Harmony and Natural Capital

Tony Juniper

From a talk at the Harmony, Food and Farming Conference, organised by the Sustainable Food Trust, Llandovery College, 10 July 2017.

It's nine years to the week since Ian Skelly and I began working with the Prince of Wales on his book, *Harmony*, but we're still seeing such momentum being carried forward by this piece of work.[1] It is truly visionary and, I have to say, working on this book was one of the most important learning experiences of my life. It really opened my eyes to many things that were previously invisible to me and, having spent so many years dwelling in the world of conservation, it was really quite a shock, actually, to engage with the big elements of what I'd been doing. I'd been neglecting really quite major dimensions of the whole piece.

Patrick Holden has mentioned the separation between the worldly and the spiritual as being one of the main themes that we dealt with in *Harmony*. Another is the separation between people and the natural world. It's on that subject that I'd like to share a few remarks because, following the publication of *Harmony*, I've spent the last seven years working very intensively on the idea of natural capital, a concept that flowed directly out of this book.[2] Now, natural capital is slightly controversial amongst the environmental community because it talks about a parallel between financial capital and the natural world: if we look at biodiversity, or a set of ecosystems, we realise that if we husband them and look after them, we can get dividends long into the future. It's rather like making a financial investment: if we blow our financial capital, we no longer get dividends or interest. And the parallel we try to draw in *Harmony* is between the way we look at the natural world as something that can be endlessly abused and liquidated in order to meet short-term human needs and the extent to which we can engage with and manage it in productive and beneficial ways: if we preserve natural capital we get dividends, if we blow it then we don't.

One of the problems of the modern world is that we have become so disconnected from nature. The idea of natural capital is a way of reconnecting people with the reality that that we are one hundred per cent dependent on healthy natural systems for our wellbeing. When it comes to food and farming, natural capital is an important factor in terms of how we need to plan for the

future. There are many levels to this, of which perhaps the most fundamental of all is soil.

When we walk across a piece of grass, many of us probably don't think about the ecosystem beneath our feet, but it is one of the most complicated and profound systems on planet Earth. Take a tablespoon of soil, take it to the lab, sit down with an electron microscope and you might count six billion individual organisms: nematodes, bacteria, viruses, micro-fungi, all operating in a complex set of relationships that is enabling the soil to discharge a series of critical functions, including those which support human well-being. In addition to water retention and holding billions of tons of carbon, of course, soil recycles nutrients, enabling plant growth, which is then the basis of agriculture.

These ecological relationships are fundamental and profound, yet we utterly disregard them. It's common for people to use the cultural label of 'dirt' when referring to soil, this particular miracle of nature. And with that in mind, we abuse it, we concrete over it and, of course, we currently farm it in ways which are utterly unsustainable.[3] This lack of sustainability is seen in a range of really alarming trends. I recently produced some material looking at soil damage across the world and the conclusion was that about one-third of agricultural soils are being either highly or disastrously degraded.[4] Organic material is destroyed and not replaced, and soil is compacted, eroded, and washed into the sea.

I guess sometimes we're inclined to think of the problem of soil erosion as being particular to the tropical countries where so much deforestation is taking place but, actually, it's happening right here on our doorstep. One remarkable reminder of that for me, a couple of years ago, was when the International Space Station passed over southern England in March 2014, following a very wet winter. The astronauts, looking down from 300 kilometres up, remarked on the brown fringe lying around the British coast, especially around the big river estuaries. One of the astronauts described this brown fringe as 'runoff'. Actually, what he might equally have said was 'soil' because what he saw was millions of tons of topsoil which had departed the land, travelled across fields, into streams and then, into rivers and finally, into the ocean.

If you think about the way in which we farm, then just look out of the train or car window and you'll see plough lines going straight down the side of hills into water courses: when it rains, the soil leaves the fields. This is utterly insane and yet it is one of the consequences of the ways in which we meet the challenge of a rising population through industrial farming methods. These practices are grossly destructive.

