

Environmental Audit Committee

Oral evidence: [Nitrate](#), HC 656

Tuesday 6 March 2018

Ordered by the House of Commons to be published on 6 March 2018.

[Watch the meeting](#)

Members present: Mary Creagh (Chair); Colin Clark; Glyn Davies; Mr Philip Dunne; Zac Goldsmith; Mr Robert Goodwill; Caroline Lucas; Kerry McCarthy; Dr Matthew Offord; Joan Ryan; Alex Sobel.

Questions 89 - 202

Witnesses

[I](#): Dr Lucinda Gilfoyle, Head of Catchment and Coastal Strategy, Anglian Water, Paul Stanfield, Catchment Delivery Manager, Wessex Water, and Mark Morton, Senior Hydrogeologist, Yorkshire Water Services Ltd.

[II](#): Paul Cottington, Environment and Land Use Adviser, SW National Farmers Union, Aileen Lawson, Senior Policy Officer Ulster Farmers Union, Fraser McAuley, Land Use Policy Adviser, CLA, Jane Salter, Head of Environmental Policy, Agricultural Industries Confederation, and Helen Browning, Chief Executive, Soil Association.

Written evidence from witnesses:

- [Anglian Water](#)
- [Wessex Water](#)
- [Yorkshire Water Services Ltd](#)
- [National Farmers Union](#)
- [Ulster Farmers Union](#)
- [CLA](#)
- [Agricultural Industries Confederation](#)
- [Soil Association](#)

Examination of witnesses

Witnesses: Dr Lucinda Gilfoyle, Paul Stanfield and Mark Morton.

Q89 **Chair:** Can I call the Committee to order and welcome today's first panel. Can you please introduce yourself, from left to right, starting with you, Dr Gilfoyle?

Dr Gilfoyle: I am Lucinda Gilfoyle. I am from Anglian Water and I am Anglian's Coastal and Catchment Strategy Manager.

Paul Stanfield: I am Paul Stanfield, from Wessex Water. I am the Catchment Delivery Manager at Wessex Water.

Mark Morton: I am Mark Morton. I am Senior Hydrogeologist at Yorkshire Water.

Q90 **Chair:** Thank you all very much indeed for coming. I am sure your trips were a lot easier than those of our guests and witnesses last week. Before we start the nitrates part of the inquiry, can I ask you about the recent spell of Arctic weather, whether your supplies have been affected and, if so, what you are doing to work on those leaks?

Dr Gilfoyle: It has been a phenomenally challenging few days. However, from an Anglian Water perspective our issues are localised. We have some localised problems with leaks and bursts that we are prioritising but we do not have a region-wide issue, as I understand to be the case in other parts of the country. For us, it is localised issues and not a widespread problem.

Q91 **Chair:** How many households?

Dr Gilfoyle: At the moment we are talking in the few hundreds, no more than that. As I said, we expect those people to go on normal supply throughout the course of today.

Paul Stanfield: It has been a challenging time but we have been okay. We have had no supply disruptions. It has been challenging, but we have managed it.

Mark Morton: We have only just had the thaw so we are expecting to see some challenges coming in the next day or two. We have doubled the number of people we have out looking for leaks already. We have put some contingency measures in place and we are warning customers they might experience a bit of low pressure while we fix pipes. However, at the moment there are no supply interruptions.

Chair: Across the whole of your area, but the thaw is just happening.

Mark Morton: It is really, yes.

Chair: Brace for that later on this week then.

Mark Morton: Yes.

Q92 **Chair:** Thank you very much indeed. Can I begin with a question to you all about water basins? Can you tell us how many water basins you have abandoned in recent years because it is too costly to clean them up? How many sources have you left behind because of the issue of nitrates, because it is uneconomic to treat them?

Mark Morton: Perhaps I could start. I do not think we have abandoned any sources due to nitrate. What we had to do was invest in additional treatment and various ways to deal with the nitrate problem. We have either installed nitrate removal, at some of our sources in Hull, or we have brought what were single, standalone sources together into a group to blend the water. We have taken some high nitrate sources with a low nitrate source or two, brought them together, blended the water and then it meets regulations. If it had not been for the investment we have made then we would have had to close those sources as some of them are above the drinking-water limit.

Q93 **Chair:** What sources are they in Yorkshire?

Mark Morton: The one that springs to mind is Kilham, which was in our written evidence. There are a number of others. I could run through a list but I probably could not remember them all off the top of my head. We can provide that information to you, if you like, at a later date.

Chair: That will be helpful.

Q94 **Mr Goodwill:** That is a problem on the Wolds near Drifffield, is that Kilham?

Mark Morton: That is correct, yes.

Q95 **Mr Goodwill:** That is a groundwater source?

Mark Morton: Yes, these are all groundwater sources although we have just installed nitrate-removal treatment on the River Hull, on one of our sources there. That is a groundwater-fed river primarily; it is over 70% groundwater. It is effectively a surface expression of groundwater, as I like to think of it.

Paul Stanfield: I am trying to think. We have abandoned a few sources, I am probably thinking of two or three in particular. They were not abandoned solely for nitrate reasons. There were other water-quality issues associated with them that we have struggled with over the years. With the ability we now have, having invested in a grid system that allows us to move water around our patch much more effectively than we have in the past, we have been able to put those off. They were not specifically nitrate issues but poor water-quality issues. I am thinking probably of three sources.

Q96 **Chair:** What were those?

Paul Stanfield: The ones I am thinking of are Milborne Wick, Bradley Head in Somerset, and then a source called Winterbourne Abbas in Dorset.

Dr Gilfoyle: I am not aware we have abandoned because of nitrates but it is a similar picture. We have 43 groundwater sources that are all above nitrate levels. We address the issues with those through either the use of ion-exchange treatment or through blending so we can keep those sources available. In terms of the scale of investment that has required, since privatisation it is something in the region of £100 million worth of investment to put that equipment in or to carry out those treatments to ensure those water sources stay flowing.

Q97 **Chair:** Great, thank you. I do not think I was aware that water was blended. I did not realise it was like making cider and you have to get it just right. That was a very interesting part of your answer.

To what extent is water pollution caused by sewage treatment spills in your catchments?

Dr Gilfoyle: If we are talking about nitrate, we have 143 water treatment works and of those we believe only three are impacted from urban sources of nitrates. For us, as Anglian—it will not come as any surprise because of the area we occupy being so important to agriculture—the bulk of our nitrate issue is agricultural in its origin. For us it tends to be groundwater nitrate that is our predominant issue, as opposed to surface water.

