

The Economics of Natural Capital

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David Shukman

Hello, everybody. My name is David Shukman, I'm science editor at BBC News. I cover things scientific and environmental. I've also attempted to cover the issue of 'natural capital'. When I first raised it with editors a few years back, there were quite a few puzzled expressions. Ecosystem services, natural capital – what on earth are you talking about? I tried to explain. I did get through, but I wish now I'd had Dieter's book with me at the time. It might have made that task easier. It is a concept that some people find hard to grasp.

Before I introduce Dieter properly and get into the substance of this session, I should say that we're on the record. It's not under the Chatham House Rule. If you're tweeting, it's #CHEvents. I sent a tweet before we started, to say this was happening.

Let's get straight on with this. Dieter Helm, many of you will know, is professor of energy policy at Oxford. He is well known to many of us in the media because we often turn to him for an economic take on environmental questions. I last turned to you on the question of offshore wind and renewables, and that stirred up something of a hornet's nest with many constituencies. More recently, Dieter has been involved in the whole issue of natural capital, chairing the Natural Capital Committee. One question I've got, if none of you raise it when we get into the Q&A, is what's going to happen next to the Natural Capital Committee, which was given a three-year term. I think we might explore that with Dieter.

Dieter, the floor is yours for the next 25 minutes or so, setting out your arguments. I can commend this to you: you won't get all of this into the talk, I'm sure, but perhaps the key points and conclusions to trigger a debate. So please join me in welcoming Dieter to the podium.

Dieter Helm

Thank you, David, for those kind words of introduction. Thank you very much to Chatham House for giving me the opportunity to talk about natural capital.

The reason I took on the Natural Capital Committee, and the reason why I wrote the book, is because I regard the broad territory of natural capital and biodiversity as one of the two great challenges that face humanity over this century. Climate change, I've worked on extensively and written about that. This seems to be the upper part of the environmental challenges we face. I've tried to provide a comprehensive overview of how we might think about that problem rather than provide enormous and particularly empirical detail.

It's really quite useful to think about how the problems of biodiversity and natural capital differ from climate change. What struck me very early on was that climate change, as an intellectual problem, is incredibly simple compared with the problems of biodiversity and natural capital. Don't get me wrong, I'm not trying to suggest it's unimportant. But just intellectually and analytically, it's about a few gases and it doesn't matter where you emit them. We measure those gases, we're concerned about the amount of those gases. There's a lot of climate modelling to work out the relationship between those gases and climate, and to look at some of the impacts that follow from that. But nearly all the hard stuff is about the design of the policy to address the problem.

When it comes to things like biodiversity, it's pretty hard to even agree what the units are. We're talking about species – which ones? Are we talking about habitats, are we talking about ecosystems? Are some

more important than others? These are, in themselves, difficult problems to get a grip on how to take the debate forward and how to improve things.

The other thing which, in a sense, is shared in common between the natural capital/biodiversity issues and climate change is the sheer scale of the impacts. I don't want to document in any detail the scale of the destruction that's underway, but many of you will be aware that a third of the mangrove swamps have gone, much of the rainforest is gone, coral reefs are being cemented over by the Chinese in the South China Sea as well as being damaged in lots of other locations around the world. It's not hard to put a category out there and then link that to the sixth great extinction, which is the one we're experiencing, to see the scale of these problems we confront.

But both climate change and this natural capital territory all have to be set in the context that in this century, at our current economic growth rates, the world economy will be roughly 16 times bigger by 2100 than it is today. Think of the world's economy today and then think of 16 of those, and all the consumption that goes with it. Think what you'd spend your money on if you had 16 times your current income. We're going to add at least 2 billion more people – on the UN's latest updates, perhaps 3 billion more people – over that period. So those underlying economic dynamics and population dynamics is the context within which this is set.

So let me say a little bit about the framework that I try to lay out in the book. Natural capital arrives at the local, national and global levels, in different components and different forms. It's very easy to define: it's everything nature gives us for free. I can be much more sophisticated about the argument but basically, it's what's endowed to us, the endowment we get from nature, which is there for us to exploit or not to exploit.

