HOUSE OF COMMONS

Environmental Audit Committee

Oral evidence: Biodiversity and Ecosystems, HC 636

Wednesday 9 December 2020

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Watch the meeting

Members present: Philip Dunne (Chair); Duncan Baker; Barry Gardiner; Mr Robert Goodwill; Ian Levy; Marco Longhi; Caroline Lucas; John McNally; Alex Sobel; Nadia Whittome.

Questions 118 - 168

Witnesses

I: Professor Sir Partha Dasgupta, Frank Ramsey Professor Emeritus, University of Cambridge, and Lead, HMT Economics of Biodiversity Review.

II: Professor David Hill, Chairman, Environment Bank; Dr Mihai Coroi, Ecology Technical Principal, Mott MacDonald; and David Webster, Director of Sustainability & External Affairs, Associated British Foods UK Grocery.

III: Professor Nathalie Seddon, Professor of Biodiversity, University of Oxford, and Founder, Nature-based Solutions Initiative; and Martin Harper, Director of Global Conservation, Royal Society for the Protection of Birds (RSPB).

Written evidence from witnesses:

–Environment Bank

–Mott MacDonald

–Associated British Foods plc

–Nature-based Solutions Initiative

–Royal Society for the Protection of Birds (RSPB)

Examination of Witness

Witness: Professor Sir Partha Dasgupta.

Q118 **Chair:** Good afternoon, and welcome to the Environmental Audit Committee for our third oral evidence session in our inquiry into biodiversity and ecosystems. We have three panels today. In the first we will be looking at the economics of biodiversity, then we will be hearing from our second panel, from private sector actors, to see how they can contribute to biodiversity, and our final panel this afternoon looks at nature-based solutions to climate change.

We are going to start with our very distinguished witness, Professor Sir Partha Dasgupta. It is a great pleasure to welcome you to the Committee, Sir Partha. You have been commissioned by the Treasury to undertake an inquiry into the economics of biodiversity. You published an interim report in April, and I believe you have generously agreed to talk to us again when you have completed your final report next year. This is a rare opportunity for us to get two bites of the cherry. Could I ask you to give us an overview of the preliminary findings coming out of your review thus far?

Professor Sir Partha Dasgupta: Thank you very much. It is a pleasure to be here, and thank you for inviting me. First of all, I should clarify that the report is, for all purposes, completed now, and we will be submitting it to senior Ministers in the Treasury and Defra in about a week and a half's time. We will be publishing it about the end of January because several administrative chores remain to be completed, and then it will be made public. Although it is not officially there, I cannot say it is a work in progress. That would be wrong.

The highlights: I think it is best to look at it from the top rather than in detail to begin with, noticing that contemporary economics—particularly macroeconomics of growth and development, which are very relevant for our purposes here, particularly the economics of biodiversity—essentially treats nature as an external body. It is external to us, humanity. That sounds a bit metaphysical, but it can be made into a very concrete, sharp statement.

You will notice that fact in that we tend to graft nature and natural phenomena, when it suits us, into economic models that are otherwise divorced from nature. For example, models of climate change will take standard models of growth and development and graft a damage function, maybe a way in which pollution is a by-product of output and so forth.

The first departure we make in the review is to regard nature as integral to humanity or, to put it another way, a much more appropriate way, that we are part of nature ourselves. We are embedded in it. I will leave it there because it has profound implications for our conception of economic possibilities at the global level. That is the first point.

The second point is that we then see the biosphere as a capital asset. That does not mean it is only use value. It could be sacred. Parts of it are sacred to us, inevitably. Nevertheless, the source of the value may differ from object to object in nature, but nature as a whole is a capital asset. I would not say it is on a par with manufactured capital or human capital, but it helps to think of the economics of it as a capital asset management problem. That is the second point.

The third point is that the way we view economic possibilities of the future and what we should measure to judge economic success or failure have to be very different, have to be rewritten. That is easy, many people say that, but to do it in an operationally significant way and embed it into the transformed economics that the review is presenting takes work and we have done that as well.

The fourth point, and I will finish there, is that unlike the economics of climate change, the economics of biodiversity are essentially the economics of the biosphere. We are looking at the big thing, the entire fabric of our life. It is not top-ended in the way models of climate change are. We think of emitting carbon and, in some sense, each nation takes on the responsibility, as least as contemporary agreements suggest, for how much carbon to emit, what the limits are and so forth. In the case of biodiversity, the problem is that the most highly biodiverse regions are in the tropics. Tracking the indirect effect of our demand for goods and services on biodiversity demands very sensitive economic modelling.

Of course, being an economist, I say it is economic modelling but what I mean is socioecological modelling. I will use "economic" as just my religious fervour, my discipline, but I can say that because I am basically trying to open up economics to embrace our neighbouring subject disciplines. That is about the size of it and I will speak to specific problems as you raise them.

Q119 **Chair:** Thank you. It is hard to know where to begin when you look at this on a planetary basis because very few of us sitting in the House of Commons think in those terms, but you raised two particular things that I would like to touch on before we open it up into more specific questions.

One is the role that the human population plays and the impact of population growth. You just referred to the bulk of nature being based around the tropics. I have not looked at a map of the human population but my suspicion is that the human population, generally speaking, is either north or south of the tropics and therefore there is not quite the degree of immediate competition for space with nature in the tropics—maybe you will tell me that I am wrong—but the competition for resource from the growing population gets more acute year by year as the global population grows.

Can you give us some sense of the significance of humanity in the way in which we consume resource compared to the way in which nature is able to generate resource for us? I suppose that is a rather roundabout way of

saying, does the human population have to stop growing?

Professor Sir Partha Dasgupta: It is a subject close to my heart. I think that, before talking about population, it is best to think about the factors that together make our impact on the biosphere, and by "impact" I mean, loosely speaking, the demands we make on an annual basis—that is our unit of time—for the goods and services that nature provides, some of which we harvest and others we use without even knowing it, say pollination, climate regulation and so forth, the huge number of invisible things that occur. There is one caveat, and I will come back to that later.

First, nature is of course mobile. That makes for a heck of a lot of the problems in the economics of biodiversity. It is not like a building, which stays put. It moves. All the time it is in motion. The second and third features of nature are extremely important, and I will come back to that right at the end if you want me to give some final reflections. Many natural processes are silent and invisible. What happens under our feet in the soil is not visible directly and is, of course, silent. These three features of nature make it a particularly difficult asset to consider.

The total demand we make on it, say globally, we could decompose into the aggregate demand in terms of final goods and services, our activities, let us say. Let us suppose we can measure our activities in terms of GDP. I know it is not accurate, but if they move in the same direction we will not be making too much of a mistake in taking that as our operation. Then there is, of course, the efficiency with which we transform nature's goods and services into final products. We now have two factors defining the demand side.

On the supply side is what the Chair has just mentioned, which is its ability to provide these services. That is the right-hand side, the supply side. On the demand side, however, if you look at global GDP, that can be decomposed into population and per capita GDP. I am now ignoring distributional issues, which we can come to. For the purposes of this moment we do not have to worry about distribution. I am taking it in the aggregate. That is where the population comes in. It is one of the factors.

There is a trade-off here. Other things being equal, a larger population means greater demand. On the other hand, given population, you could in principle alter the other factors to keep demand from overshooting supply. It is in that sense we need to worry about population, and we should, largely because we do not. It is a taboo subject in so many conversations. In fact, I used to be asked about 40 years ago, when I was younger, why I am working on whatever I am working on. They would say, "Why are you working on population? It is not part of the agenda of economic discourse. Demographers do that, but they are slightly inferior beings." That is the set-up.

The first point to note after that is that nature does not respond to rates of change in the demand we make. It does not respond to the rate of

change of the demand we make. It responds to the demand we make, the absolute demand. Growth rates of population, slower or faster, will have an impact in the future, and we should worry about that of course, but what matters now is the fact that there is a huge overshoot of our demand over the supply. That is one of the things that we establish in the review quantitatively, how much of an overshoot of total demand there is over the supply. For that to close we have to worry about the actual numbers, the absolute figures, because nature is responding to that.

On the question about tropics versus the north, it is useful to remind ourselves that in 1950, just after the second world war, the world population was about 2.5 billion. It is now 7.8 billion approximately. Global GDP has, in real terms, expanded by a factor of nearly 15. These are all approximate figures, of course. That was in 70 years.

We are looking at an extremely important phase of human civilisation. Forty years ago, certainly 50 years ago, there was not an overshoot. Estimates have been made by ecologists as to what the global demand was relative to the global supply. Of course locally things were different, some regions were overexploiting, others underexploiting. I am talking globally now. It is that which has shifted from sustainability to an unsustainable situation, and it is in that context that we need to think about population.

When we worry about population in the south or, let us say, Africa, which is very often in the news, we should remember two things. First, by no stretch of the imagination can Africa be regarded as being responsible for the global overshoot because the aggregate GDP of sub-Saharan Africa is only about 4% of global GDP. If you look at the footprint, in other words, our demand, it is calculated in the review as about 6%. We are looking at peanuts because it is a very poor place. The great growth in population in the 70 years that I mentioned from 2.5 billion to 7.8 billion took place in Asia, Europe and Latin America because the gains in health and infant survival were not matched by reductions in fertility.

The second point is that when we worry about sub-Saharan Africa, as we should, we worry about its future, not the present, in the sense that it is not responsible for the global overshoot, but for the continent to manage it with such a high fertility rate as it is witnessing is problematic. That is something we ought to care about, and we have a lot to say in the review regarding the help we can give on family planning and reproductive health. Very fortunately, it is one of those areas where several good things correlate. If you care about women's empowerment, then yes, it is extremely important to have family planning tools available to the world's poorest women, whose unmet need for family planning has been estimated to be huge, and I can give you statistics on that as well. That is the background. I hope that seems—

Chair: That is extremely helpful, thank you. We have slightly strayed into the next set of questions, but over to Barry Gardiner.

Q120 **Barry Gardiner:** Professor Dasgupta, it is a huge pleasure to be able to have this conversation with you. I wanted to focus on that very uncomfortable and politically sensitive part of your interim report on population and consumption. At 75 pages, I think you win the world record for the longest set of instructions for any prophylactic. I have never felt so guilty about having four children in my life.

You point out that the problems of biodiversity loss do not generally lend themselves to technological solutions and that consumption fuelled by population growth, the Y and the N of your formula, have to be incorporated into our economic analysis. How much of our environmental degradation do you attribute to population growth and those consumption patterns? Can you explain to us how you think that by altering what you call our socially embedded preferences we can reduce the damaging impacts of consumption and population on our natural capital?

Professor Sir Partha Dasgupta: I thought you and I had become friends when we last met and you are asking questions like that. To respond to the first part of your question—answering it would be intemperate—we have a calculation of the following sort, using the impact inequality. When I say "impact inequality" I mean the difference between the aggregate demand and the aggregate supply. That difference has been growing and that is the impact inequality. Just to remind you, the aggregate demand was decomposed into population, per capita output and the efficiency with which we transform nature's goods and services into the final product.

Q121 **Barry Gardiner:** You talk of the imbalance between humanity's ecological footprint and Earth's regenerative capacity.

Professor Sir Partha Dasgupta: That is it, exactly right. I am looking at the left-hand side now, keeping the right-hand side quiet for the moment. Technological action takes place on the efficiency parameter, the efficiency with which we transform. It is not only technology, by the way, it includes institutions as well—institutional reforms can get us a long way—but let us just marry the two together into one pile and let us call it "technology".

We have done one calculation that I think you will find interesting, in which we asked the following question. Assuming that global GDP was to continue to rise at the rate it has been in the last 20 to 30 years on average, for the next 10 years to 2030—the reason we use 2030 is because the United Nations Sustainable Development Goals have 2030 as their intended target date by which the goals are reached. Assuming that GDP continues to rise as it has, even if we reach the goals, are they sustainable?