Paul Stanfield: We only have one sewage treatment works where we have a nitrate permit, which is Poole Sewage Treatment Works, because it discharges into a Sensitive Area. Under the Urban Wastewater Treatment Directive we have an obligation to remove nitrate. There is one sewage treatment works that we have had to build nitrate removal on. To date we have not had any failures of that nitrate consent.

Mark Morton: Nitrate is primarily an agricultural problem as far as we can tell. The one urban catchment for groundwater that we have looked at—again, it is primarily a problem for groundwater sources, apart from the River Hull—there is dominantly agricultural nitrate. However, we do see an influence from a group of urban sources. Some of that is probably sewer leakage. It is not spills from sewage treatment works, it is leakage in the network system. There are also probably impacts from agriculture or application of fertilisers and nutrients on parks, open spaces, gardens, and also impacts from things like landfills. Mains water leakage as well seems to potentially impact.

Q98 **Chair:** Where are those sewage leakages taking place?

Mark Morton: They are just somewhere in the network. We do not know exactly where. This has been done by using a mass-balance approach. We have taken the total load of nitrate that we see in our sources, tried to relate that back to the land use that we see in the catchments and balanced up the levels of nitrate. Partly this is because we want to understand where the nitrate sources are coming from, so we can talk to the right people and work with them to try to address the problem. That is why we have been doing it. We have also been trying to look at stable isotopes to try to fingerprint the source of the nitrate. We have been

looking at the water that is coming out of our sources and analysing that using oxygen and nitrogen-stable isotopes. That gives you a fingerprint that you can use to identify where the nitrate is coming from. It is not categoric, because things shift, but it gives you an idea and a feeling of where the nitrate is coming from. Again, that should help us talk to the people we think are responsible and work with them.

Q99 **Chair:** Obviously you have all invested significant amounts on sewage treatment works and nitrate-removal plants. How much have you spent and how much do you foresee spending in the future? What is your next AMP?

Dr Gilfoyle: Our next AMP for nitrate removal at sewage treatment works is very small. The Environment Agency—and we work very, very closely with it—has identified only one location where we might need to put treatment in at a sewage works. Our focus, supported by the Environment Agency, is that we will get far better benefit from investing in catchment management solutions, trying to avoid the issue entering the raw water in the first place, rather than relying on end-of-pipe treatment. We have quite a focus on that for nitrates this AMP.

We have had quite a lot of success with our strategy to date around pesticides in the previous AMP. We now want to work on a wider range of issues. That is where our focus and investment is when it comes to nitrates.

Paul Stanfield: Nitrates impact us in two ways. Obviously with our drinking-water supply compliance we receive water from the groundwater, in particular, from the catchment. We have 13 sites at the moment where we are employing catchment management actively to try to work with farmers, engaging with them, to reduce their input. We are planning to add six new sites to that under AMP7.

We have not had to build any new nitrate plants. That is partly because of our increased ability to be able to blend with other sources. That is also because we are seeing the impact of our catchment management work now, particularly at a few sources where we are seeing declining trends of nitrate. That is obviously a cost to us, doing catchment management, but much less in terms of treatment.

In terms of sewage treatment works, Poole Harbour is our main area of concern because it is a Sensitive Area. We spent £12 million in 2008 at Poole Sewage Treatment Works. That gives us a running cost as well of around about £1 million per annum. That has been done. There is a debate at the moment with the Environment Agency about Wareham, where we could be spending something like £7 million to £9 million. We are discussing with the Environment Agency at the moment what is the most effective way of dealing with that, whether we could offset that by using catchment management instead. However, it is discharging into a Sensitive Area so we are preparing ourselves to build treatment there.

Dorchester Sewage Treatment Works, because it does not discharge into the Sensitive Area, has a different driver, it has a Water Framework Directive driver. The Environment Agency there has allowed us to pursue an offsetting project. Rather than spending what would be £6 million on nitrate removal at Dorchester, it wants us to offset the increase. That is basically 40 tonnes per annum of nitrate we have to work with farmers to offset.

Q100 **Chair:** How are you working with farmers to do that?

Paul Stanfield: That is an interesting question. Up until two or three years ago, it has been very much one to one and personal. We have our own team of advisers who go into the catchments, talk to the farmers and advise the farmers that they are in a Sensitive Area, as sometimes farmers are not necessarily aware of that. A lot of it is about training. Where appropriate we will fund farmers to take measures—for example, cover crops and moving bare soil during the winter. That has been done on a one-to-one basis. Recently we have developed this EnTrade project. The software bit of EnTrade is a reverse auction system, which allows us to engage with a larger number of farmers within the catchment. We may go on to talk about this, but the interesting thing is that it begins to ask the farmer, “How much value does this nitrate saving have to you?” We are beginning to introduce looking at how we can use market mechanisms to engage with the agricultural industry to reduce nitrates.

Q101 **Chair:** Thank you. You have talked about the £1 million a year. How have you managed to bring down those treatment costs?

Paul Stanfield: There is a slightly different system that we have used. We have tweaked the trend. When we started we were treating to a much lower figure. We have relaxed that slightly but still well within consent and introduced another system. The real cost bit is using methanol as part of the treatment, which is about encouraging bugs. They feed on methanol and use that in the reaction to reduce nitrate. Those are the big costs, chemical and power.

Mark Morton: From a wastewater point of view, we have been focusing more on phosphate than nitrate. Nitrate has not really been a problem for us. We have been looking at a number of small sewage works that discharge into the ground because our problem is primarily in our groundwater sources. It is something we have done in collaboration with the Environment Agency. We have demonstrated our impact is negligible. We are certainly not having any effect so there has been no change to our consents for those works to do with nitrate. There was a project a couple of AMPs ago that did look at that, and there were some minor modifications of works to bring them into line with the nitrate limits. They are quite small works and the investment was quite small.

Our focus is much more on the water supply side of things. As I said, we see that the bulk of the nitrate is coming from agricultural sources. Our focus is going to be on catchment management in the next AMP and engaging much more with the agricultural community. That is very much

about working together. We have a catchment management group set up with the Environment Agency, Natural England, the National Farmers Union and independent agricultural advisers. We are talking together to try to work out what the best plan of action is. In fact, on Friday we were supposed to have a focus group with farmers and Natural England. We have been funding Catchment Sensitive Officers to work with the farming community. Unfortunately, the snow defeated us but we have rescheduled that for a couple of weeks' time. We are hoping this will be a real way of moving forward. This has worked well for us on metaldehyde, slug pellets. We had a farmers' focus group, working on a trial catchment, dealing with metaldehyde, and that seems to have been very positive. The farmers were the ones coming up with the solutions to the problems.