Aside from the impact of farming practices on the soils, and the way in which

we are ploughing and leaving ground bare and exposed over the winter, we have moved from mixed farming to industrial monoculture. We have removed many features of local ecosystems: wetlands have been drained, grasslands ploughed, hedges removed and woodlands grubbed up, all in order to make bigger and bigger fields, exacerbating the problems of soil depletion. At the same time as we've done that, we have been depleting another bit of natural capital: biodiversity, above-ground. We have not only been simplifying the soils, but also the ecosystems on top. Of course, those ecosystems are also critical for food production, not least through the activity of pollinators. Most of the flowering plants on Earth today are insect-pollinated, including two-thirds of the world's crop plant varieties.

As a result of the loss of habitat and the use of toxic chemicals, those insect populations have been declining and, as a result of that, food security is being imperilled. We have calculated the value of these kinds of natural services, and when it comes to pollinators, a technical study published in 2010 estimated that we are receiving something like 190 billion dollars of value per year from insect pollination.[5] Now, these kinds of figures are sometimes controversial and they are quite hard to work out in very specific ways. However, we can get an insight as to how those numbers might actually stack up through specific examples. One that really struck me is photographs taken in south-western China where fruit farmers in the springtime climbe up apple trees with paintbrushes and move the pollen between the blossoms by hand. They have to do this because all the insects, which would otherwise have moved the pollen, have been killed by industrial quantities of chemicals that have been deliberately deployed in order to control pests. They did control pests but, obviously, at the same time, they killed many of the pollinators. And while we are killing pollinators in an attempt to reduce pest attacks, we are also removing beneficial animals from the landscape.

Many recent studies tell us how we derive enormous benefits from the many natural predators of pest species. One study that struck me as being particularly illustrative was an experiment conducted in a Dutch apple orchard whereby half of the orchard was covered with mist nets, a very fine netting designed to prevent penetration by songbirds, but still allowing moths to lay their eggs and caterpillars to hatch - which damage the fruit.[6] Then, in the other half of the orchard, nest boxes were fitted to encourage great tits to come and nest in there. To cut a long story short, in the half of the orchard where the birds were present there was a fifty per cent higher, high-quality apple harvest compared to where they were excluded.

In these kinds of instances, where we actually begin to gather data, we can reveal hidden values in natural capital that are worth many billions of pounds

when translated into financial capital. In the case of those birds in the Dutch orchard, it seems to me that we still lack the proper tools to be able to calculate the kinds of values that are being provided, whereas we can be very adept at putting cash values on the impact of pesticide sales and use on GDP and competitiveness. When we start to look at the other, less obvious values of natural capital, we find enormous negative impact coming from the way in which we're farming in order to make profit in terms of financial capital. As a result we are removing natural capital and, in the end, we will begin to undermine our food security.

Soil health, the recycling of nutrients, the activities of pollinators, the activities of natural pest controllers, all contribute to agriculture in ways that have real economic value. Then, on top of all of that, of course, is the ultimate limiter of agriculture and land: the availability of fresh water. In our modern society we're inclined to think that water comes out of taps or, increasingly, out of bottles, including plastic ones. Yet the provision of water is one hundred per cent governed by the activity of natural systems, ranging from the seeding of rain clouds by plankton in the oceans, through to forests and wetlands which store purified water, and then to the recycling of water on land by ecosystems. When we begin to damage these systems on a large scale, it can have an impact on water security. Over recent years, we have seen several examples of this, including a very long period of drought that affected food production in the La Plata Basin of Northern Argentina, Paraguay, and southern Brazil in 2014-15. And the drought, in turn, was linked with the destruction of tropical forests in the Amazon.[7]

Recently, I travelled to West Africa in order to understand the sustainability of cocoa production there. I was very struck by conversations I had with local farmers, government officials and major cocoa and chocolate companies, all telling me the same story about the impact on yields over recent years of prolonged and severe drought.[8] And, indeed, droughts of unprecedented severity and length. And this, they all put down to the loss of the tropical forests in that part of the world. It was striking to note the highest cocoa yields that remained on the Ivory Coast are now clustered around the Taï Forest National Park, which is the last piece of intact tropical rainforest in that part of the world.

We are also beginning to understand the idea of so-called sky rivers, which transport water from tropical forest ecosystems, which themselves act as a kind of a biological pump, over long-distances. As water is dragged off the ocean, over to the interiors of these continental areas covered in tropical forest, it falls as rain which is then re-evaporated back into the atmosphere. As the water rises as vapour, it condenses and its volume decreases, and, as it does so, it pulls up more air from below, creating long-distance water transfers over thousands of miles.