To answer that we need to ask whether, by 2030, we will be able to close the gap and make the impact inequality into an impact equality. We did one set of exercises—it is the kind of exercise any of you could ask your teams to perform, it is very straightforward algebra—where we asked

this. Assuming that global GDP's growth rate from now to 2030 will be approximately the same as it has been in the past 20 to 30 years, how fast would the efficiency parameter need to rise in order to close the gap? That is question 1. Question 2: has that speed been attained in the past 40 or 50 years? We can estimate those two.

The answer is no to the latter. It will take about four to five times that speed. That is very useful because it says that we cannot depend on technology. For many things, of course, technology is amazing. We are witnessing it in our own lives this minute, even as we speak. It is extraordinary. On the other hand, for biodiversity and our impact on the biosphere, technology has been extremely rapacious in its use of nature. Again, it is not surprising because we do not price nature, so what would entrepreneurs save on new technology that is economical in its use of nature? There is economic capital and labour, but not nature, because that is free.

Barry Gardiner: They are externalities, yes.

Professor Sir Partha Dasgupta: That is the background as to why I am rather less impressed with the possibilities of nature. We have to capture the issues with regard to per capita income and population.

The second part, which is what I am coming to just now, is that the per capita income is an important one to think about, particularly for us in the west. This is not going to be a problem where it is win-win. This is not World Bank modelling. Some slack has to be met by some of us. The question is whether it is possible to feel less pain, as the Americans say, in reducing our consumption. That is where the point you made about socially embedded preferences comes in.

Another weakness of contemporary economics—the stuff I teach, my profession—is that we think of the human person as living in a supermarket. The models that you use in your own offices, in the Treasury and in treasuries all over the world, are built on the idea that humans are egoists. We certainly are when we go into Tesco or wherever—obviously we do not have to worry or we feel we do not have time to think about the rest of the world, we need to come home with our purchases—but for many of our essential aspects of life, we belong: we belong to our community, our society, we influence others and others influence us in our demands for goods and services. Fads and fashion are just an extreme form of it. It is far deeper in our human psyche. You know as well as I do. If you read Homer or any serious literature, it will tell you that the socialness of the human person is of the utmost importance, and to ignore it and pretend that somehow economics is outside it is to belittle economics.

There is hope there, if we can share some of the restrictions that we might have to make. Putting taxes on nature, for example, is going to raise prices for final goods and services, and if it does we will have "less". The question is: is it going to be very painful?

Q122 **Barry Gardiner:** That is one of the things I wanted to come to. Professor Purvis from IPBES has submitted evidence to us saying that "people have become addicted to cheap things—but they cost the earth", very much the point that you have just made. What policy levers do you think Government have that can change that addiction? How are we politically able to change those socially embedded preferences?

Professor Sir Partha Dasgupta: I would slightly rephrase it. It is not changing our preferences; it is moving within the preference to co-ordinated action. It is a co-ordination issue. If I know that you are consuming thus, I may be more inclined to consume thus and then there is a snowball effect, as fads and fashions have.

How does one change it? There are several ways of doing it. One is to take advantage of some of our behavioural biases, anomalies that behavioural psychologists have recently unearthed in the last 20 or 30 years. The "nudge" literature came out of that. Nudging is not the same as embedded preferences, but the phenomenon of biases could be used to leverage changes and there have been some very exciting examples of that. Publicity is one.

Deep down, I think it has to do with education. I can come back to that at the end if somebody asks me about it, because the review concludes that ultimately we will have to educate ourselves about our place in nature and it should start at the youngest so there is less resistance. If you feel that we have to do this otherwise our children will suffer, our great-grandchildren will suffer because we are belittling nature—I do not see any way out.

We see some aspects of it now in parts of the population, including the younger population turning away from meat, which is extremely biodiversity-consuming, as you know. We have data on that in the review, how meat consumption is very—

Q123 **Barry Gardiner:** Can I push you? It is not diplomatic for Governments in the developed world, where our per capita consumption far exceeds that of the global south, to be telling Governments there how to control their population growth, and it is certainly not politically acceptable for privileged, in my case, white males to be advising women in sub-Saharan Africa about family planning. How should we be approaching this challenge of population growth, and what role does international aid and women's education play in that?

Professor Sir Partha Dasgupta: Where I would disagree with you is to think that it will be the white male speaking to the sub-Saharan African woman. If you speak to the sub-Saharan African woman on her own or with her women friends, you will get a very different answer. We are looking at societies that are pretty patriarchal, as many societies are. Even ours is, in many ways, even now. A sign of progress probably is to even out that imbalance.

There is a huge amount of evidence. These are not opinions I am quoting. Everything I say on this I can back up with data, and that is in the review. The expression of unmet need for family planning is huge. Demographers have done a lot of work over the last 30 years going out there. Countries like Bangladesh have done amazingly well in recent years, in recent decades. In about 1971 when Pakistan broke up into the two bits, the total fertility rate in the two parts was about the same, about 6.5. That was 1971. West Pakistan, which is Pakistan now, was much richer than East Bengal. Now Pakistan's total fertility rate is about 3.4, 3.5, and Bangladesh is about 2.2. It has gone down. Of course, in Bangladesh, as you know, income per capita has increased.

It is not a question of education having driven the demand for family planning; it is more that Bangladesh was filled with family planning NGOs who worked with women, not individual women but groups of women, communities. It is one of those things where you offer the assistance, you do not tell. One of the pleas that I have made in the review is to urge our Government to increase their share of aid going to family planning. This is not an imposition; it is a service.

Q124 **Barry Gardiner:** Indeed. Given that China is hosting COP 15 and its controversial one-child policy led to 400 million environmental footprints not being born, how likely do you think it is that we might see measures on population growth and consumption incorporated into the outcome of COP 15?

Professor Sir Partha Dasgupta: I am so far removed from serious decision-making that I could not possibly answer you. I personally do not feel that draconian measures are needed if we put serious attention to this as part of the choice bundle that people face, even in the poorest countries. If you think about it, this matters even more in the poorest countries, because we have a lot of slack. We are rich. If we make a mistake, it does not really matter, but there, a mistake can mean non-survival. They will be receptive, provided it is the women who are approached and they are approached in groups, not alone, again because of social embeddedness.

Barry Gardiner: Driven from the bottom, yes.

Professor Sir Partha Dasgupta: That is right.

Q125 **Barry Gardiner:** The 25-year environmental plan in the UK talks of a lighter footprint, but it does not specifically set a target. Do you think it would be a helpful recommendation of this Committee's report that the UK Government should set an overall ecological footprint target?

Professor Sir Partha Dasgupta: Again, a very good question to which I will be giving a rather unsatisfactory answer. Targets are good. Targets concentrate the mind. Targets also reveal or reflect our values, and that is very good. However, the way targets have been used in the past—we have signed a document and now we can go home, everything is fine—is just not on. Biodiversity requires infinite patience at the local level, right

down to the community or the village, if we are looking at sub-Saharan Africa or south Asia. Targets must be backed by something like a vision in each country, each region, as to how the target is to be brought about.

It is not like saying, "We are all agreed that we are going to have zero carbon emissions by 2050 and now you just decide how you want to do it", where some will use taxes, some will use controls or whatever. Here it is much more delicate, partly because the target for us may be that in this country we must not only think about the ecological footprint here, because so many of our commodities come from elsewhere and the impact of our demand on the ecological footprint there is rather large. We have to have a serious modelling exercise understanding the flow of goods and services across the globe, and in the case of England, of course, identifying what we are doing to the rest of the globe, not just ourselves, when we make demands.

Q126 **Barry Gardiner:** Therefore a target must be backed up by a change in the current global economic models and, in the UK, the current economic model, as we see that transformation happening in the Treasury, to ensure that the delivery mechanisms are in place to deliver them?

Professor Sir Partha Dasgupta: That is exactly right.

Barry Gardiner: Thank you very much. A great privilege talking to you.

Professor Sir Partha Dasgupta: A pleasure talking to you, and a privilege, too. It is nice to see you again.

Q127 **Caroline Lucas:** Let me just echo that. It is a great honour to have you with us, Professor Dasgupta. Thank you for your time. It was music to my ears to hear you talk about the importance of education, because I have long been campaigning for a new GCSE in natural history, but I know John is going to ask you about education so I shall come to my questions, which are about growth. Moving away from GDP to alternative measures of wellbeing has been discussed for many decades. Could you explain your concept of inclusive wealth and how the Government can orientate the economy around social wellbeing?

Professor Sir Partha Dasgupta: There are two functions these measures deliver for us. One is what you would call standard policy analysis. We need a measuring rod for judging whether one policy is better than another when we consider a policy, and a policy could be an investment project, by the way, a green project or whatever. There are competing demands on our resources, therefore we need a measure for that. There we have a standard tool. Here I am not talking about private returns. I am looking at social, obviously, so I am not using market prices, I am using social values for the goods and services, including nature.

The standard one is to look at the net present value of a project. That is well known. The sister or brother of it, a kindred spirit of it, is the rate of return on the investment. That is one. The other reason we need

measures is to ask whether we are on a sustainable path. Are we leaving behind for our children as much as we ourselves inherited in terms of productive capacity and asset structure? These are two different objectives for these measures, and GDP does not sit well with either.

The comments against GDP have been large and loud, but I can show you immediately why it is the wrong indicator to use for project appraisal. When we estimate the net present value of the benefits of a project, what are we measuring? We are measuring the change in our wealth that the project brings about, because net present value means you are adding the net benefits over time, and when you are adding the flows are converting into a stock. The change is a change in the stock of our assets.

Immediately alarm bells go off in your mind and you say that we cannot use GDP because, say, increasing GDP is inconsistent with what we are doing at the project level. There we are not saying, "How much does this project contribute to GDP?" we are asking, "Does it have a net present value that is positive?" If it is, accept it; if it is negative, reject it.

What then does "wealth" mean? It is much richer than Adam Smith's notion of wealth. I should remind you that the founding father of my discipline wrote a book on the wealth of nations; he did not write a book on the GDP of nations, and he had a reason for it. He was looking at stocks and assets, literally assets: what we use to produce goods and services and what we leave behind for our children and our great-grandchildren, what we give as gifts. These are all assets. Focusing on assets is exactly right. We want to know what the aggregate value of that asset is.

Inclusive wealth is the aggregate social worth of the assets that the unit has command over. For the world as a whole, it will be global. The reason we use the word "inclusive", or people like myself use the word "inclusive", is just to remind ourselves that we want to measure not only human capital and produced capital but natural capital as well. That is where all the action is now. At least the review's job is to concentrate on that because we are looking at biodiversity.

Q128 **Caroline Lucas:** Do you think our institutions are fit to deliver social wellbeing as they are now? If not, how could they be changed in order to do that?

Professor Sir Partha Dasgupta: There is a great deal of hope. I am more optimistic about our moving to a different system, to a system where nations begin to try to produce something like balance sheets in the way companies do. There is a good deal of hope because many countries are moving in that direction. They are asking for satellite accounts on natural capital in this country particularly, but also in India. Satellite accounts will try to measure natural capital or make estimates of natural capital.

Remember that you and I are discussing the conceptual background. When you move from the conceptual side to the application side, of course you have to cut a lot of corners, huge numbers of corners. We are not going to be able to have the inclusive wealth of the UK. That would be impertinent. It would be the wrong thing to try. However, we know that is the goal. That is the idea. Once you have the idea, you can then back off.

In normal economic modelling in the Treasury, you will have different sectors. How is manufacturing doing? How is the service sector doing? How is the consumption sector doing? At the end of day, we can aggregate those into one pile and we have GDP, the aggregate output. We feel comfortable about breaking up the economy into sectors and then we have different accounts for that. Here I am suggesting that we should be quite happy with proceeding with separate accounts, one natural capital account and so forth.