We are hoping we can recreate a similar sort of environment on the nitrate issue, where we can explain what our problem is—the rising trends of nitrate that we see in our sources—and hopefully the farmers, because they are the experts on dealing with the land, can look at that and help us to solve the problem while also getting benefits for their farm and their business. It is not just about nitrate. This is an important point, we have to look holistically at a number of different problems that there are. We sometimes take farmers to our water treatment works and show them the amount of silt we are having to remove. Effectively that is their fields, which we are collecting in our treatment works. By encouraging improved soil health and increasing organic matter we can hopefully deal with things like loss of soil as sediment, we can deal with the nitrate problem, we might get some benefits from pesticides as well, and also potentially from flooding because it tends to slow the rate at which water discharges through the soil and into the surface water system. There are multiple benefits to be had. It is a very complicated system; water and agriculture are all complicated. However, it is something we are trying to get to grips with now.

A lot of that is about understanding how the flows are through a catchment. Because they are natural systems they are not nice defined channels and pipes. They are very complicated and the water flows in odd ways. We are finding out more about our catchments as we are investigating them now and that is where the investment needs to be.

Q102 **Zac Goldsmith:** One of the incentives you described was direct payments to farmers. Can you elaborate on that? At what sort of level are those direct payments? In any sector you are going to have people who are up for working with you and tackling this problem but you are also going to have people who are more reluctant or less interested. Are the direct payments at a level that is enough to persuade even the laggards to get involved?

Mark Morton: This is what we are looking at, to think how we go along that route. We have been reluctant to effectively pay the polluter. That may be advantageous in certain circumstances but what we have done for metaldehyde is given some of the farmers in the catchment in the trial an incentive to switch to ferric phosphate pellets, which are a bit

more expensive. It is a wedge; as they get used to using them and find they are cost effective, the payments tail off. We might do something similar with nitrate but we are not that far down the road with nitrate yet.

Q103 **Zac Goldsmith:** Can I put the question to Mr Stanfield? I think it was you who mentioned it in your evidence. Is that something you are doing already or you are planning to do?

Paul Stanfield: We do that. There is a regulatory flaw. We would not fund anything that the farmers should be doing anyway. What we are looking to do is to push them beyond best practice, as it were.

We have taken the step to pay farmers. That payment is half of what Countryside Stewardship would pay. We put very little strings attached to it, so it makes it as easy as possible for farmers to engage with us. That is about a relationship with our advisers. We have advisers in the field who are talking to farmers so there is a large level of trust that is built up. We do not ask for masses of paperwork in that engagement. For example, we have been paying farmers about £50 a hectare for putting in a cover crop over the winter, to cover that. Some farmers take that up and some farmers choose not to and, for their own reasons, would not engage with us and probably would not even if we offered them more.

Q104 **Zac Goldsmith:** Dr Gilfoyle, what are the practical steps that have been taken through that collaboration with farmers and other stakeholders to reduce nitrate? Cover crops, is that the easiest mechanism? Are there any others that you are pursuing?

Dr Gilfoyle: There is a whole raft of things. It depends on the crop that is being grown and the time of year the crop is being grown. There are some complexities starting to creep in now. Our issues are predominately groundwater. We had started to see groundwater improve because farmers were doing a lot less spring cropping, which meant that soils were not being left bare in the autumn. However, as farmers are responding to the problems they have with black-grass, and the issues around resistance to the herbicides for controlling that, they are starting to move towards spring cropping to try to avoid some of those issues. There is a concern that perhaps the nitrate will start to come back up again.

It is about talking to farmers about what is practical for their land. Half the battle—excuse the word—is to explain to people what the issues and risks are and then to enter into a dialogue about the art of the possible. We have Catchment Advisers that go out and work one on one. It is time consuming but it is incredibly valuable because there is no such thing as a typical farmer and there is no such thing as typical land management practices. It is important to understand the details of what people are growing and how they are growing. Sharing data and information is absolutely critical. It is about sharing at a local level that means something to the people who are managing the land so they can take action or adjust their activity.

We are looking at incentivisation. We have been very focused on this with pesticides in the last AMP. We run the biggest product-substitution trial in the UK, which is "Slug it Out", and that is all around metaldehyde. Mark has alluded to problems in Yorkshire and we have a big issue with metaldehyde in the Anglian region. Payments help. They can be seen as sharing the risk, so you are sharing the risk with farmers to explore different ways of managing land. However, money is not the whole answer; sometimes it is information and sometimes it is independent advice. Quite often it is about allowing people to trial things on their land so they can see it for themselves. We might be funding small-scale crops so people can understand how that might work for them.

Q105 **Zac Goldsmith:** This is a question to all of you, have you seen levels decrease in places where the Protection Zones are active? Is there a marked and noticeable decrease?

Dr Gilfoyle: Some.

Paul Stanfield: No.

Mark Morton: What was seen, I think it was in either Kilham or Etton, which is on the Yorkshire Wolds, there was a scheme called Nitrate Sensitive Areas, the NSA scheme, where farmers were paid to pretty much stop using fertiliser and pesticide. Certainly we saw evidence of a noticeable decrease in a short time period, about five years. However, it was quite expensive. That was a Government-funded scheme. As it stands at the moment, we have not seen any noticeable decreases.

Q106 **Zac Goldsmith:** What was the expense?

Mark Morton: I do not know off the top of my head, it is 20-odd years ago now.

Q107 **Zac Goldsmith:** I am not asking for the numbers, but what was the main reason it was so expensive?

Dr Gilfoyle: Quite a bit of it was about arable reversion. You were taking land out of cultivation and then obviously paying compensation for that, to convert it to grassland.

Mark Morton: There were significant changes in land use, as you sometimes see with some of the European water companies where they have bought land and changed the land use dramatically away from intensive agriculture.

Q108 **Zac Goldsmith:** If an area moves towards organic, or even becomes organic, presumably there is then a measurable impact in terms of nitrate and other pollutants decreasing?

Paul Stanfield: There is still a lot of nitrate involved in organic farming, with manures and so on. The problem with the catchment—particularly groundwater, as you know—is that it is very difficult to say, "This bit of nitrate is coming from over here". Therefore it is very difficult to isolate the impact of a particular farm becoming organic. From the

measurements we have taken in fields and things there is not necessarily a big difference between organic and inorganic.