A really important distinction early on, and this is all about getting traction on the problem so we can think about how to go about analyzing it and how to put policies in place to improve things. A really important distinction is between renewables and non-renewables. This isn't about questionable things like wind farms and solar panels. This is a distinction between those things nature gives us for free once, and they get used once, and that's the end of the game – think North Sea oil and gas – and those things nature gives us for free which nature keeps renewing forever, or until evolution catches up to them, unless we take them below critical thresholds where they're no longer renewables.

Natural capital approaches these two things in very different ways. A non-renewable: someone's got to use it so it's basically a question of intergenerational equity. What compensation should one generation who uses non-renewables pay to the next? The shortcut to that is: they should have some sovereign wealth fund or, as I argue, some nature fund to set aside the economic rents from that depletion, which are available to future generations. Think what Norway does with its oil and gas, and think what we've done with ours. Our generation has had a nice party – we've spent the lot. The Norwegians have left something to the next generation. I'll just put aside there's 4 million of those and 60 million of ours, and there are different kinds of problems to address. But those problems are very tractable, very well defined and almost always we do not do the intergenerational thing properly.

The other category, which is the one that matters, is renewables. It's the stuff that nature gives us for free forever, provided we don't take it below a threshold. Think of herring in the North Sea. Economists value this stuff very badly. Provided we don't over-fish the herrings, there are going to be herrings next year and in ten years' time and in a thousand years' time and a hundred thousand years' time. We can take the surplus above the threshold and nature will still keep doing that. Think about the integral between the threshold and the amount for time infinity, and the only way you can bound that value is if you have some

discounting rate to say people in the future are less important than ourselves. The value of that is truly extraordinary. Losing the option of that is not just an option today – there's no herring on the plate, no pickled herring tomorrow – it's forever there's no herring on the plate, unless you think there's some genetic engineering will solve that problem.

So these things are very valuable. The natural assets – to make this problem really tractable – that we're particularly interested in is renewable assets which are in danger of going below the threshold, so they're no longer renewable – losing that option forever. So what we want to focus on is the assets at risk, and put our laser attention on those assets to ensure that those ones we don't lose as a first priority. And clearly, we are. We're going to extinguish perhaps half the species on the planet this century. So when you think about the economics of this, this is a crazy option to lose. There might be some things, some viruses and so on, that you want to get rid of, but in general this is irreversible and one wants to take those values seriously.

The British government, and indeed *Brundtland* in the sustainability definition, made the objective that future generations should have assets at least as good as the current generation. I translate that across to saying future generations should have natural assets at least as good as the current generation. The argument for that, which upsets many economists, is that the rot has gone so far that there really isn't enough substitution left in terms of physical capital and human capital to make up for even more destruction to the natural capital. The British government's objective in the 2011 white paper is absolutely clear: they are going to ensure the natural environment is not just no longer in decline but the next generation will have a better natural environment than we do. That's enshrined in the white paper as government policy. By the way, that's the basis on which the Natural Capital Committee operates.

If you say that, the corollary of that is that you must invest sufficient in capital maintenance to ensure that the aggregate of natural capital does not decline. We're going to go on damaging some natural capital – you can't build 300,000 houses a year, you can't build High Speed 2, you can't do the huge amount of economic development that's going to take place without some assets being damaged. There's no option. But you might want to say, and it's the argument I advance in the book, that whereas you might damage some assets, you should always compensate for that damage such that the aggregate of natural capital does not decline through time.

I set out different rules of how that might be formalized, as the essence of what is an environmental policy set of objectives in this territory. There's room for argument about it. Some people think that if we have a lot more iPods, we may not have to worry too much about losing the swallows. Other people think that trade-off is a little bit tighter. I certainly do, although when I made this comment to some of my undergraduates, I was horrified that quite a lot of them didn't know what a swallow was, which really did quite surprise me. Which demonstrates, by the way, that old adage 'you don't know what you've got until it's gone'. You don't know you've lost it if you never knew it was there in the first place, and that's true of quite a lot of our natural environment.

So if you want to hold the aggregate of natural capital intact, to ensure the next generation has a set of natural assets at least as good as this generation, you have to spend money on capital maintenance. This applies not just in the environmental territory, it applies across the infrastructures. It's quite a general result. If you want the next generation to have a transport system at least as good as the one we've got, you want them to have an energy system at least as good as the one we've got, you want them to have a river system at least as good as the one we've got, you have to do capital maintenance. These assets are assets in perpetuity so there's no depreciation.