A final point, since you raised the word "wellbeing" and I have not used that expression here. The reason wealth is the right thing is not because I say so or Adam Smith talked about the wealth of nations. Who cares? That is neither here nor there. But he was right and so am I. The reason is that the theorem says that inclusive wealth has the property that when it goes up, wellbeing goes up. When it goes down, wellbeing goes down. There is an "if and only if" relationship between inclusive wealth and wellbeing. When I say "wellbeing" I do not mean one generation's wellbeing, I mean intergenerational wellbeing, something like today's, tomorrow's and the day after's.

You might say, "Well, what is the connection between the two? They seem to come from different ends. One is an end and the other is something like a means. Wealth is a way of getting things we want, whereas wellbeing is the stuff that makes our lives worthwhile, a flourishing life." The link is these prices, these accounting prices I mention. They are not market prices; they are the social values. In the Soviet Union they used to call it "social values". That is exactly what they used to say. It was a while before American economists could figure out what they meant, and I had to explain at a meeting. I said, "Look, these are Lagrange multipliers" and immediately the Americans nodded. They understood. That is a mathematical expression.

These are social values. The trick in the economics of biodiversity is to find ways to estimate—and maybe "estimate" is the wrong word to use. For particularly sacred objects we would not use that, but many parts of nature are not necessarily sacred. They have use value. Try to estimate those. There are ways of doing it, all imperfect, but it is better than saying they do not have any value. That is the reason why wellbeing and wealth go together, when defined properly, by the way, obviously not wealth at market prices.

Q129 **Caroline Lucas:** I would love to have more time—I can already feel the

Chair getting a little bit twitchy—because that takes us into all the issues around biodiversity net gain, whether or not you can trade off one set of gains against another. It also takes us into the question of how we genuinely mainstream this at the heart of Treasury, because I know there is work around natural capital accounting and so forth, but when Rishi Sunak stands up and announces his Budget he is talking about very narrow measures of GDP growth; he is not talking about this much broader, inclusive understanding of the kind of wealth that you are mentioning.

Professor Sir Partha Dasgupta: Just one observation. We should not feel too depressed about the gap that exists between what we would like to move towards and where we are, because we are used to making these compromises. We cannot value a sacred grove, but that does not mean we are making trade-offs. The sacred grove is a sacred grove, it is not to be touched. Every society has one.

Q130 **Caroline Lucas:** We do not say that, though. We say a sacred grove can be replaced by growing another one somewhere else.

Professor Sir Partha Dasgupta: Then it is not quite as sacred. You would appreciate that is a different level of argument. Is it sacred if it can be replicated that easily?

Q131 **Mr Robert Goodwill:** Good afternoon, Professor Dasgupta. We have seen recently that the Treasury is prepared to fine-tune its Green Book benefit-cost ratios in so far that it has tried to skew things to the north and tried to make projects in the north more attractive and more likely to get funding. Do you feel that, similarly, we could update those calculations to fully value biodiversity in future decisions on infrastructure investment?

Professor Sir Partha Dasgupta: Yes, very much so. First of all, the reason we need to make a move in that direction is that market prices are hugely misleading. They do not reflect the social values that I was mentioning before. The aim of the Green Book is to try to move in a direction where, at least on a piecemeal basis, you try to correct that imperfection.

The absence of accounting prices, shadow prices or social values in the marketplace is also a reason why the citizen has a responsibility—indeed to herself, not to others—to insist that projects are made transparent as to where the goods are coming from, what the source is and where the sinks are. In other words, project appraisals and economic activities need to be studied from source to sink, not just at the source and then truncated at the point of production, because what happens to the output matters. That entire operation requires a grammar for doing that, and one of the things we have tried to do in the review is to show how that grammar can be constructed.

The reason we citizens very often get worried when we buy something in the supermarket, it does not have an acknowledgment of all the things

that have happened from source to the point at which I am purchasing, is that the prices are not good enough. The price does not signal any of that information. We insist on that. I think the move is exactly in the right direction here. It can be done, but it has to be done in a very decentralised fashion because biodiversity requires geographically and spatially sensitive data, and spatially sensitive engagement among people.

The review has two chapters on civil society and communities as being absolutely essential for the maintenance, protection and promotion of nature because the natural capital is on the ground and information about the state of the natural capital is locally known. The best of Governments will not know it. It is not possible for them to know it because some of the knowledge is implicit, intrinsic to the person who is using it. Farmers in south Asia, foresters in Brazil, they know their local ecosystems better than the best ecologists. They will not know the principles, but that does not matter. They know which part of the year the flowers bloom and when they do not. The Green Book could be widened to include the involvement and engagement of local communities in a big way, including children, by the way.

Q132 **Mr Robert Goodwill:** Would you agree that the Government are already starting to react to that sort of pressure from local communities? I will give two examples, the 10-mile HS2 tunnel through the Chilterns and the recently announced Stonehenge tunnel. None of that added up from the point of view of cost-benefit, but there was tremendous pressure brought to bear politically to enable those projects to go ahead and limit their environmental impact.

Professor Sir Partha Dasgupta: Yes, that is absolutely right.

Q133 **Mr Robert Goodwill:** I am part of the problem. I was the roads Minister for three years, and I was constantly inundated by colleagues asking me for new bypasses. I think the only time that an MP tried to stop one was Norman Baker and the A27 near Lewes. There was tremendous pressure to have new infrastructure put on the ground because of the economic impact it can have on shoehorning in investment. Do you feel that the Government's roadbuilding programme risks further fragmenting habitats in the UK, and how compatible is the roadbuilding programme with our goals in terms of nature recovery?

Professor Sir Partha Dasgupta: At the end of the day, the devil is in the details. Fragmentation is one of the fastest ways of reducing biodiversity, destroying biodiversity, and there is a very good ecological reason for it. Ecological processes are non-linear, therefore if you halve an ecosystem then some of the productivities of the two halves will be smaller typically than the original productivity. That is where things go wrong. One reason is that, of course, the migration possibilities of organisms are reduced when you create this. One has to be very careful and the review is very clear about it.

We spend two chapters explaining why fragmentation is bad news, why dams are bad. Dams are the most popular things in developing countries but they are among the worst things that have happened, not just in terms of the ecology. The problem, as you know better than I do, is that construction is one of the most difficult sectors to control in terms of cost overruns, and dams are basically construction and not much else. There has been tons of work on dams to suggest that the high dams have been economically unproductive, never mind all the displaced people, never mind that they carve out the natural traffic of organisms, fish, for example, and animals and their natural migration patterns are disrupted. Never mind that, just the economics of it: they are not economically profitable.

Yes, fragmentation is very bad news and we have to be very careful. Of course, you cannot always say, "No fragmentation." That will not work either, but if you take the review seriously you will be much more circumspect about infrastructure projects. They cannot be happening willy-nilly in the way it happens in many countries, particularly in developing countries where obviously infrastructure has high visibility and status.

Q134 **Mr Robert Goodwill:** One of the Chancellor's recent announcements was of a new state infrastructure bank to finance many of these projects. I am guessing it is going to be full of very hard-nosed bankers who maybe do not see biodiversity and nature as being top of the list. In fact, when you talk about overruns in cost, one of the reasons HS2 has become so expensive is all the environmental mitigation, the tunnelling, the tree planting and everything else, which we all support but has made that project more expensive. Do you think we could incorporate the economics of biodiversity into the remit of this new infrastructure bank?

Professor Sir Partha Dasgupta: I would hope so. I should say that, as an economist, when I am asked about infrastructure or if someone says "infrastructure" in the middle of the night and I am woken up, I do not necessarily think in terms of a dam or another highway; I think about the greening of a forest, the revival of a forest. That is infrastructure. Infrastructure is essentially the conglomeration of capital assets. That is what we are doing, which is providing a particular service, and if you can revive a wetland that, to me, would be an infrastructural investment, as it should be because that is what it is.

Q135 **Mr Robert Goodwill:** The returns will be indirect returns. The benefits of that investment may not flow directly back into the bank's coffers, but more widely across society.

Professor Sir Partha Dasgupta: That obviously requires some calculation, that is for sure. One cannot make a blanket statement. What does one do in this kind of situation? One works from principles. Fragmentation? Question mark immediately. We better check that. Building a road? Question mark, because it is trampling over natural capital. Again, question mark. Each is a question mark, it is not an

argument for saying, "No, you cannot do it." It is high time the shoe is now on the foot of people who hang out with ecologists. That is the best I can put it.

My sensitivity to ecological issues came out of learning ecology, not because I have any more sensitivity towards nature than the average person. It is just that I have better knowledge. I know how sensitive ecosystems are and how fragile they can be. In some ways they can be very robust; on the other hand, robustness involves huge time. Recovering an ecosystem is very much harder than destroying it, just as society is. It is darn hard to put an institution back together again if it has failed, but destroying it is easy. You can destroy it with a snap of your finger. A whole country can go bananas, but to put it back together again could take years of goodwill. It can be very difficult with ecosystems.

Q136 **Mr Robert Goodwill:** It can be very difficult for local MPs because, generally, the local people want the bypass. The people camping up in the trees tend to be people who have shipped in from elsewhere in the country.

Professor Sir Partha Dasgupta: Yes, that is going to happen too. Human societies' experiences differ so much. In my own experience, studying Africa and south Asia, I find typically it is the locals who want preservation. They certainly want a road to connect their village to the town, that is for sure—access to the banks, access to the markets and so forth—but they do not think of the road as being one that is basically going to plough over pretty much everything else.

Q137 **John McNally:** I will now move you on to something that is obviously very dear to your heart, from the conversations we have had so far, and that is children's education and our relationship with nature. I am probably a bit like you, I believe absolutely if you want to change the world you need to get busy in your own little corner. That is a certainty. I liked your reference earlier to "nudge", that basically politicians are the architects of choice in how society is going to perform. Sometimes you would think we are not performing too well as politicians.

However, I know we are pushed for time. Professor, you have talked about the need to mend our relationship with nature and how important it is for personal reconnection to nature and driving change, in comparison to changing the economic framework that businesses and citizens operate within. As I said earlier, we try to change that in our own little corner. For example, in my own area of Scotland we have had conversations with local groups, we have taken children to the polar regions, to Greenland. We have had 10 children from pretty bad backgrounds, who have had challenging backgrounds, and we have taken them there, and in return we have had children from Greenland coming to Scotland as well.

I feel all of that is part of developing a relationship with nature. I know that might be a wider one, but it is partly the nature and that children can achieve things. Going back to the question I asked you, do you think

that is the type of thing we need to do to mend our relationship with nature?

Professor Sir Partha Dasgupta: Yes, very much so. Beyond just saying yes, there are two reasons why I think we desperately need a reconnection with nature. When I say "we", I mean everybody, but obviously the focus is on the urban population now with increasing urbanisation. One is that there is so much evidence now that our wellbeing depends on our connectedness to nature. There is now a whole branch of psychology. We report that. It is not original to me in the review, but I report the evidence that has been compiled of how sensitive we are, our mental health is, to not just contact with nature but connectedness. Contact is important. Having a plant in our high-rise apartment is okay, but connectedness is deeper and that, too, is required. That is one aspect.

The other aspect is a little more subtle. If you remember, there are three additional aspects of nature, which are that it is invisible, it is silent and it is mobile. These three aspects of nature make it so different from normal capital assets that, ultimately, no amount of institutional refinement is going to bring our activities in line with our aspirations regarding sustainable development.

It just has to be the case that at the end of the day, we, each of us, have to be judge and jury of our own actions. Nobody is there to monitor it. Some of our actions that impinge on nature are neither observable nor verifiable. Nobody can take us to court because there would not be any evidence. Nobody can observe us and then wag their finger at us as our neighbour might do, saying, "Don't trample over the grass" or whatever. That discipline has to come internally.