Q109 **Zac Goldsmith:** We will deal with that with the next panel. Would you support catchment management approaches being made statutory, or are you happy with a voluntary approach? In other words, of Government intervention requiring a catchment management approach generally, probably as part of the repatriation or rewriting of the CAP. Whatever regime replaces CAP it is likely to be a catchment approach. Is that something you support?

Mark Morton: I do not think so at the moment. The voluntary approach is the way we would like to work. What it does need is support from a regulatory perspective. Water companies are in a very good place. We sit in the middle. We can work with lots of people, we have lots of resource, and we have lots of expertise within the companies. However, it is not free. We do need support to be able to spend our customers' money to be able to effect a change that is going to be 10, 15, 20 or 30 years down the line. We are spending a lot of money upfront. By working together and drawing in these people, we get multiple benefits out of it. Having a statutory box to put that in would make things more difficult for us. At the moment we are seen as a commercial organisation. Farmers recognise that we are not a regulator and do not have that regulatory arm that is coming onto a farm. They know we are organisations that need to make money. They are organisations that need to make money. There is a bit of synergy there and a bit of common freedom of thought.

Q110 **Zac Goldsmith:** How would the synergy then work between you and Government? Obviously we do not know what regime is going to replace CAP but we have a fairly good idea of the direction of travel. The understanding is that we would move to a system of public money and return very directly for public goods, which involves not polluting the land, not polluting the water, managing land so that flooding is minimised and so on. If that is the whole approach of the Government post-Brexit with the new CAP regime, there is going to be a big overlap between what the Government will be doing with public money and what you are already doing out of self-interest. How will that synergy work?

Mark Morton: By the Government making sure we have the incentive and the ability to spend that money, so we are not being restricted by not being allowed to spend that money to get that good. By us spending some money and the Government spending money—the Government providing us the support to be able to spend that money—then we can all work together. That does seem to be the way that it is working. The farmers have their expertise in managing the land. We have expertise in managing the water. You have the regulators, Natural England and the Environment Agency.

Q111 **Zac Goldsmith:** If you have both the private sector and Government both wanting to incentivise or reward farmers for not doing things that are going to up your costs or damage public health how do you avoid overlap? How do you avoid double payment? There will have to be a

much closer synergy than what you have just implied presumably.

Dr Gilfoyle: Some of that is around fair share. Who gains the most? Who is making the biggest contribution to the issue? There is a huge amount of work to be done between the water industry, Government and the farming sector together to look at what CAP reform looks like.

I know you touched on voluntary just now but voluntary can, under some circumstances, only go so far. From our perspective we would very much support a catchment approach within CAP because sometimes you need more than just voluntary, depending on what it is you are dealing with or the number of people you need to take up a certain way of being. There should be opportunity for both Government and private-sector investment to operate in that space, depending on what the benefit is that is being delivered and also what the best outcome is for customers. When I say "customers", I mean customers of agriculture as well as customers of the water sector. Customers need affordable food in the same way as they need affordable and reliable water.

- Q112 **Zac Goldsmith:** The Green Alliance has spoken about providing funding for farmers to go beyond legal compliance, to go beyond the bare minimum. In a sense you have already addressed that. I think that is what all three of your companies are doing. Is that something you imagine will escalate in the years to come and will you be putting bigger emphasis on that going forward?

Paul Stanfield: Some of it is about clarity. Some of it is about making sure the farmers know what they have to deliver. I think there is some doubt in farmers' minds. There are so many priorities that they are not quite sure what it is that they can deliver. If you tell a farmer to deliver something they are very ingenious and a good manager of land can deliver that. There is also the whole issue of polluter pays, and we may come back to that. We do not necessarily want water customers paying to reduce farming issues. At the moment the jury is out. From Wessex's point of view the polluter pays is a principle we would go with, but at the moment it is more of a customer-pays-less-than-he-would-otherwise principle. Those two things have to go together going forward.

- Q113 **Zac Goldsmith:** I take your point about the polluter pays. It is not a nice idea that the polluter should be paid for not polluting. Equally presumably the payments you are making are calculated on the basis of what you are saving further downstream, the same as flood management and slowing down surface water to avoid having to build expensive defences downstream. That presumably is the calculation. It is not a philanthropic thing that you are doing.

Dr Gilfoyle: It is. The calculation is around the best outcome for the customer. To give you an idea of one of the things we have been looking at this AMP, if we had to put treatment in for metaldehyde it would cost our customers £595 million to build. Dealing with that one active would put our bills up by 20%. Clearly that is not possible or acceptable in any way, shape or form. A catchment management solution that involves sharing some of the cost risk with farmers, around asking them to use a

different product that does not cause those issues in water is still expensive, we are still potentially talking tens of millions of pounds, but it is a better outcome for the customer in terms of what happens to the price of their bill. You can potentially generate wider benefits around a catchment approach anyway. If your water is cleaner then there are other benefits you can get in terms of biodiversity, amenity, habitat and the ability to move raw water around that makes you more resilient in terms of being able to answer demand threats.

Q114 **Zac Goldsmith:** This is my last question. Is there anything any of you would like to add in relation to what you think is needed to make catchment management programmes more effective?

Dr Gilfoyle: A longer-term approach is what we would like. We would like support that allows us to invest over many years. Nitrate is a perfect example of where this is needed, nitrate in groundwater. You may not see the benefits of the actions you take today for 20 years. At the moment investment in our world and some of the regulatory support we have does not necessarily lend itself to that long-term investment, it tends to be very short and confined to five-year AMP periods. A longer approach to be able to fund longer catchment strategies until you see the benefits would be really helpful.

Paul Stanfield: It is true to say that catchment management does not work effectively where there is no effective regulation behind it. That is a concern we have. There is plenty of legislation out there. A concern is that that needs to be enforced. Simply enforcing existing regulations would help the situation.

Q115 **Zac Goldsmith:** My very last point, do you see the shift in the way CAP is going to be organised, towards something which is more catchment oriented, as a window of opportunity to fill that gap that you have just described?

Paul Stanfield: Yes.

Dr Gilfoyle: Yes, definitely.

Q116 **Zac Goldsmith:** Are you lobbying for that? Are you involved in that discussion?

Dr Gilfoyle: Yes.

Paul Stanfield: Yes.