You might think that sounds rather accountingly arcane and academic. It's absolutely radical in its implications. When George Osborne presents the next set of national income accounts, he should subtract from the notional balance the capital maintenance to maintain the assets intact, just like he should subtract from current revenues the amount of money to fill up the potholes in the road so that we don't pretend we're better off by not repairing the roads. Similarly, it should be the repair of the capital stock in the infrastructures more generally and in the natural capital stock very clearly.

This applies to non-renewables and renewables. If you restate national income accounts for the period of the whole of the North Sea oil and gas, and all of the environmental things I'm describing, you will discover that GDP growth, for example in Thatcher's period (peak to peak or trough to trough), which was formerly 1.7, is not 1.7. That was not the growth rate. That's not an anti-growth argument. It's simply saying what you measure without doing the capital maintenance is an unsustainable growth path. And since it's unsustainable, it will not be sustained. That means that growth in the future will be lower, that people will be worse off because this maintenance has not taken place.

So in the book I spell out what the accounting framework for this is, and separately the Natural Capital Committee has done a great deal of work on how to do these sorts of calculations and how to apply them in the context of assets at risk, thresholds, limits, benefits – all the technicality stuff which is absolutely vital to working out whether in fact you are maintaining these assets intact, and telling you where the revenue flows should go. If you look at the Natural Capital Committee's website, you'll find some really interesting papers by various other members on different dimensions of this, in addition to the treatment I tried to give them in the book.

If we say that we're really laser-focused on the renewables, that we want to make sure they don't go through the thresholds, that those are the assets at risk – but we also want to make sure that the rents from the non-renewables are transferred between generations – what policies would follow? The book is designed to translate these general ideas and objectives into a policy framework that's also funded. There are basically three or so policies that you would focus on, if this is what you wanted to do to maintain those assets intact.

The first is very straightforward. It's only an elaboration of what property rights are anyway. It is that if you damage natural capital, you should pay compensation. If you come and park your car all over my lawn, I can sue you for the damage you do to my lawn. Any property right that you have, that other people invade and damage, you're entitled in law – that's what a property right is – to have put right. This is just an elaboration of that principle. If the gains from the damage to natural capital are sufficiently great to make the project worth doing, then you must be able to pay the compensation. If you pay compensation, the aggregate will not go down.

So when the developer wants to develop 500 houses in my village and concrete over a rather nice meadow, the question isn't, does he or she do that or not – it is, does she do it and pay compensation, or does she not do it? The compensation is quite interesting in my village case. Just down the road, I have the privilege of being the vice-president of BBOWT, the Wildlife Trust. We have a really good nature reserve. How about giving us 20 acres of extra land to tack on to our nature reserve for the half-acre that's going through this building development? That maintains the aggregate in natural capital intact. It improves economic welfare; the benefits of the nature reserve are greater than the costs foregone. We meet the overall aggregate natural capital.

So compensation is very important. The practicalities of this, we may come to in the discussion. They are complex. But better to be roughly right than precisely wrong. Not paying compensation is precisely wrong. That's what happens at the moment, most of the time. This is a substantive improvement.

The second area of policy is to do with environmental externalities, charges, taxes, etc. People get very upset about this, particularly house builders and farmers and others. But the reality is that if you don't pay for the pollution you cause, that is an economically inefficient outcome. Economic efficiency is defined when all costs and benefits are internalized in a market system. So not to price pesticides, not to price herbicides for the damage they do to our natural environment does not make your economy better. It makes farmers richer but you have to pay it in your water bills, because the water company has got to invest in all the capital equipment to clean up the water, to provide it back to yourself. It's inefficient. There are a number of core areas where we could do quite a lot by introducing some smart green charges. Fertilizers, pesticides, herbicides jump to mind immediately, but there are many others.