How do you do that? It seems to me the only way to do that is if we care about it. Insulting nature is an insult to ourselves. That is why I am very keen on education, not just at GCSE, which is a terrific thing to happen, but right from the word go. If only we could have a quartet rather than just the three Rs. Add a fourth, nature studies. In effect, we all ought to be, in part, naturalists. That is how the review ends, because it seems that is what economics is pointing to. All of this is driven from economic arguments, by the way. We are not talking about sentimentality.

Q138 **John McNally:** I think you are getting towards the point that there is more than money. There is ethical investment going on out there now. We have seen just last week that a lot of the big pension societies in Scotland, with vast amounts of money, lost millions of pounds because their trustees had not noticed people moving away from fossil fuels and so on.

I wanted to take you back to the children aspect of things. We have heard good evidence here—Caroline Lucas spoke about this earlier—about extending the GCSEs in England and in Scotland, I think. Our exam system is different, but it is still the same type of thing. I have heard

through many areas now that for children who get involved in Green Flag, the local vocational work they take on, there does not seem to be anything we can put towards an actual qualification that is measured and can achieve something. Surely that is something.

If you want to keep people involved from primary school, Doug Allan—a great chap—said it, Tony Juniper said it; they have all said the same thing. It is a recurring theme that we need to get children involved from an early age, from the age of reason, to understand what they are doing and why they are doing it. Could you give us a comment on how you think we could transform the whole education system to encourage that appreciation of nature? Should it just be embedded in there?

Professor Sir Partha Dasgupta: Yes, it should be embedded, but again the road to that will take time, presumably. It is not going to happen just by the snap of one's finger, but ideally, yes. In the United States, at the undergraduate level, the system is so different from the one in the UK. The universities that I have taught at, they always had a compulsory history of western civilisation. Everybody had to take it in their first year as freshmen. That was good, but nobody asked them to learn some basic nature studies and I do not see why it should not happen. I would like to see that happening here at the university level, too. Yes, we ought to be educated right through. I learned it the hard way, in the second half of my life. That is my loss, not anybody else's.

John McNally: I am mindful of the time.

Professor Sir Partha Dasgupta: It is a pleasure to talk to you.

Chair: Professor Dasgupta, you have entertained and fascinated us in equal measure. Thank you very much for joining us today. We look forward to the publication of your final report. You have kindly agreed to speak to us again, so we look forward to continuing the conversation at some stage.

Professor Sir Partha Dasgupta: Thank you very much. All the best and have a great Christmas.

Chair: Thank you, and you.

Examination of Witnesses

Witnesses: Professor David Hill, Dr Mihai Coroi and David Webster.

Chair: That takes us on to our second panel, and I would now like to introduce our witnesses: Professor David Hill, who is the chairman of the Environment Bank; Dr Mihai Coroi from Mott MacDonald; and David Webster from AB Foods, the director of sustainability. You are all representing the private sector. To ask the first set of questions, we have a former private sector businessman, now the MP for Norfolk North, Duncan Baker.

Q139 **Duncan Baker:** I always like it when people call it Norfolk North. We call

it North Norfolk, us locals down here. It is very important, North Norfolk, because it is a constituency—I am a resident as well, and I grew up there all my life—in an area with a significant amount of agriculture.

Mr Webster, the new agricultural reforms that we are going to see come through are extremely exciting. I perhaps have to declare somewhat of an interest, as I have family who have married into the farming fraternity, which is virtually impossible to avoid in North Norfolk. I have often asked who is better to play a role in protecting our environment than those who manage our land, and that would be our farmers. Will these new reforms be enough to get us to a level of sustainable production?

David Webster: I have quite good links to Norfolk myself because I worked with Mr Jordan. My background was with Jordans Cereals at Pensthorpe nature reserve.

The new reforms from Government are extremely exciting. The principle that is embedded within them in terms of public money for public good is absolutely the right direction of travel. Clearly the detail is not quite there at the moment, although we have seen the initial scoping of planning. I absolutely agree with the Government on the concept of running a series of trials to understand precisely what the interventions that are being proposed will mean in terms of farming and how they can be applied in practice.

There are a couple of things to say. The fact that soil management looks as if it is in tier 1, that is a positive step, because certainly if I look at the commodities that we are buying from the UK—I work on the grocery side of the business, so that would principally be wheat and oats and cereal-based crops. Soil management, soil planning is absolutely central to our thinking around sustainability moving forward as well. We have a number of trials going ahead now, looking at min-till and zero-till on to clover ley and things like that as a means of capturing carbon into the soil over time. That is a very positive step in the right direction.

Clearly the other side of it is going to be how the biodiversity components specifically—particularly pollen and nectar—are implemented in reality. I worked on the Jordans farm partnership programme a few years ago, which was a build-on from the conservation grade model, which we worked with the Wildlife Trusts. One of the big issues is about how different farms on different types of soil create alternative habitats for wildlife, particularly pollen and nectar. A farmer said to me on one occasion, "It is easier to grow 200 acres of wheat than it is to grow 20 acres of pollen and nectar habitat." There is quite a lot that is going to have to sit within the detail to take a broader view, but from our perspective we would see it as a very positive thing.

Duncan Baker: A little bit, "sit tight and watch for the detail to come before we can answer the question." Can I ask the same question to Professor Hill?

Professor Hill: We think it is going to be critically important to get ELMS to function effectively, and it marries with other potential areas for blending finance to finance these things. I believe very fundamentally that private investment into private landholding is the way that nature recovery will work, because it has to be done at such scale. Therefore we are going to need the landowning and farming sectors to work with us to deliver that. It is not possible to be within the domain of the environmental NGOs, good that they are, where they cannot do it at the scale that we need to see change.

Q140 **Duncan Baker:** In a slightly simplistic view of this, if it does not work and it is not sustainable, and we will probably only be able to tell that over the next—I would say we need to let it integrate first—four to five years, possibly a bit longer, we will simply end up importing more food than we currently do to make it work.

I want to talk about natural capital as well. I notice that ABF, along with Tesco, is calling for a natural capital approach to pricing products. The NFU is nervous—you could probably describe it in that way—and I suppose the question around the NFU finding something to be nervous about is what will it mean for British farmers having to absorb potentially more cost, especially if we are transitioning to the ELMS system? Are you concerned that costs will shift to farmers or consumers?

David Webster: That is a very good question. The honest answer is I do not entirely know at this stage. It depends what is within the detail of the final implementation requirements. In theory, if we get this right and we can improve soil quality and integrate some of the management elements, it should work to the benefit of British agriculture.

I have heard within the farming community that there is a certain degree of nervousness about whether there will be funding there into the future. Irrespective of that, it is the right direction for us to be heading. It sets a very positive precedent for moving forwards.

Q141 **Duncan Baker:** One could be slightly challenging. You can go back a long time in history and ask what was the basic premise of why we ended up with the BPS system? It was effectively because farming was not a sustainable livelihood that you could make a living out of, and it had to be supported by payments. We are now going to transition into a different level. That will undoubtedly mean, in my personal opinion, that larger farms will be able to create economies of scale. Some of the smallest farms will have to transition and probably move to more environmental measures.

There is a nervousness that if they end up with a shift of costs at the same time, it will accelerate more people to biodiversity measures than to food production methods but, again, you are right to say that we have a bit of time to see this happen. Professor Hill, what do you think about this shifting of costs and natural capital?

Professor Hill: It is essential that we do that. I spend quite a lot of time on the North Norfolk coast because it has some of the best wildlife habitats in the country, but in the part of the world where I am, in the Yorkshire Dales, the farming sector is almost already so unprofitable that business as usual cannot continue.

As long as we get the environmental performance delivery right and the proper payments for those, and commercially it is important that we move away from a grant-giving type of approach within the farming sector. I know it is not politically a good thing to say, but food is recognised as being incredibly cheap on the whole. We have to support a system that provides value for money. How we deal with the poorer parts of society in gaining access to that food is obviously a difficult issue, but we cannot continue, as we have been doing, with a subsidy system where massive areas of Britain are not generating profit from farming, so why are they doing it? Agricultural technology will help significantly, but we have to have an ELMS mechanism that is based not just on income foregone; it has to be a much stronger system than that for the farmer.

Q142 **Duncan Baker:** That is interesting because it leads me on to my next question. I was in retailing in a business that did many things, but it owned supermarkets and had a department store, so I was involved in retail. That is an industry that is seeing seismic change. There is no intervention to compensate for what the technological revolution is doing to the high street, yet there was intervention in the farming industry probably 40 or 50 years ago. Your comment about how they are going to have to accelerate and deal with competitiveness is no different from any business industry having to change, but it is going to hinge on how well the ELMS system works. If not, we will see more farmers diversifying, as we currently see, as you probably well know. You probably holiday on farms in North Norfolk that have had to diversify into leisure and tourism. It is an interesting mix of how the future will come out.

It is interesting that alternative products seem to see enormous growth, and that is one way in which we can promote sustainable consumption. But drawing a line with the comment that I was in retailing, many people think that there needs to be additional support to drive this—education and training, for instance—but what more can be done by the food industry as a whole to push promoting sustainable consumption?

David Webster: I appreciate that question. The Jordans model has worked very well. It has been a very long commitment; that is 35 years since 1985. I worked for about 10 years on that brand specifically. It was, if I am being absolutely honest, very hard work to get consumers to recognise the depth of the work that was taking place on the farms.

Over the last few years we have retaken stock and formed a consumer-facing partnership through the Wildlife Trusts. This is a theme I wanted to come back to during the course of this evidence session, which is there are opportunities here to link with third sector organisations that have the specialist capability to be able to ensure the right habitats are on

place on the farm and to convey trust between the food industry and the consumer.

If I go back over the past few years, it has been historically quite difficult to do that within brands, but there is a massive sea change occurring out there at the moment in terms of more interest in brands that have purpose embedded at their core. The Jordans model is one example. Dorset Cereals is another brand in our stable, which has planted 46,000 trees through links with the Woodland Trust.

The Government thinking about policies that integrate the relationship between the farm producer and the food manufacturer would be a very sensible thing to do. That may be around biodiversity provision, or it could easily be around the provision of efficiencies within the supply chain that commercially benefit the food producer and also create the opportunity for biodiversity habitats to be created under the new ELMS system. I am quite keen that that model is incorporated into our thinking, either now or as part of the national food strategy.

Q143 **Duncan Baker:** Luckily I do not have to declare an interest because Jordans is in the neighbouring constituency that my colleague, Mr Mayhew, who is normally on this call, looks after. It is an example of people who have that model absolutely right.

Finally, Professor Hill, we have seen an awful lot in recent times about legislation coming forward for carbon reporting and businesses being legislated to report on their environmental credentials, quite rightly so. We have even seen that coming through in recent pension legislation. Do you think biodiversity reporting requirements should also be instilled into companies?

Professor Hill: Yes, I absolutely do. We are calling it corporate natural capital accounting, and I think it is around natural capital disclosure. If we can require corporates to disclose their impacts on natural capital through their supply chains, they can then reduce that. Where they cannot reduce it to a zero residual, they can invest in land-based interventions and management interventions on estates, farms and so on, generating a big income stream. We estimate that the market there is probably well in excess of £3 billion a year, which would go into nature-based solutions, natural capital and so on.

It follows on from the biodiversity net gain delivery. If we can get that model right, we have a model that can then be used on farms. We are already measuring uplift on taking farmland and creating large-scale habitats out there, looking at the services and the natural capital they provide and putting valuations on that to raise credits from it, with corporates interested in buying those credits. If we can get that to scale, either through a legislative framework or through a financial reporting framework, it is going to be a much bigger market than biodiversity net gain from development. There is a way to go, we could be perhaps three years away from that, but I do think that is the way to go. Corporate

natural capital accounting is definitely something we need to be progressing at scale.

Duncan Baker: That is wonderful. Thank you very much.