Q117 **Chair:** Have you all submitted evidence to our 25-year Environment Plan?

Dr Gilfoyle: Yes.

Chair: Yes, you have. I can see people nodding behind you. Thank you very much.

Q118 **Joan Ryan:** We have moved on to regulation, which is what I want to talk about. You have all talked about working in partnership. At the end

of the day, the Environment Agency is the regulatory body of the designated Protection Zones. Do you think it is doing enough to protect groundwater sources from nitrate pollution? You talked about enforcement. Maybe you could address that in a little bit more detail as well. Is it doing enough? That is its job, and yours, at the end of the day.

Paul Stanfield: The Environment Agency is under a lot of pressure. It has some very, very good people working for it. Resource wise though, it is struggling. If I can give an example of our situation, over the last few years the Environment Agency land and water staff numbers have gone down from 50 to about 22 people. Given their off-duty things—like flood watch, which is all crucial stuff—they reckon they are able to do proactive visits across Dorset, Wiltshire and Somerset to 20 farms per annum. To put that into perspective, there are 400 high-risk farms identified in the Hampshire Avon alone. It is a job that is beyond it, in a sense. That is an area of concern. It recognises that itself. We need to address that.

Going back to CAP, we need to come up with systems that work from a regulatory point of view given the Environment Agency situation at the moment. It is not easy for them at all but it means there is no effective regulatory backstop to catchment management.

Q119 **Joan Ryan:** Last week a witness said, "I cannot comment on whether the Environment Agency has enough resources but the resources are not put into enforcement". Do you think it needs more resources, or does it need to shift what it is doing with the resources it has? Or can you not comment on that either?

Dr Gilfoyle: It is difficult to comment on its resource level. Government bodies are all under pressure. What that is driving is a more collaborative relationship from which we are starting to see some real benefit. We work very closely with the Agency in our region. It is very supportive around catchment management, just as it is around investment programmes through WINEP.

From what Paul has said, I can only echo this, the powers are there. It does not need any more powers. It is about making sure that those are enforced where we need to so we have that baseline, otherwise catchment management and other solutions will not work. We, as organisations, do not have enforcement powers. I am not sure we would ever want to go there, that is not the relationship we would ever want to have with our customers. That sits squarely with the Agency. We will support it as much as we possibly can but we do need that function to be carried out.

Mark Morton: Some of it is about avoiding that regulatory approach because sometimes it drives behaviours you do not want anyway. It is much better to have an incentive that people will work with. We work very closely with the Environment Agency in our region. It does very well with the resources it has.

The farmers I think would welcome a bit more engagement, in some ways. An anecdote: one farmer at a meeting we had stood up and said,

"I have been collecting all this nitrate application information for 20 years. It would be really nice if someone came and looked at it." The problem is, as said, that the Environment Agency does not have the time and ability to go and visit every farm. However, maybe that is not the right way to do it. Maybe the right way to do it is to incentivise the farmers in such a way that they want to do the right thing. Some of that is about providing that information to them, to say, "We have a problem. What can you do to solve it?" We have been talking at agricultural shows and things to farmers, where we have identified that cover crops seem to be a potentially beneficial way of dealing with things for the farmer in terms of cost-benefit for his farm. You ask the farmers and they either say, "Yes, we already do that", or, "We cannot do that because it does not work on our farm because of the way that we manage the farm". They are not blind to a lot of things they can do, they do try them. Maybe in some circumstances it will pay us to incentivise the farmers to do something differently, where it is not cost effective for them, because of this ultimate benefit to our customers that pay us money. I do not think we need any more regulation, no.

Q120 Joan Ryan: Part of what we have been told by previous witnesses is that compliance is disproportionately weighted towards smallholdings. Why is that? Is that to get up the numbers of how many farms it has inspected? Does that make farmers unhappy? Are they aware of this? Are they bothered about it?

We were also told that few of the inspectors are experienced or qualified enough to do much more than check that farmers' NVZ records are in order. It has the regulatory powers but it does not have the resources. Do you think it has the knowledge, experience and qualifications?

Dr Gilfoyle: I cannot comment on the smallholding piece, which was news to me. However, qualifications and working with accredited experts are really important, particularly if it is around advice. One of the things that we have found is very effective is that our Catchment Advisers are all facts and basis trained. You need to be trained at that level to be able to give credible advice, not just to the farmer but, of course, you will be working with his agronomist and the other agricultural experts that he has as part of his business. Having qualified people is very important if their advice is to be taken.

Joan Ryan: If farmers are to have confidence in what is being said.

Dr Gilfoyle: Absolutely.

Joan Ryan: I think it was Wessex that made the point about the smallholdings and the imbalance in regulatory enforcement. Not only is there not enough but is there an imbalance and a lack of a level playing field?

Paul Stanfield: I am going back to the EA, we have some very, very good EA people and we work very closely with them in our patch. We feel there are issues around the RPA, the Rural Payments Agency, which covers cross-compliance and the NVZ inspections. There is a suspicion its

main focus is on livestock and animal welfare. That is very important but as far as we know they seldom go out of the office and look into the field. It is all about tags and ears and so on. There is a sense of unfairness. I am not qualified to talk about that particularly but that is a complaint I have heard, that in terms of the RPA there maybe are not the experienced people within that organisation to provide effective visits.

Q121 **Joan Ryan:** Can I ask you all, what do you think is needed for collaboration with Government agencies and regulators such as OFWAT, DEFRA and the Environment Agency? What is needed to make that more effective?

Paul Stanfield: Clarity is one thing. We have a plethora of things: Source Protection Zones; Safeguard Zones; rumours of Water Protection Zones. If I take the Safeguard Zones, which are Water Framework Directive designations around our sites, associated with them are Safeguard Zone Action Plans. Most of the actions in those plans are our actions, water company actions. It is not necessarily clear what anyone else is doing in those catchments. A big thing is clarity. Who is doing what and who is responsible for what?

To some extent it comes back again to regulation and enforcement, as to what is good practice, what is best practice, and what is that regulatory floor. That would help everybody.

Dr Gilfoyle: From the position of our regulators, for catchment management solutions and the opportunities we could unlock through CAP for all of that, it is about getting a greater alignment between water sector regulators who all have different priorities, different needs and different objectives. We have started down the line of bringing our regulators together, alongside ourselves and others who are interested in this area, to explore what is necessary to make catchment management effective and what we would need to have lined up. That conversation is in its infancy. There is a lot more scope to explore that in greater detail. We need support to be able to invest in these areas but we also need some alignment around some of the things we are being asked to do. There is greater scope to explore some of that going forwards.