Indeed, if we travel to the grain belt of North America, the Great Plains of South Dakota and North Dakota, we find water which has travelled north from the Amazon and Central America on these very long-distance air currents, powered as they are by the tropical rainforests. These are fundamental dependencies that we ignore at our peril and, as we look forward to the future of farming, it's going to be essential that we move beyond the idea that technology can solve all of our problems. We must understand that the reality that we inhabit, including the entirety of our financial economy, including farming, is dependent on nature. To ignore this involves us in an unsustainable and destructive crisis of perception. If we destroy the soil, remove pollinators, take away natural pest control and erode the natural systems that purify and renew water, our farming systems cannot go on. We need to change the way in which we look at all of this, not only by developing sustainable food production, but in order to be able to limit and cope with the consequences of climate change. To accomplish this we need to increase organic matter in the soil, put more carbon in to the soil and less into the atmosphere, and conserve the forests, especially the tropical rainforests, that are so important for the planet's hydrology.

Just to conclude with one final thought, aside from the crisis of perception in which humanity sees itself as outside nature, rather than as a part of it, there is also a crisis of economics. If we are going to look forward to a more sustainable and durable future for farming, we need to begin to measure things differently. Cheap food has become the totem for policy-makers and food companies across the world but, actually, it's not cheap at all, not once we factor in the multi-billion pound damage being done, day in and day out, to the systems that sustain agriculture. We therefore need to start measuring natural capital and coming up with a more rational assessment of economic success. If we do that, I think we can go a long way towards sustaining both farming and life on Earth.

Notes

1. HRH the Prince of Wales, Tony Juniper and Ian Skelly, *Harmony: A New Way of Looking at our World* (London: Harper Collins, 2010).

2. Also see the Natural Capital Coalition at https://naturalcapitalcoalition.org/.

3. Tony Juniper, *What has Nature ever Done for Us?* (London: Profile Books 2013), pp. 35-41.

4. See Jonathan Watts, 'Third of Earth's soil is acutely degraded due to agriculture', *The Guardian*, 12 September 2017, https://www.theguardian.com/environment/2017/sep/12/third-of-earths-soil-acutely-degraded-due-to-agriculture-study (Accessed 25 September 2019), and United Nations Convention to Combat Desertification, *Global Land Outlook*, 1st edition, 2017, https://knowledge.unccd.int/glo/GLO_first_edition.

5. Joshua Bishop, Nicolas Bertrand, William Evison, Sean Gilbert, Annelisa Grigg, Linda Hwang, Mikkel Kallesoe, Vakrou, Cornis van der Lugt, and Francis Vorhies, 'The Economics of Ecosystems and Biodiversity Report for Business', TEEB – The Economics of Ecosystems and Biodiversity Report for Business - Executive Summary 2010 (Malta: Progress Press, 2010) at https://www.unepfi.org/fileadmin/biodiversity/TEEBforBusiness_summary.pdf [Accessed 10 July 2017]; Tony Juniper, 'Why the economy needs nature', *The Guardian*, 9 January 2013, https://www.theguardian.com/environment/blog/2013/jan/09/economy-nature [Accessed 10 July 2017]; Also see, Tilo Arnhold, 'Economic value of insect pollination worldwide estimated at 153 billion euros', Helmholtz Centre for Environmental Research - UFZ, 15 September 2008, https://www.ufz.de/index.php?en=35639 [Accessed 10 July 2017]: The value of pollination was €153 billion in 2005 for the main crops that feed the world and pollinator disappearance would translate into a consumer surplus loss estimated between €190 to €310 billion.

6. Tony Juniper, *Nature?*, pp. 139-40.

7. Jonathan Watts, 'The Amazon effect: how deforestation is starving São Paulo of water', *The Guardian*, 28 November 2017, https://www.theguardian.com/cities/2017/nov/28/sao-paulo-water-amazon-deforestation (Accessed 25 September 2019).

8. Tony Juniper, *Nature?*, pp. 167-8.