Q144 **Alex Sobel:** Obviously we are in a period now with the Environment Bill where this is coming around. I sat on the Environment Bill Committee in its early stage, before it took its very long break. Part 6 of the Environment Bill brings forward new powers and responsibilities. It might be worth starting with Dr Coroi about what his experience has been at Mott MacDonald using the new biodiversity net gain metric. Is that metric fit for purpose?

Dr Coroi: I believe the introduction of the biodiversity net gain metric and the mandatory requirement within the planning system are probably the biggest step forward since the 1980s, when the EIA process was introduced in the UK.

From my experience, we have used the metric quite a lot recently. It works well, generally speaking. However, I think everyone agrees, including the Government, it will need some refinement and update. I can suggest a few ways to improve it based on my experience and the feedback I have received from colleagues. To start with, it should be simplified a bit. We, as consultants, have no problem in understanding and using it, but the vast majority of people will find it very difficult. I am mainly concerned about the local planning authorities and Natural England, because they will have to evaluate biodiversity net gain assessments and the net gain plans submitted with the applications, which require very specialist skills and training.

Another aspect that is not working very well at the moment is the connectivity score. For small sites we found it difficult to apply the metric and, at the same time, for very large sites. However, that is a different discussion because it is mainly to do with nationally significant infrastructure, which is not covered by the mandatory requirement, but I can provide some feedback on the use of the metric on those projects as well.

There is also some inconsistency in the way people deal with the habitats retained onsite. Following the temporary removal of some habitats there are two approaches, you either say that you will reinstate it, retain it, or removal and creation of a new habitat. The first approach is not appropriate, in my opinion, because there is a big time gap between when habitats are removed and when the new habitat is functional, which can take many years for woodland in particular. Therefore a multiplier should be applied even for those habitats retained.

I am not sure if it is possible at this stage, but I think the metric could capture some of the indirect impacts outside the red-line boundary because for large projects, such as airports, the changes in the composition and structure of important grassland habitats, for example,

can happen much wider than the red-line boundary. Therefore that can be captured in the metric as habitat degradation, a reduction in the condition.

Another point is that, because the mitigation hierarchy is such an essential tool in managing biodiversity risks, it should be captured in the actual metric. Projects should demonstrate the benefit, in the first place, of avoiding important areas of habitat and then minimising areas affected, restoring habitats onsite and, only as a last resort, using offsets for their residual impacts.

I would like to highlight the importance of using the correct mitigation hierarchy here. I do a lot of work internationally, and on those projects we use four steps in the mitigation hierarchy, which is avoidance, minimisation, onsite restoration and offsetting. In the UK we use three steps; we do not have the onsite restoration. I think it is very important to consider that before we talk about offsetting.

Q145 **Alex Sobel:** Professor Hill, I have read a couple of your blogs on biodiversity net gain as part of my work on the Environment Bill Committee. Do you generally agree with Dr Coroi's assessment? If so, what changes would you like to see?

Professor Hill: The metric, for our purposes, is very fit for purpose. It works extremely well. I agree with Mihai that this is probably the most important policy move for conservation in the last 10 or 20 years. It works very well for us.

The one area that I think is a problem for development is that there is a bit of a hijacking of the onsite side of things. If I could relate it to what Caroline Lucas said, the whole reason why I set up the Environment Bank was to bring this biodiversity accounting to the UK, because I was pretty fed up with the way that development was being done and is still being done in this country. We measure it, but there is no enforcement by the planning authorities to say, "We are not going to allow this planning application to proceed because it has biodiversity impacts."

The majority of biodiversity net gain calculations are done on sites of low biodiversity value. There are some where those values are higher. What we have done so far is to sweep under the carpet that impact on those biodiversity sites and not capture its value. I will be as bold as to say we have probably something like 1 million houses in the planning system at the moment that will collectively deliver very, very little for biodiversity.

The problem is that the ecological consultancy sector only has jurisdiction within the red-line boundary. There are endless difficulties with viability and costs associated with trying to keep small fragments within a development site or changing master plans accordingly. Some developers are able to do it but, generally, it is a bit of a fudge, frankly. What we need to be doing, in my view, is engaging the capital investments that

could come from biodiversity net gain into large-scale new nature reserves. That is where I would like to see this.

You can do it without disenfranchising local people, but in our view—and the view of colleagues such as Ian Bateman at Exeter and Stewart Thompson at Oxford Brookes—there is a myth around this biodiversity within the boundary of a housing scheme. It is not biodiversity; it is great landscaping and planting and great place-making. I would like to see much more emphasis on accrediting both onsite delivery and offsite delivery of these places. That is how we will generate biodiversity and make a major financial contribution to nature recovery in this country.

Q146 **Alex Sobel:** Following on from that and this onsite/offsite debate, when I was a councillor we secured a brand-new park in my ward on a site, of which I think 23% was developed for housing. We secured that biodiversity net gain in the park. Therefore this onsite/offsite debate is not as simple as you are positing. How can we square offering flexibility of buying offsite credits—or conservation credits, whatever you want to call it—with the risk that this might undermine the locally based ecosystem services that exist and community access to nature on land that was previously greenfield or even green belt?

Professor Hill: It should obviously be delivered as locally as possible. If we have one problem at the moment with the way it is being looked at it is with respect to the idea of Defra/Natural England selling credits. They will collect money from developments in an area, but that money will not be spent in the area, whereas our model is all about selling credits to deliver crackingly good sites near to that development, if you cannot put as much of it as possible within the development site.

Your example of parkland is a very good example, and that works very, very well. However, the general thrust at the moment with development is that it just needs more development land if they cannot deliver viability within that area. That is quite a critical point. To give you an idea, the great thing about the metric is that it gives transparency. Anyone can go and measure what the developer is saying about where they are going to do this. If you take a 100-hectare housing scheme, which is a big scheme, and you put just 10% of the biodiversity net gain requirement properly accounted for by the metric into the site, every 10% costs them around £73 million in lost revenue from housing, so they are going to want to do that elsewhere, and it costs around £40 million on lost land that they have paid development land prices for.

What we do is design great places where people want to live, but we are not saying that these are going to be the plains of the Serengeti, if you can bear with me. These are great places where people can live, but what could we do with £50 million-worth of that in terms of putting money into very good sites on landowners' land and farmers' land to create new places with permissive access nearby? I think locals, generally, would really welcome that. However, I worry that the whole argument is probably being a bit hijacked by this idea that people want lots of scrub

and woodland mosaic within a housing scheme with ponds. No one is asking the general public here. We are viewing this through our ecologists' lens, and I am afraid that it does not stack up.

We are now starting to see developers realising that when that metric is making it transparent—and they play around with the metric in many cases so they do not need to spend money offsite—we know from some of the volume housebuilders they are realising that this has a major cost and they will be better off spending probably a tenth or a fifth of the money by creating something at scale. From each of these large-scale housing schemes you could generate a major EU LIFE-type based project. That is what we are talking about. That is what we are losing from being hung up on creating biodiversity within a housing scheme. Of course the people who used to walk on that field where the housing scheme is are not going to go and walk around a new housing scheme to get their nature fix; it is an utter myth. I am afraid we just have to get to grips with it and come up with a much better solution for the future.

Q147 **Alex Sobel:** Following on from there, and maybe moving on a little to the offsite credits aspect, you served on the board of Natural England as deputy chair and then moved into this role. More recently you have had some criticism of Natural England and the potential effect it might have on the development of a market in offsite credits. What role do you think Natural England should play in delivering biodiversity net gain policy, and potentially in the market for offsite credits?

Professor Hill: Yes, you are absolutely right, the whole idea of biodiversity net gain was worked on during that time and now is obviously going to be manifested in a mandatory situation. I am not desperately keen to see Natural England selling credits, for the simple reason that it interferes with a market developing. What you will end up with is the public purse having to pay for this. If we cannot get private sector investors putting money into it, which they will not if Government are putting money into it, it double delivers and that is not going to happen. We have had investors come to us to say, "Is it true that Government are going to sell credits? If they are, there is no way we can be involved." We would miss a very, very significant amount of investment that would come into the natural environment from the private sector.

I also question whether this is within Treasury rules. It is anticompetitive, in our view, and we would like to see that looked at. The private sector will simply deliver this as it is.

The roles for Natural England are obviously huge, as a regulator, as a licensor, looking after European and domestic designations, expanding the designation series, for example, and maintaining the favourable condition of the sites we already have. Its role is not really to interfere with the private sector being able to develop a biodiversity net gain market. This will expand into the corporate natural capital area as well. You need a reasonably mature position for the sector to take hold of land

ownings there and to develop the nature recovery that we need. Therefore I think Natural England need to focus more on its first-class planning advice, particularly around SPAs, SACs and so on.

One thing it ought to be able to do is to set up a mechanism to ensure that the local planning authorities are able to deliver on their biodiversity duties. That is going to be important. The LPAs are fundamental to making this work. If the LPAs cannot do it or are underresourced to do it, it is not going to work anything like as well as it might and we will miss very significant amounts of money going into the natural environment. Maybe that is a role for the Office for Environmental Protection, I do not know, but certainly there is a role there for Natural England rather than the OEP.

Alex Sobel: Whenever we get an OEP.

Q148 **Mr Robert Goodwill:** Professor Dasgupta talked about biodiversity flex, particularly in the tropics. I would like to start with David Webster, if I might, talking a little about what we can do in terms of our trade policy and how that can be affected. Obviously some products are very difficult to attach to that. If it is biodiesel, it is difficult to know where it is from. One area where the Government have made proposals is on illegal logging. Do you think the current proposals to ban illegally harvested forest products in UK supply chains go far enough? Do pass on to one of the others if that is not your specialist area.

David Webster: I am very happy to give you a headline view, but I would not say it is necessarily a specialist area. If I start with the issue around use of commodities, obviously there are forest commodities that will be considered essential within the food industry. Some of them are associated with significant externalities, as were described before, with palm oil and soya being two of them.

The first point I will make is that the Government's decision to mandate reporting is a very significant step forward. Reporting and transparency do drive—and certainly within a food industry context have driven—significant change. ABF is unusual inasmuch as we span both consumer goods, such as the Jordans, the Dorset Cereals and so on, as well as more commodity-based markets. We are certainly seeing, as a result of the policies of some of the supermarket retailers now, a significant pull on alternative farmed and zero-deforestation commodities coming into the UK. Therefore my view is that transparency, possibly looking at expanded transparency into the future, is a good place to be.

I would be worried if you went further than that, into placing restrictions around legally deforested land, simply because of the risk of exporting problems overseas. Commodities could be imported by other countries that are then turned into foods that come into the UK at lower cost. We have not addressed the substantive issue that we are focused upon, which is how to stop illegal deforestation absolutely, but also how to go beyond that and get long-term sustainable management agreements

around high-value conservation areas particularly in Brazil, Argentina and Paraguay.

Q149 **Mr Robert Goodwill:** Yes, there is a fairly narrow line between what is legal and what is illegal in Brazil and what is turned a blind eye to, as far as I am aware.

David Webster: I believe so. I believe the chain of transfer of land from forest into farm is complicated, and there is a mix of legal and illegal activities that are driving that process.

Q150 **Mr Robert Goodwill:** Private companies are very good at publishing their corporate social responsibility reports. There is usually an electric vehicle somewhere in that report, or another project that they can put on the front page. Why do you believe there are still large gaps between the commitments made to sustainability by many companies and what tangible progress is happening on the ground? I think we call it greenwash, don't we?

David Webster: I accept the sentiment that sits behind the question and that appearance. I will make two points. One is the sheer scale of the issue that we are facing. I am not sure that was necessarily fully understood when some of the commitments were originally made. I am thinking about commitments to end deforestation by 2020 and so on. I know many of the actors within the sustainability community, within the retailers and some of those consumer goods companies, and I know they are very genuinely committed to addressing those issues.