Mark Morton: It is that support, and it is that support for this long-term approach. The regulator needs to be flexible. Partly it is about trusting us as water companies, as we have a vested interest in this. It is allowing us to plan for managing our catchments over a long time period, allowing us to invest in those catchments as well. It is providing the mechanisms where the water company can say, "We need this amount of money and we are going to set out this long-term programme, over 15 or 20 years, when we are going to work in that catchment and work with everybody in it". We are in a good place to drive some of that but we need that regulatory support to do it.

Q122 **Joan Ryan:** Thank you. For my final question, witnesses in our previous hearings described nitrate and phosphate pollution as inseparable. Do you agree with that? How does the regulation of phosphate pollution

compare with nitrate? I was aware that earlier, Mr Morton, you said that phosphate rather than nitrate was your issue and that nitrate was not really a problem.

Mark Morton: It is an issue for our surface water discharges, our sewage works, where we are trying to reduce the phosphate load into the river systems. Phosphate is not a problem for our groundwater sources. That is where our nitrate problem is mostly manifested, in the groundwater. That is a distinction.

From a groundwater perspective there was a project at one point we called "P in Groundwater", which was about phosphate, amongst other things. It did not go very far because we do not see much of it in groundwater. It is much less mobile in the subsurface environment. It gets bound up in the soil, sticks there and does not move very far. Nitrate is much more conservative as a chemical. It does not get stuck as quickly to the soil. If the plants do not grab it and uptake it, it can move through the system. That is the problem. For groundwater the two things are fairly well diverged.

Q123 **Joan Ryan:** You do not agree?

Mark Morton: Not on the groundwater issue, no.

Paul Stanfield: The science is developing all the time. We recognise that phosphorous and nutrients are an issue. We have a big phosphate treatment programme going into AMP7. Phosphate from our sewage treatment works is an issue that we recognise as well.

Dr Gilfoyle: We are in a very similar position. For us phosphate in sewage treatment work discharges is an area of great focus for us. To put it into some context, we are looking at in excess of 100 schemes in WINEP currently at the moment around phosphate work at sewage treatment works, whereas for nitrate we are looking at potentially one in WINEP. That gives you some perspective of how it works from our perspective.

Paul Stanfield: Similar ratios to us.

Q124 **Dr Offord:** Mr Morton, in your evidence to this Committee you said it is your organisation's intention to have 100% anaerobic digestion in the future. I was interested to get an understanding from you of what your rationale is behind that?

Mark Morton: It is using the sludges we have in the sewage as a resource. We can avoid putting all that sludge to land because we can turn some of it effectively into green energy, we can develop a better product at the end, it is less harmful and more efficient for us because we can also generate power from it as well to run a sewage works. It was one of my colleagues that brought that up in particular. It is something that we see as generally beneficial. It is beneficial to us and to the environment, utilising a resource that is there, producing power from it and producing a product at the end of it that is less harmful.

Q125 **Dr Offord:** I see Anglia and Wessex are both nodding their heads when you speak. I would like to ask the same question of you, is it your intention?

Dr Gilfoyle: It is our intention to move towards treating 100% of our sludges in that way. Renewable energy is important to us. If we can generate power it means we can pass that saving on to the customer. Currently we are generating about 16% of our own energy, but we have aspirations to do more of that.

The other piece of note is that the biosolid product that you create as a result of this is important for agriculture. It is hugely important for putting organic material back into the soil. As we all know that is something that is very important. It also releases a very slow release of nutrients. Again, if farmers are using biosolids and applying those to their land potentially they do not have to spend as much money on fertiliser or apply fertiliser so there are some water-quality benefits there. Better organic matter means you get less soil erosion. Again, that is of interest to the farmer but it is equally of interest to us because it keeps the soil on the field rather than in the watercourse, which is where we and the farmer want it to be.

From our perspective anaerobic digestion is a positive thing all round and it actually allows us to put something back into the soil.

Q126 **Dr Offord:** You use the word "aspiration". As a politician I am always cautious of that.

Dr Gilfoyle: We are currently sitting at about 85% to 86% but our aspiration and our intention is to move towards 100% in a very short period of time, because the energy generation is of value in being able to pass that saving on to customers.

Q127 **Dr Offord:** It has been corporately agreed?

Dr Gilfoyle: Yes.

Paul Stanfield: We will be at 95% by the end of this AMP. Definitely that is the direction we want to go in. I cannot add much more to what has been said. It is a great way to generate power. GENeco, which is our subsidiary that looks after the Avonmouth plant, is famous for the "poo bus", a bus powered by poo. There is a lot of innovation around that area. Certainly the product they get at the end of the day is a very useful product for farmers and also saves us a lot; it is easier to transport, it is easier to apply, it can be applied more accurately and so on.

Q128 **Dr Offord:** Mr Morton, would you like to take the opportunity to explain what percentage you are currently at?

Mark Morton: I am afraid I do not know. I am happy to get that information for you. As I say, it is one of my colleagues that is dealing with the AD side of things so I will dig that information out and let you have it.

Q129 **Mr Goodwill:** So I can understand how this is going to be delivered, are we talking about lots of small anaerobic digesters associated with each small plant or are we going to be transporting sludge to some bigger location where that can be done more cost effectively?

Mark Morton: It is a bit of both. We already have quite a lot of anaerobic digestion. We are building a large anaerobic digestion plant at our sewage works in Leeds, which will take sludge from a number of different smaller sewage works where it is not economic to run anaerobic digestion in. I guess it is a matter of scale. Where it is sensible to build a big plant and transport stuff we will. Where it is sensible to have smaller plants, because the transport costs do not stack up, then we will do that.

Q130 **Colin Clark:** One supplementary. I farm in Scotland. For biosolids that come out of plants at the moment I think you have to notify or record that you are putting it on your land and there is a restriction on what you can then grow on the land. Will what is going to come out of anaerobic digestion plants be a safer product, will it be more sterile and not have the same issue?

Dr Gilfoyle: We have something called the Biosolids Assurance Scheme, which has some very, very rigorous standards applied to it. The products that come out of anaerobic digestion are very controlled in terms of what impact they might have on the environment and also what health impact they might have. That means they are able to be applied over a greater range of products.

Paul Stanfield: The safe sludge matrix is another measure. We had a recent biosolid workshop inter-water company to discuss those sorts of issues. The emphasis is on improving quality.

