have been over twenty realignment projects in the UK designed either for habitat conservation or flood risk management or both, the largest of which, at Alkborough on the Humber estuary, protects 90,000 hectares of land and 300,000 people from sea-level rise. The financial benefit of this flood protection is estimated to be more than £400,000 a year. In addition, it has produced new recreation opportunities to benefit the local community both directly through increased tourism, as well as significant conservation benefits.

Lower Danube Green Corridor

In Central and Eastern Europe, WWF have been working along the length of the Danube to restore natural floodplains. They found that since the start of the twentieth century over 80 per cent of the original

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floodplain area had been lost due to agriculture, power production and building of canals for navigation. As well as the adverse effects on biodiversity with loss of important habitat for breeding birds, there have been serious socio-economic impacts as villages flood more frequently, ground water recharge is reduced and water quality suffers. Working with local partners, WWF have instigated a programme of wetland restoration which is helping to regain and retain this vital adaptive functions – reducing the risk of floods and droughts to the local communities, allowing the recovery of fish nurseries which provide commercially, as well as ecologically important species and contributing to improving the state of biodiversity. Restoration of the 37 sites that make up the Lower Danube Green Corridor is estimated to cost €183 (\$299) million, but will likely lead to additional earnings of €85.6 (\$120) million per year. Before the restoration, the 2005 flood cost €396 million in damages. This value will only increase as climate change impacts increase – leading to rising flood damage costs.

Filling ditches with tree trunks

In Finland the state Natural Heritage Service, working with Regional Environmental Centres, has begun a programme to un-ditch and restore mires and restore native forest. These areas had been badly affected by drainage and cutting for forestry and road construction from the 1950s. Over





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two thirds of the country's mires had been drained by the 1990s and much of the forestry cover was homogenous young stands in isolated patches. By filling in the ditches with tree trunks, vegetation and peat from the same mire and prioritizing restoration of selected forest sites to allow natural succession a number of climate adaptation benefits have been realized. Flood management is improved as restored mires are better able to hold water during intense rainfall. At the same time ground water levels are stabilized and water quality improved. Air quality has improved and management of the forests using more traditional techniques reduces the threat of invasive species taking a hold. There are also carbon benefits as well as improvement in rural livelihoods as local management is re-introduced. Not to mention the benefits for biodiversity as habitats are restored and enlarged.

With climate change already having an impact on biodiversity and human society, and with those impacts predicted to increase –perhaps faster than we expect–many will argue that biodiversity conservation is a luxury we can ill afford as we struggle to provide food, clean water and housing for a rapidly growing population. But, as these three examples demonstrate, we can't afford NOT to protect biodiversity and ecosystem services. Conserving and restoring ecosystems is a cost-effective and accessible way to adapt to climate change and can also have multiple economic, social and environmental benefits. We cannot tackle biodiversity loss without addressing climate change, nor can we address climate change without tackling biodiversity loss. We must take urgent action to improve our degraded wildlife and ecosystems - not only so that we can retain the inherent character and quality of our landscape, but because we cannot afford not to if we are to ensure that society can retain a high quality of life as our climate changes.

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