However, I think the scale of this is enormous. If I took soya as a commodity, that crop is 350 million tonnes a year, of which the UK imports about 3.5 million tonnes for use largely in animal feed, but 100 million tonnes goes into China. The capacity of UK or even European-based businesses to effect that change, particularly consumer businesses, independently from the supply chain is really quite limited.

From an ABF perspective, obviously we have a CR report. I am not sure whether it has an electric vehicle in it, but we certainly have a CR report. The business within ABF that has been most focused on this issue is AB Agri, which is our agricultural feed division. I think it has been taking those issues seriously and has been driving change within the broader sector. Since 2014 it has been working within the European Feed Manufacturers Federation to develop alignment around sustainability standards. It has a commitment to end deforestation within its supply chains by 2025 and is making good progress against that. From next year 40% of the volume it is bringing in will be zero-deforestation approved, and roughly 10% in addition to that is coming from North America. Therefore I think it is well on track to address the issue.

However, it is an issue of enormous scale. If I am speaking very plainly, I think it needs a combination of private sector, Government and inter-

Government co-operation to address particularly the protection of high-value lands in South America—Brazil, Argentina, Paraguay—and so on.

Q151 **Mr Robert Goodwill:** Finally, how can the Government facilitate the transition to greater public reporting on biodiversity and more sustainable supply chains, either promotion on the internet, something on the packet itself, a charter mark or something that people can recognise?

David Webster: I have different views on this. I think the starting point is recognising that there is no singular private sector, there are lots and lots of different private sector actors and they are motivated and driven by different market forces. It is critical that the Government understand that and fuse the policy to the market force that is most likely to facilitate the greatest good.

For example, if you talk about brands that have an inherent strength around differentiation and can charge a premium for what they are doing—markets like the work Jordans has done, and the organic sector plays an important role in this—any policies that can fuse the linkages between premium brands and their supply chains and incentivise that co-operation have the power to do enormous good.

The difficulty with that is the scalability of it. There is then a piece of work that can be done at a second layer down that is more about understanding how businesses operating with larger supply chains, again through connectivity, can start to act at scale to address some of those issues. I point to Primark as an example. It is working with farmers in its Indian cotton supply chain and, as a result of that intervention, it is currently reaching 100,000 farmers and plans to expand that very significantly over time.

It has implemented a whole series of measures that have not only increased agricultural productivity but have reduced pesticide usage and, probably most significantly, increased the returns for the farmers themselves, doubled the income to those farms. That talks to the point Professor Dasgupta was making about how the private sector and the NGO development sector can interface their activity together to effect change that has both a social dynamic and an environmental dynamic.

Mr Robert Goodwill: Of course, as this Committee has already reported, it is so it can produce clothes that people wear once and then throw away, but maybe we should not go there.

Q152 **Barry Gardiner:** Dr Coroi, what barriers do you see to more integrated development projects that address biodiversity, climate change and poverty alleviation? How will we ensure that, in the responses we make, progress in one area is not entailing regression in the other?

Dr Coroi: In our experience, most projects in international development focus on climate change, water security and food security. Biodiversity comes very rarely; it is not the main focus of those projects. We think this is mainly because of the silo approaches of donors, lenders and

beneficiary countries. What we think is needed is for the international development partners to define terms of reference and examples of integrated projects that cover climate change, biodiversity and food and water security at the same time.

We also need to encourage developing countries to adopt those integrated approaches, because they may need capacity building. It is not all about money. They will need concrete examples of how things are done on the ground in an integrated way. In our experience, there are some key elements that need to be in place at the same time for an integrated project to be implemented. They include strong policy and leadership, and policy should be driven by the science. Therefore some policies may need to change or evolve. Then robust processes and systems to ensure that we get where we want to be, capacity building to plan and deliver those projects, and the capability to ensure that the people involved in the projects have the right skills.

Funding commitments are also needed, and this is to do with the understanding of the financial institutions and donors as to why they should invest in those projects. The focus should be on biodiversity or integrated projects rather than the current situation, where the vast majority of the money goes into climate change mitigation and adaptation. From what I have read, only 3% of international climate finance goes into biodiversity and the protection of ecosystems, which is a very small proportion.

Q153 **Barry Gardiner:** Given we know that in the global south up to 50% of people's GDP lies within their environment, within their natural capital, do you think that all the projects funded by the FCDO should require a consideration of natural capital to be embedded in that assessment? Going back to our first panel session, I think you were listening to what Professor Dasgupta was saying about impact inequality. Would you like to see that whole new economic framework embodied in our development projects?

Dr Coroi: I believe that natural capital approaches will be used for many projects, but this should not become a blanket requirement because it can become a box-ticking exercise. However, I believe FCDO projects should have an initial assessment of the risks and opportunities—

Q154 **Barry Gardiner:** Dr Coroi, can I just challenge you there? Clearly the way in which any framework is implemented can become a box-ticking exercise. Can you give me examples of where you believe it would be counterproductive to include an assessment of natural capital as opposed to leaving that out of the development equation?

Dr Coroi: I do not work personally on natural capital, and I will not be able to give you a specific answer, but I can consult with my colleagues in the international development team and the natural capital team and provide the evidence after this meeting.

Barry Gardiner: Thank you.

Dr Coroi: I know that in some cases requiring a natural capital approach would not necessarily be the best approach. We think that an initial more high-level assessment should be done as to whether natural capital should be adopted during the later stages of the project rather than investing from the beginning a lot of effort in using a natural capital approach.

Q155 **Barry Gardiner:** What would be the initial phase of the project? What are the criterion that you would be using there that would exclude natural capital?

Dr Coroi: I am not very familiar with the criteria because I do not necessarily do that kind of work, but it should be done very early during the inception of the project. If natural capital is not mentioned in the terms of reference, we as consultants should have a discussion with the FCDO or other donors to understand why and how natural capital should be adopted in that particular project.

Q156 **Barry Gardiner:** You heard Professor Dasgupta talking about that correlation between natural capital and wellbeing, and the importance of trying to get the effect and causation in balance and the right way round. I am slightly confused by why you would seek to exclude it in a development project that is looking at things like poverty alleviation and climate change, as well as biodiversity.

Dr Coroi: I was referring to projects where natural capital is the main focus and would require a detailed assessment, which is very time-consuming and requires very specialist skills. My answer was about that kind of question. If we talk about more high-level natural capital approaches, yes, I am for using those.

Q157 **Barry Gardiner:** Forgive me then, it may have been the way in which I posed the question to you. Let me try to put it more simply. When our Foreign, Commonwealth and Development Office is considering funding projects, should it be a required consideration of the project that it includes natural capital considerations as part of the project assessment?

Dr Coroi: I totally agree with this, and I said yes. Projects by default should have a more high-level screening of how a natural capital approach should be used, yes.

Barry Gardiner: Thank you. We got there in the end.

Q158 **Ian Levy:** I have a couple of questions to finish off this round. They are around private sector finance for biodiversity. What do you see as the biggest barrier to private sector investment in biodiversity? I realise that we have obviously had a very tough year dealing with coronavirus, but could you expand on what you see as the biggest barrier around investment?

Professor Hill: I think there are two immediate barriers. One is that we are told that there is a lot of money out there for environmental projects, particularly around carbon but also biodiversity, until you start to drill down to put projects together. One of the areas is the barrier I identified earlier in terms of Government intervening in the market. They need to set the framework, the metrics we have, but they should not be in the business of selling credits into the marketplace itself. That is a real switch-off and we have personal experience of that, which we would like to overcome.

There are three parties to this. One is public sector finance, one is philanthropy, so looking at the whole rewilding debate, which is incredibly exciting in one respect, and then private sector investors and how they generate a return. The returns that they are looking for are relatively modest but long term. Government could play a fantastic role here in giving certainty to a market. They might even want to intervene by putting money into systems to develop projects themselves. I do not necessarily—

Q159 **Ian Levy:** Professor Hill, that follows on to my next question. If the Government could do one thing to encourage the private sector to account for biodiversity, what would it be?

Professor Hill: To give you a live example, I got involved with the excellent Broadway Initiative run by Edward Lockhart. We put to Treasury and Defra a scheme looking at putting about £120 million of the £640 million Nature4Climate fund into 10 projects to bring forward private sector investment in things like habitat banks and other areas. We got lots of great words back, but it did not materialise into backing something. Out of it I think came the green recovery fund, which was a £40 million scheme that really went just to the environmental NGOs, which is fantastic, but it did not do the job of leveraging the private sector investment.

There are two things that I think they should do. One would be to look at putting a serious amount of money into a small number of concept projects from that Nature4Climate fund. The second would be to ensure that they do not themselves interfere in the market but set the framework. Don't interfere by trying to sell credits. We do not buy our BMWs—if we drive BMWs, that is—from the Government, so I am not sure why we should be expecting the public purse to be engaged in that market because it will fail, I think, and lead to much less money going into the system from the private sector, which is out there, it just needs the right signals.

Ian Levy: That has been very helpful. Do any of the panel want to expand any further on that or make any more comments?

David Webster: I think it comes back again to what is meant by the private sector. Obviously there is development and infrastructure, which Professor Hill has just given a view around. From a food point of view, the

interesting point for me is that I do not think it has to be just private sector or state; it can be a fusion between the two. If I look at the biodiversity delivery that we have put within the Jordans Farm Partnership, for example, that is based around the countryside stewardship grants for high-level wild bird food and pollinator mixes. Then we add to that through interface with the Wildlife Trusts, and we compensate the farmers for the price of the grain.

There are multiple different interventions already taking place within the food industry in particular, linking directly with farmers. A policy that encourages that, to have a biodiversity component specifically attached to it, would be very helpful and would help to magnify the capacity of the food industry to make a positive contribution to addressing that in the UK.

Ian Levy: Lovely, thank you. I think that covered the two questions—I managed to wrap them up into one—so I will hand back to the Chair.

Chair: On that note, I probably should have declared that my farm is the beneficiary of a relationship with Severn Trent Water in which this year we planted cover crops on areas close to a sensitive watercourse in order to help it with some of its biodiversity net gain. So we are living the dream.

I would like to thank our panellists: Professor David Hill from the Environment Bank; Dr Mihai Coroi from Mott MacDonald; and David Webster from Associated British Foods for their evidence to us today.

Examination of Witnesses

Witnesses: Professor Nathalie Seddon and Martin Harper.

Q160 **Chair:** That takes us on to our final panel for the day. I would like to introduce Professor Nathalie Seddon, who is professor of biodiversity at Oxford University and founder of Nature-based Solutions Initiative. Welcome, Nathalie.

Professor Seddon: Thank you very much. It is a pleasure to be here.

Chair: Thank you for joining us. Also Martin Harper, who is the director of global conservation at the RSPB. Welcome, Martin.

Martin Harper: Hi there, good evening.

Chair: Thank you for joining us.

Q161 **Ian Levy:** Thank you, Nathalie and Martin, for joining us this afternoon. Could you give us a definition of nature-based solutions and what they should include?

Professor Seddon: Yes, of course. Thank you for the question. It is important to be very clear on this. Nature-based solutions involve working with nature to address societal challenges, providing benefits for both human wellbeing and biodiversity. More specifically, these are

actions that involve the protection, restoration and management of natural and semi-natural ecosystems. They involve the sustainable management of aquatic systems in working land, such as croplands or timberlands, and they can under certain circumstances also involve the creation of new ecosystems in and around cities and across the wider landscape. So their actions are underpinned by biodiversity and are designed and implemented with the full engagement and consent of local communities, farmers and traditional communities across the world.

Ian Levy: Thank you, Nathalie, that was quite precise and very helpful to start us off. Martin, do you want to expand on that, or are you quite happy?

Martin Harper: I would agree with Nathalie.

Ian Levy: Fantastic, that is great. I will hand over to the Chair to carry on with question 12.

Chair: Thank you very much, Ian, for a very concise opening to this panel.

Q162 **Nadia Whittome:** Nathalie, how can nature-based solutions best deliver climate and biodiversity benefits?