Mark Morton: Yes, there is a very strong emphasis.

Q131 **Chair:** Are you selling this to farmers or giving it away?

Paul Stanfield: We are selling it, yes.

Q132 **Chair:** It is another income stream?

Paul Stanfield: Yes.

Q133 **Chair:** Thank you all very much. That ends our first panel. Thank you.

Examination of witnesses

Witnesses: Paul Cottington, Aileen Lawson, Fraser McAuley, Jane Salter and Helen Browning.

Q134 **Chair:** I have just been discussing oolitic limestone and the three types of limestone. You find everything you need geologically in Yorkshire, which is good to know.

Can I ask our second panel to introduce themselves, starting, from left to right, with Mr Cottington?

Paul Cottington: My name is Paul Cottington. I work for the National Farmers Union as Environment and Land Use Adviser covering the South West.

Aileen Lawson: I am Aileen Lawson from the Ulster Farmers' Union. I am a Senior Policy Officer covering environment and rural development.

Fraser McAuley: Good morning. I am Fraser McAuley. I am the Land Use Policy Adviser at the Country Land and Business Association.

Jane Salter: Good morning. I am Jane Salter from the Agricultural Industries Confederation. I head up the environment policy area.

Helen Browning: Hi, I am Helen Browning. I am Chief Executive of the Soil Association and I am an organic farmer in Wiltshire.

Chair: Lovely. Thank you all very much indeed for being with us here this morning. We are going to begin with a question from my colleague, Kerry McCarthy.

Q135 **Kerry McCarthy:** Last week when we had scientists in to give evidence we were told that the levels of nitrate pollution that would be required to not damage the ecological system would not allow us to have a modern farming industry. Is that something you agree with? Sorry, that was phrased as a double negative. If I can ask particularly the AIC and the UFU to start with, your evidence rather downplayed the impact of nitrate pollution. You were very much focused on drinking water. What about the wider ecological impact that nitrates have?

Aileen Lawson: In Northern Ireland we are constantly being told by our scientists and our policymakers in Government that nitrates are not the biggest issue, it is phosphates and it is phosphates that are causing the eutrophication in Northern Ireland waterways. We do not use any groundwater in Northern Ireland for drinking water. Our drinking water all comes from surface waters, and 100% of our surface waters in Northern Ireland are below the 25 milligram of nitrate per litre limit and 89% below the 10 so we have a lot lower levels than what there would be in other parts of the UK.

Jane Salter: We are looking at the Environment Agency database in our assessment. That reports on the number of waters failing because of poor water quality. The water quality grading accounts for ecological status. At present there is only 0.2% of water bodies failing because of nitrogen. Therefore it is for other reasons that the ecology is being affected, which may be phosphate or sediment but not principally nitrogen. Hence the way in which we balanced that comment in our response.

Q136 **Kerry McCarthy:** We were told that for groundwater protected for drinking water—I appreciate you have said in Northern Ireland it is not used for drinking water—nitrate levels were responsible for 65% of failures to achieve good chemical status. Are nitrates the problem or not?

Helen Browning: One of the things that is interesting is that we have been working to this 50 milligrams per litre target, because that is the level we have been worried about in terms of human health. However, the evidence is clear that much, much lower levels than that are an issue in terms of biodiversity and environmental pollution. If you look at the 2 milligram level, from the evidence you were given last week only 6% of our water seems to comply. We are probably talking slightly at cross-purposes about whether we are concerned primarily about human health or the environmental impacts.

Q137 **Kerry McCarthy:** That was very much something the scientists said last week. That goes back to the question I posed at the beginning. Is your take on it affected by what we look at in terms of drinking water and the impact on human health of drinking water, or do you feel you have a responsibility to look at the wider ecological impact as well? Do you not accept then that the lower levels are there?

Jane Salter: Less so for the environment. Based on Environment Agency information you have to know how to interrogate the databases to come up with the right statistics. That 65% was based on failure for all other inputs, not just nitrogen. My colleague worked for the Environment Agency and was able to find the data from the databank. It is not easy to do unless you know how the database works.

Q138 **Kerry McCarthy:** My brief says that for groundwater protected for drinking water nitrate levels were responsible for 65% of failures to achieve good chemical status. Have you just said that is a wrong analysis of the data?

Jane Salter: I need to check, I am sorry. I do not fully understand the way the question is phrased.

Helen Browning: It may be worth noting that the amount of nitrogen we have in the system is now well recognised as being beyond the planetary boundary of the amount of nitrogen we can safely have in our global system. There is too much of the stuff about. We think about levels in certain watercourses but we have too much within our environment as a whole.

Q139 **Kerry McCarthy:** Can I ask then about the impact on climate change?

The focus of today's session of this inquiry is about the water supply. Am I right in thinking that the use of fertilisers contributes quite a significant portion of greenhouse gas emissions?

Helen Browning: The biggest issue is nitrous oxide, clearly caused by the oversupply of nitrogen in the system, which is something like 298 times as potent as CO₂ and exists in the atmosphere for something like 114 years. It is a big driver of climate change.

The other side of the equation is the energy that is taken to manufacture nitrogen, which accounts for something like 1% of our total emissions from agriculture or about 2.5% if you factor in the emissions that come from that manufactured nitrogen as well. It is a driver of climate change.

One of the reports that came out of FiBL quite recently suggested—this gives you a “for instance”—that if half of the EU went down the organic road between now and 2030 we would reduce the climate change impact of agriculture directly by 23% and by another 9% because of the energy that is used in manufacturing artificial nitrogen. If you went all the way you would be taking something like 64% or 65% of your agricultural greenhouse gas emissions out of the system.

Q140 **Kerry McCarthy:** I had a figure here that the ammonium nitrate fertiliser used in wheat cultivation contributes 43% of greenhouse gas emissions in a loaf of bread.

Helen Browning: Yes, that is a figure I have heard as well. Something like half of the emissions come from the nitrogen.

Q141 **Kerry McCarthy:** Going back to the talk about rivers and groundwater—perhaps the two organisations who have not come in yet want to take this—what do you think would be an achievable but ambitious target for the proportion of rivers and groundwaters meeting a good ecological standard by 2020? What do you feel that your role is in helping us achieve those targets?