There is a converse to this which is very popular in the climate change debate at the moment. Not only should you charge people for the pollution they cause if you want to be efficient, just like you charge people for anything else they want, you should get rid of perverse subsidies. When we come to natural capital in Britain, in England, there's a perverse subsidy which has done phenomenal damage to our natural environment: it's called the Common Agricultural Policy. I'm not advocating abolishing it tomorrow, although I don't know any economists who think that we shouldn't, at least in principle. But there's much more that we could do to steer away from the perverse subsidies that are currently in place. After all, agriculture claims – well, the NFU claim to produce £100 billion of output a year; actually, it's 9, because they include every burger van and everything in the food chain in their calculation. The output is about 9. Three billion of that is directly subsidies. Farmers are exempt from most taxes. Business rates, different buildings, inheritance tax, even diesel are all part of these frameworks. Plus, of course, they don't pay for the externalities. We as a society could do much better – economic growth would be higher – if for our money we got a better natural capital stock, given that the balance between the true costs of what's happening and the output is quite close to zero. That's an example of trying to go against the grain of perverse subsidies and ease them out, just like people argue about coal being subsidized relative to renewables and so on in the climate change area.

The third bit is what we do with the money from the depletion of the non-renewables. The North Sea oil, etc. If you want – this is my strong aggregate natural capital rule – to maintain the totality of natural capital for all generations for the future to come, you should reinvest the economic rents from the depletion of non-renewables in a nature fund. We're getting a little bit close to that in Norway, where certain things can't be invested in the frame, certain environmental things are given priority. But of course, any small step in that direction would revolutionize the amount of money that was available to environmental improvement and to our natural environment. After all, virtually no resources go into this sector. Budgets are pittance compared with what goes into agriculture or anything else. I'm always reminded in my wildlife trust – there are wonderful people who stand with a tin in local towns like Abington, trying to collect a few pounds on a Saturday afternoon to contribute towards the cost of our nature reserves. Then you think about the millions and billions that go into other areas. There simply is not the kind of equation of the required resources and the required value with the allocation.

So basically, there are three sources of funding here: compensation, adjusting for green charges and subsidies, and the fund from the depletion of natural resources. Note not one of those is public expenditure. It's extremely important to note this. It's just things you would do for a well-functioning market if you wanted to sustain economic growth for a time. That really is the component of the funding side of this. It's not just that the compensation plus the green charges plus the rents from depletion of

non-renewable natural resources would stop the rot. By definition, it would improve things. Why? Because the compensation principle stops the rot, full stop. It means you have to compensate for the damage, so there will be no more damage if compensation is applied. So all the rest of the revenue, even if you spend some of it, can be for restoration.

That really is the big economic prize in all of this. We're not at a point of having the optimal natural capital stock. There are large benefits to be had from improving natural capital and taking it forward. The funding regime adds up to that.

Just to conclude with a couple of examples. Some of this improvement might be creating green spaces inside cities. I throw out the idea that you might want to say that nobody should live more than 500 metres from a green space. If you go out into London today and just sample the air quality and work out what trees and green spaces do in an urban area, that's incredibly valuable. As we show in a Natural Capital Committee report, air quality consequences in terms of damage are really very large from our urban areas. These are small parts of it. Putting woodlands on the edge of cities is where people can enjoy them and get the maximum benefits. None of this concrete over the green belt because it happens to be poor-grade agricultural land in lots of places – turn it into really good natural capital right next to the populations who can enjoy them. We have this debate in Oxford, which we might come to in questions, on the east side. You want natural capital to be where people can actually enjoy what's available to them and get the benefits from it. And so on and so forth. Cleaning up the rivers – I'm involved in a project for the whole of the Thames at the moment. You can think internationally and domestically.

The concluding point is this. One of the things which is much more optimistic about biodiversity and natural environment than climate change is in this territory you can make a difference in your back garden, in your village or town, in your urban space, in your country and internationally. Every bit is incrementally beneficial, whereas putting wind farms in the North Sea might drive up the cost of energy, push production to other countries and increase emissions. Climate change has to be global; that's the bit that is more difficult. This has global dimensions but it doesn't stop you starting this afternoon or this evening, when you go home, doing one small thing like – anything, from encouraging flowers for bees, etc., right through to these broader policy domains I put forward.

So this is a crackable problem. It's a problem for which there are practical policies that can be put in place. These should finance themselves. The net result should be that sustainable economic growth is higher than it otherwise would be. I repeat, as I said at the beginning: it's not hard for people to appreciate that what we're doing is unsustainable, but they never (or rarely) draw the conclusion that follows. If economic growth as it currently is, is unsustainable, it will not be sustained. So this is a hard-headed economic argument for addressing one of the two major problems of our time. Thank you very much.