Professor Seddon: This is a very important question and one that many people are asking. It is a huge area of active research in the UK and across the world. The extent to which nature-based solutions, which I defined, can support biodiversity—that being defined as the diversity of life from the level of genes and the level of ecosystem—and also provide carbon benefits so that it can draw down and secure carbon stocks over the long term, this varies of course very widely across the different types of intervention involved and the different types of natural habitats involved.

To give an outline of what I mean, protecting intact systems, so ancient, natural and semi-natural woodlands in the UK, for example, or peatlands, protecting these or restoring degraded landscapes to their natural state can deliver significant biodiversity and carbon benefits. The key thing is that, globally and also in the UK, many ecosystems that are rich in biodiversity, in native biodiversity, are also very rich in carbon.

Recently there was a very interesting study produced by WCMC, which showed that conservation action, so protection and restoration of ecosystems in areas that are rich in both carbon and biodiversity, can secure nearly 80% of the potential carbon stocks and 95% of the potential biodiversity benefits that will be achievable if you, for example, just focused on carbon or just focused on biodiversity. That work—and there are many other studies—speaks to the need to take biodiversity into account as well as carbon when deciding where to prioritise conservation actions or where to prioritise nature-based solutions. Protecting and restoring those native intact ecosystems and connecting them is very important for both biodiversity and carbon.

It is important then to think about creating new ecosystems through afforestation. To be very clear, afforestation involves planting trees, often non-native species, on naturally treeless habitats. Whether or not there are biodiversity and carbon benefits depends on a lot of different factors that need to be taken into account. Of particular importance are the species you use, whether they are native or not, whether they are going to be resilient and survive the climate conditions in that environment or not.

The critical consideration is the state of the landscape prior to the intervention, then another critical consideration is the scale at which you measure those biodiversity benefits, whether you measure them locally, regionally or whether you consider the biodiversity benefits globally. For example, establishing tree plantations of non-native species in very degraded landscapes might benefit biodiversity locally if it enables regeneration of natural ecosystems. In many parts of the world, including the UK, the land has been so badly degraded that native natural vegetation would not easily regrow there. Sometimes tree planting, afforestation, can help start the process towards restoration.

But if you put non-native tree species in intact native ecosystems, such as ancient grasslands or peatlands, which is a very relevant context for this country, or natural woodlands, then the outcomes for biodiversity will be poor and probably over the longer term the outcomes for carbon will also be poor. It is very important to consider, as we are often saying now, right species in the right places and to think about nature-based solutions in a very holistic way and to consider a wide range of different habitats. I am sure Martin has much to add to that as well.

Q163 **Nadia Whittome:** That is extremely helpful. I did want to move to Martin because I know that both the RSPB and also the Nature-based Solutions Institute have warned against promoting commercial conifer plantations as nature-based solutions. Do you think that a move away from domestic conifer plantations potentially displaces demand to overseas timber products and is thereby creating a higher carbon footprint and lower environmental standards?

Martin Harper: I will add one point to what Nathalie said, which was very comprehensive, and it will segue into answering your question. In public policy in the UK, we have an experience of how not to do things, which is essentially to prioritise—in the case of the early days of renewable energy—carbon at all costs without considering the ecological impact of renewable energy schemes. We have had various commercial attempts over the years to drive up timber production, which has led, for example, to the plantation of the Flow Country in Scotland, which of course we have now spent the last 20 years trying to unpack.

If we want an integrated response to the nature and climate emergency, it is up to public policymakers to set twin objectives from the outset. Sadly, we have just been experiencing the example of how not to do things. There is a case in Cumbria at the moment where the Forestry

Commission has had to say that it made a mistake in consenting to the plantation of timber forestry on a bog. That is obviously the wrong course of action.

However, just coming to your point, the way we would like to guide the rollout of commercial timber in the United Kingdom—because of course we accept there is a need for that—is to make sure we have the right standards. The UK Woodland Assurance scheme could really help that. At the same time, we may have to have a conversation about demand as well. The good news, and we may come on to this, is that the Committee on Climate Change has today produced its report about the Sixth Carbon Budget and it has highlighted the significance of nature-based solutions. Maybe we will come on to this later, but particularly around forestry, it is talking about 9% of agricultural land being needed for growing timber by 2035 and then going up to something like 21% by 2040 or so.

Of course that can have consequences in offshoring agricultural production, which gets you into the question again about how we make sure that we do not export our ecological footprint. Of course all of the debate about due diligence and understanding supply chains is incredibly important in that context, but it is the right standards, demand reduction and also reducing waste, because some of the timber waste is not adequately used, and at the same time managing the ecological impact of any commodity, whether it is paper or other agricultural commodities, when it is offshored.

Q164 **Nadia Whittome:** Nathalie, do you think the way that nature-based solutions are implemented in the UK—because we have heard from the Government that they are prioritising nature-based solutions—chimes with the IUCN's practice guide? If not, what do you think the Government should be doing to get these nature-based solutions right?

Finally, as an add-on to that, how significant a role do both of you think nature-based solutions can be playing in reaching our climate and biodiversity commitments? I would be particularly interested to know whether you think that the biodiversity net gain principle is ambitious enough.

Professor Seddon: Thank you for the excellent question, and thank you also for flagging up the work of the IUCN. Earlier this year it launched its global standard for nature-based solutions, which is an attempt to bring together expertise. It was a two-year global consultation process. It is a dynamic set of principles that align with a broad set of guiding ideas about what constitutes successful and sustainable nature-based solutions. The general consensus is that this has four key parameters. I am going to list them now in brief, but I will then reflect on what the UK is doing in light of these four overarching principles.

The first one is that nature-based solutions are a very important part of the climate change mitigation solution. I will answer your question about how much of a solution they represent, but they are not to be considered

an alternative to radical decarbonisation across all sectors of the economy, as I will explore in a short while. Unless we decarbonise, we will not keep within 1.5 or 2 degrees of warming and the damage to ecosystems and their capacity to draw down and store carbon will be very badly damaged. It is not a question of either/or, we need to both scale up nature-based solutions and decarbonise our energy system.

The implications of this are that any investment in nature-based solutions must only be provided by those entities that have very ambitious, credible and verifiable plans to decarbonise. I would also add verifiable, ambitious and credible plans to remove deforestation, and destruction, loss and damage to ecosystems, from their supply chains as well. That is an important overarching issue around nature-based solutions and is very important to keep in mind. We can, if there is time, circle back to that perhaps.

The second principle is that nature-based solutions should be considered with a landscape perspective, and that involves lots of different sorts of land use functions and different sorts of habitats that need to be connected across the landscape in order for those landscapes and the people that live within them and depend upon them to be resilient in a rapidly changing world. Much of the discourse around nature-based solutions in recent months or even years has been around tree planting and forests. There are various reasons for why that has happened, but certainly when we are thinking about the UK, we also need to be thinking about all the other ecosystems that are extremely important stores for carbon and extremely important sources of biodiversity.

I am thinking, of course, of peatlands and wetlands, the flood plain meadows, the kelp forests, seagrass meadows, salt marshes, all these very rich and important coastal ecosystems. We will perhaps talk about that again later. We need to be thinking about protecting, restoring and connecting those across landscapes. That is the second point.

The third point is that the evidence is abundantly clear from across the globe and the UK that unless nature-based solutions are designed and implemented with, by and for people, local communities, farmers and so forth, they will not be nature-based solutions. They will not provide solutions over the long term. That is an incredibly important piece. For many people this is not nature-based solutions, it is not conservation per se, this is about working with nature, people working with nature to deal with things like climate change impacts as well as climate change causes, health and so forth. That is the third one.

The final one is that good nature-based solutions, successful ones, sustainable ones, are underpinned by the variety and diversity of life, so biodiversity. Protecting biodiversity is not simply an outcome of nature-based solutions. Nature-based solutions must be underpinned by biodiversity, nature biodiversity, so they must be very diverse in their species, in their ecological functions, if they are to be resilient over the

long term because diversity gives systems their resilience. More diverse ecosystems are much more resilient to climate extremes, whether droughts or floods. They are more resilient to pests, diseases and pathogens, which are becoming more common under climate change.

Even if you are somebody who is primarily interested in carbon, unless your nature-based offset, for example, is underpinned by biodiversity, it will not even deliver on carbon over the long term. Biodiversity is a fundamental property. These are the four guidelines and they are reflected by the IUCN standards and a range of other groups of practitioners who have created these guidelines.

In terms of how well the UK is doing—and I am sure Martin will be able to provide more granularity on this—I would say there are definitely certain things that are happening that are very consistent with that. The Nature Recovery Network, for example, in areas that are important for biodiversity, they are going to be increasingly connected across the landscape, so that is very much consistent with the second guideline around connectivity and diversity across our working landscape. That is very encouraging.

Just to be clear, it is important that ecosystems and different habitats are connected because an adaptive response of organisms to climate change is to shift their ranges. They therefore need to be able to move through the landscape, such as through hedgerows and other connective tissue in order to be able to deal with the impacts of climate change. There is no point having a reserve that is isolated from other reserves because in future it might not host any biodiversity at all because the things that could survive there no longer can and they do not have anywhere to go. The Nature Recovery Network is very encouraging.

The second thing is there is a commitment to increasing woodlands to the tune of around 30,000 hectares a year, every year. This could be consistent with the guidelines if it is done in the right way, so it is the right species in the right places. If this is all single species, pine plantations for commercial ventures, that is not a nature-based solution. That is not consistent with the guidelines, but if these woodlands are generally going to be planted in appropriate places, if a good mix of species that are resilient to the impacts of climate change and diseases are going to be used and if those new woodlands are not to be placed on peatland, ancient grassland or flood plain meadows, or all these other very important ecosystems in the UK, then that will be consistent. They will also be consistent if the local communities, the farmers and landowners are actively involved in implementing that. It is not a top-down solution; it is very much a bottom-up solution. That is important.

Clearly the ELMS scheme, which has been discussed quite frequently this afternoon, is farmer-led. Farmer-led ecosystems stewardship is very consistent with the principles.

In terms of shortcomings, clearly it is important to emphasise, as I mentioned briefly, all the other ecosystems, so in policy documents and in the Committee on Climate Change's budget there is an emphasis on tree planting, on woodlands and on peatlands—and it is great to see that peatlands are in there, as peatlands can harbour enormous amounts of carbon within them—but we also have, as I mentioned earlier, very rich reservoirs of what is called blue carbon in our coastal ecosystems.

As yet, the long-term carbon potential of those ecosystems in the UK has not been fully quantified, so they do not form part of calculations so far about the mitigation potential afforded by nature-based solutions, but clearly work from other parts of the world show blue carbon to be very rich and indicate that there is a lot of potential there. We need to get away from only thinking about native woodlands and peatlands, important though they are; we also need to think about what we are doing with those coastal ecosystems.

If I may, when we are talking about climate change, we also need to be thinking about the extent to which those natural ecosystems also protect us from the impacts of climate change. They certainly do. There is lots of evidence from all over the world that coastal ecosystems like salt marshes protect infrastructure, property and communities under increasing pressure from storms and sea-level rise and so forth.

Perhaps I should leave it there for my observations on how the UK is doing. I could go on to talk about the mitigation potential, but perhaps Martin should come in and talk a bit more about the UK context now and then we could maybe circle back around to the mitigation potential of ecosystems if you wanted to, rather than break up the flow. It is obviously up to you.

Nadia Whittome: Thanks so much, Nathalie. That is fascinating, and they are points that I hope the Government take on board, particularly on nature-based solutions needing to go hand in hand with decarbonisation. We will move to Martin because I am conscious of time.

Martin Harper: I will quickly start with a general observation about how well I think the UK Government are taking nature-based solutions into account when they are considering their low carbon agenda. I would observe the very good 10-point plan that the Prime Minister produced for the green industrial revolution. The only measure that did not have a carbon figure linked to it was number 9, which was around nature-based solutions. To my mind, that illustrates the maturity required in terms of understanding the value of nature-based solutions as part of the UK's decarbonisation agenda.

The RSPB and WWF produced a report relatively recently that highlighted the carbon stored by existing natural habitats, something like 16 billion tonnes of CO_2 equivalent, and also the restoration potential from a carbon point of view. That was something like 123 million tonnes. There is huge potential, and I think the WWF says something like 6% to 7% of carbon

reduction can be achieved this decade from nature-based solutions, but at the moment it is just not there in terms of the common language of the UK Government.

That is why the Committee on Climate Change's report today was so important, because it was much more specific and clear about targets associated with peatlands and woodlands. What I hope to see in the next phase, particularly around the NDC—nationally determined contribution—that the UK will have to produce is that nature-based solutions are more embedded in that thinking because that will help drive action and, provided it is done to high standards, will deliver great return.

I should say we have been trying to help with this debate. We produced a nature and carbon map that is trying to do a coincidence map of where areas are good for wildlife and good for carbon, and we will shortly be producing a map that will show the restoration potential, which is where you will get your best returns by investing in those lands, good for carbon, good for wildlife. I will just pause there because I know we are all jabbering on too much.

Q165 **Chair:** Could I follow that up before introducing our last set of questions? Martin, you talk about the joined-up approach and the tree-planting target that the Government have. Do you see that being linked coherently with the Sixth Carbon Budget recommendations of the Committee on Climate Change? Have you had time to consider whether the strategy is sufficient to deliver the target yet, or is the maths not straightforward?

Martin Harper: I have only seen the headlines from the Committee on Climate Change, and I think they are talking about 30,000 hectares a year. I can see Nathalie nodding.

Chair: That is the Government target for at least the first 10 years.

Martin Harper: Yes. Again, I am seeing Barry nod now, so I assume that is completely in step. The RSPB has form in this area and we are wise to be cautious. Indeed, the example in Cumbria is the reason why we are a little cautious because too often we have had schemes that have been rolled out in a way of just delivering the target without thinking about the biodiversity impact, either of the location or indeed of the quality of the management, which is why I talked about the importance of UKWAS as the standard. It is why Nathalie, in her opening remarks, talked about the importance of guiding the woodland expansion in the right way in terms of right tree, right place.

Barry Gardiner: Soil structure.

Martin Harper: Well-structured, well-managed, exactly, because that will benefit—

Barry Gardiner: Soil structure.

Martin Harper: Soil structure, that is what I meant.

Q166 **Marco Longhi:** Mr Harper, how do you think the Government should finance an upscaling of nature-based solutions?

Martin Harper: The context, sadly, is that the Government's own indicators suggest that biodiversity financing, which I suppose is code for a nature-based solution in this context, has reduced 33% over the last five or 10 years or so. Internationally it stabilised at about £155 million, I think it is. When I think about what is needed to be done, there are three main areas—four, I suppose—and one is that setting the right ambition is important, so obviously enshrining that in either the NDC or indeed in terms of the contribution that nature-based solutions will make to the Sixth Carbon Budget and then ideally reflecting that in areas such as the Environment Bill and biodiversity targets and making sure you have the right ambition on place.

Then I think this is talking about making the existing subsidy scheme work harder to increase the level of public sector capital investment and then also thinking about the role of Government in terms of shaping and harnessing private investment. We have been very supportive of the UK Government's shift towards agriculture subsidies, moving towards delivering things that people want in terms of a protected farmed environment. We think that something like £2.9 billion will be required annually in terms of delivering the obligations in terms of the farmed landscape.

We have also proposed that something like £615 million-worth of capital investment is required to deliver some of the habitat restoration obligations, which is going to be crucial. I note that, for example, the Committee on Climate Change talked about £1.5 billion, so perhaps we have underestimated it. At the moment, the Government are doing the right thing. They have set up the nature and climate fund, they have been fast-tracking some of the funds in terms of the green economy emergency funds and it has been very welcome. But there is a mismatch between both the needs and potentially the opportunity and the available resource.

Finally, there are lots of innovative ways that we can harness private sector finance. Of course biodiversity net gain is one, and that is going to be enshrined in the Environment Bill, but there are other measures that will set the framework, which I think will give investors confidence that what they get in return is to the highest standard. I think that is particularly important when it comes to carbon offsetting. I am happy to say more about that in due course, but I will pause there.

Professor Seddon: As Martin alluded to at the end, the voluntary carbon markets are very buoyant, or are becoming increasingly so, and there is a real need to support and develop boundary organisations and platforms to ensure two things. As I have said, those investors are good investors in that their investments in nature-based solutions form part of systemic change in those organisations, by which I mean eliminating deforestation and radical decarbonisation pathways that are credible and

ambitious relative to the size of the companies, or indeed countries, and so forth. It is matching those with the good projects on the ground that meet the guidelines around being people-led, biodiversity-based, landscape approaches.

The worry currently is that quite a lot of that money generated through the carbon markets will not do that, and it may do more harm than good if it gets funnelled towards commercial forestry, which is not, as we explained, a climate solution at all. There are lots of efforts to develop these platforms so that we do not turn away the funding that could really help to scale up landscape restoration and ecosystem restoration in general, because this is chronically underfunded. We need to massively scale up investment in repairing the natural world, so we do not want to turn away all that funding, but we just need to make sure that it is coming from the right places and is going to the right projects that are demonstrably benefiting people and biodiversity across landscapes.

Q167 **Marco Longhi:** If I could perhaps stick with you, Professor Seddon, on nature-based solutions in COP 26 and COP 15. What commitments would you hope to see come out of COP 26 and COP 15?

Professor Seddon: Obviously the UK has a huge opportunity, as host of the COP, to have that COP be the start of something. Not the end of something, but the beginning, a platform to catalyse the sort of systemic change that has been talked about throughout this session around how we value economic success and bring human wellbeing into measures of economic success, getting away from a reliance on GDP.

Without that sort of systemic change, any efforts to restore ecosystems or clean up supply chains will not be enough, very minor compared to the need to fundamentally change how we value nature and bring the value of nature to be central to decision-making. Ultimately, we need COP 26 to catalyse that in a genuine way. Some of the things we have been talking about, good investors, are part of that, but of course COP 26 is also an opportunity for the UK to lead.

The UK wants to lead on nature in particular. We had the UK-led leaders' pledge, which is a commitment that 77 countries, I think it is now, have signed up to to hold one another to account, to reverse biodiversity loss by 2030, so within 10 years we want to reverse biodiversity loss. If the UK wants to lead on that, it needs to lead by example and needs to get its house in order if it is to inspire action in other nations. We might think, from a carbon and biodiversity perspective, what is in the UK is a drop in the ocean, but we need to lead by example.

I would say there are lots of brilliant projects going on all over the UK and COP 26 is a real opportunity to spotlight those and show what good looks like from a UK or northern European perspective to inspire action in those countries, perhaps especially in those countries, that have all the biodiversity and still have a lot of forests, such as tropical nations, where we stand to lose so much from their continued loss and damage. That is

an opportunity not to be wasted, and lots of us are working with the UK Government to ensure COP can do that.

Obviously, it is very important that targets and goals are aligned between COP 15 and COP 26. For too long the biodiversity community has been working in isolation from the climate community. We are seeing massive shifts in that, greater integration in the IPCC and so on. I think that is all to be welcomed, but we need to make sure of those targets—and there are encouraging signs from the zero draft, the post-2022 framework. There was a goal in there to develop a target for nature-based solutions that increase our resilience in the face of climate change and also mitigate against climate change. In other words, targets that reflect the goals of the Paris agreement.

We are seeing some countries increasingly incorporate nature-based solutions into their NDCs, both for mitigation and adaptation. Obviously there are great opportunities for the UK to do that in a very comprehensive way as well. I will leave it there, but those are the key things I would like to highlight about COP.

Martin Harper: Nathalie sums it up very well. Specifically regarding CBD and COP 15, smart targets are absolutely essential, which is why we are so pleased the Prime Minister announced 30% protected land and sea by 2030, although of course the designations are not adequate. I know other contributors to this inquiry have made the point that it is the quality of land inside those designated areas that is very important. Smart targets are essential. Having good accountability frameworks is very important. The CBD has a lot to learn from the UNFCCC about how to get real traction. We are looking to see the national biodiversity strategy and action plans to have the equivalent standing to the national determined contributions from the UNFCCC.

Finally, mobilising finance is going to be absolutely key to all this. We can have the most perfect set of targets agreed in Kunming, China next year, but unless the world steps up in financing biodiversity and nature-based solutions, we are going to be looking at another lost decade. That is not what we need.

It is worth noting that the nature conservancy in the Paulson Institute has recently published a report that essentially tries to identify what the biodiversity funding gap is. That is a bit of a proxy for nature-based solutions, but globally something like £143 billion is spent and we need about £722 billion, so that is a five or seven times increase on where we are now. I can see Mr Gardiner is showing that report. That is where the political debate should be, and that is where we will need leadership from our Prime Minister, both in the run-up to Glasgow but also in the run-up to Kunming. This is why the leaders' pledge for nature is so important because we want all nations to be committing to the task of our time, of tackling the climate and nature emergency. That requires us to invest now as part of the recovery from the pandemic, but also to think about

how we transform our economies so we cause less harm and we begin to deliver what the UN is calling a decade of restoration.

Q168 **Marco Longhi:** The IUCN has quite a sophisticated definition for nature-based solutions, but when you look into more detail and the framework as to how you would operationalise and deliver on it, it gets rather complex. What are your thoughts on how you think Government could take on such tasks when they are so very complex? How do we keep it simpler, in other words, as Government?

Martin Harper: Can I offer one thought and then I will leave it to Nathalie, who is the lead? I will keep it quite simple. If you were to think about the habitats that are the most significant from a UK point of view, it is peatland, woodland, coastal habitats and blue carbon. Just focusing on peatland, given the fact that something like 23.3 million tonnes are being emitted from our degraded peatland at the moment, we think that peatlands need to be restored by 2040.

That sort of target could be enshrined in the Environment Bill. Set a target to restore and then, of course, the actions will flow. That includes capital works to try to restore the peatlands, end some of the most egregious practices, such as burning of vegetation on deep peat, stop planting trees on deep peat and then banning extraction and, indeed, the sale of peat in compost for horticulture. I would keep it quite simple. I would focus on those habitats that are most significant in terms of delivering for carbon and wildlife, and then deliver the actions I have identified, but Nathalie will have another view.

Professor Seddon: I do not have another view. I think that is fantastically well-put. You are absolutely right, we have to focus on what we mean by nature-based solutions in this country. Absolutely, peatlands, coastal ecosystems, natural ancient woodlands and grasslands are all very important and the protection and restoration connections. It is "protect, restore, connect", those three words. That is what good nature-based solutions in this country look like. The carbon benefits and the biodiversity benefits of those actions are very important.

I agree that some of the definitions of nature-based solutions out there are rather long and seem to include all sorts of things, but we have boiled it down. To qualify as a nature-based solution, an action must provide one or more benefits to people, such as reducing flood risk or storing carbon, while causing no loss to biodiversity or no loss of ecosystem integrity compared to what the landscape was like before. That is the key thing: what are you dealing with? If the landscape is very degraded, nothing else will grow, then maybe plantation forestry is quite a good option because it will bring back soil fertility and that can get the ball rolling towards restoration. Hopefully, between us, we have introduced some clarity about what nature-based solutions are.

Chair: That is a very neat way of rounding out our session. I would like to thank Professor Nathalie Seddon and Martin Harper from the RSPB for

your contributions to our rather extended session today. I appreciate your staying on to conclude the third panel. Thank you to all our witnesses, to members of the Committee and Medha Bhasin from the support staff, who put together our brief. Thank you very much.