Paul Cottingham: These things are very locally specific. You need to have the data coming in for a local area to understand what it is you need to achieve. In general, for NBZ, nitrate vulnerable zones, the level is set at 50 milligrams or 11.3. In certain areas where it is very sensitive like Poole Harbour, which was described earlier and where it is eutrophic, the level is more like 4 milligrams. It is a lot lower. What you need is good evidence of what is required for the ecology and a good understanding of what systems are already in place to try to deliver that.

Part of the issue is—again, taking Poole Harbour—that a lot of the nitrogen coming through to the harbour, as you heard the other day, is 30 or so years old. It is trying to get a balance between what is historic pollution and something that is current. It is about trying to deal with what you have in front of you.

Fraser McAuley: I agree with that. There are quite a lot of measures that farmers can take to reduce the amount of nitrate leaching into the groundwater. There are a lot of things that are well-known to the farming

industry that can happen, and the best way to do that is to offer advice, guidance and incentives for farmers who adopt these practices. I would say lessons we learned from organic agriculture like cover cropping, diverse rotations of crops, using less available nitrogen for crops and improved plant breeding would be suitable for making this impact we all wish to see.

Q142 **Kerry McCarthy:** We heard from the water companies just now that in some cases the farmers are willing to take up these incentives in return for being paid to do that, but other farmers are more reluctant. How do you think we can encourage them?

Fraser McAuley: I would say you need a baseline regulation, which we have currently. There is the Water Framework Directive and the NVZs, which are well-known and have had some benefits. For things that get above that baseline we need to introduce a payment for public goods or public benefits, one of which would be water quality and one of which would be biodiversity. Incentivising that but also using a lot of advice and guidance along the way would be the best way to get farmers to do that. There are already a lot of CLA members and a lot of good farmers in the UK who are adopting these measures. Sharing that best practice between them is a good way of doing that.

Q143 **Kerry McCarthy:** Presumably in the consultation on the command paper you will be feeding into that on the whole concept of public money for public good. You will be making that point.

Fraser McAuley: Yes. It is something that we have been advocating for five or 10 years, payment for public good. How that manifests itself would be in a land management contract, a multiannual contract to farmers to engage in the public benefits that we need but that also benefit farmers as well: biodiversity, water quality, air quality, permitting public access, tree planting and a whole range of things that need to be carried out. It is not just about looking at nitrates and water quality.

Q144 **Kerry McCarthy:** How do you think farmers will respond to that? Again, I think what we are interested in is that you will get some farmers who are very keen to take the agri-ecological approach or the organic approach and some farmers who are willing to respond to incentives, but what about the more traditional element who just want to carry on doing things the way they have always done? We know with the stewardship schemes and the current CAP payments that the take-up has been very low, partly because of the huge amount of bureaucracy that surrounds it. How can you mainstream this or standardise this sort of approach?

I have Paul coming in, then Helen.

Paul Cottingham: There is always a difficulty for what are called the "hard to reach" people. There are always going to be some people who do not turn up to meetings and do not read all of the bits of guidance in the farming press. You are always going to have difficulty getting to those folk. Otherwise, in general, you have very high engagement with these issues. You did have 70% or so of farmers involved in countryside

stewardship-like schemes. You have probably 90% of dairy farmers involved in Red Tractor Assurance and as part of doing the assurance stuff you have to do nutrient management planning and have manure management planning. There is already a lot of engagement.

To get more, I would suggest what you need is to make sure that those who are farming in their local area get to understand the data of what is happening there. They need to understand where it is coming from and what everyone else is doing. Then you need to have all the tools in order to take action, which includes having good advisors and things like support mechanisms through capital grants or something similar.

Helen Browning: We obviously need to put in place the right incentives framework and all the things that have been talked about. One area this Committee might want to look at is whether we need to do something more fundamental around manufactured nitrogen. In my own experience of becoming an organic farmer and therefore not using manufactured nitrogen, it drove a huge number of changes on my farm in terms of the way I valued my manures. I cannot bear it when people talk about manures as “waste products”. For farmers, they should be gold dust.

When I took over my farm we were putting all our manures on the fields that were closest to the buildings because it was convenient to muck out and chuck them on those fields. We were oversupplying massively in phosphate, potassium and, clearly, nitrogen. Those become hugely polluting areas of the farm. We were buying fertilisers to fertilise fields a bit further away.

If you start to talk about nitrogen budgets for England, possibly a cap and trade type of system for nitrogen or possibly a nitrogen tax, these things have problems attached to them but they are well worth looking at. If you can drive all farming to value the manures—which do have nitrates in them and do have problems, potentially—and you start to incentivise farmers to look after those manures properly, you have a chance at cracking this problem. We have to reduce the total supply and get farmers to look after their manures in a way that is going to be of benefit to them and to the environment too. I would start to look at the opportunities around nitrogen, hopefully providing some additional incentives as well for farmers to do the right thing. That might be a route worth pursuing.

Q145 **Kerry McCarthy:** Who has done good work on things like nitrogen budgets? Can you point us to sources?

Helen Browning: I can certainly send you what has been done. We have done quite a lot of work on this that we have not published yet. There are some issues around how you do it. I think it would be well worth teasing that kind of thing out and seeing whether there is a way of disincentivising the use of manufactured nitrogen and using some of that funding perhaps to encourage the kind of good practices that have been talked about further down the table.

Jane Salter: I would say that a lot of Helen has said has already happened. There has been a 39% drop in inorganic fertiliser use in the last 30 years. We have moved from an acute problem, a lack of awareness about nitrate and nitrogen in the environment, to a point where significant awareness is in place and a lot has been done to change practice. The reason that fertiliser use has fallen so much is because grassland farmers are using their manures more efficiently. The overall increase in nitrogen use efficiency in the last 30 years is 27%. That needs to increase. The industry knows there is an issue with nitrogen in the environment. That will be done by improved spreading technologies and new seed varieties.

To add on to what my colleagues from the farming organisations said, there are 5,000 accredited advisors now supporting farmers. We are a long way away from where we were. It is important to see that we are on a continuum and to keep driving it rather than always going back to the industry not caring, because it does. Attitudes have shifted no end. As the water industry said, we need to harness the positive skills and intelligence that are now on farm. Those conversations are of a very high quality and no longer is the environment the poor relation. Agri-environment is one. That is where we are today.

Chair: Okay. A quick follow-up from Colin.

Q146 **Colin Clark:** I want to follow up on what Helen Browning has been saying. For the record, I am an organic farmer as well. I grow 500 acres of organic potatoes, carrots and other field crops, which is pretty intense organic agriculture. I have 25 years supplying big supermarkets with organic produce but I am also a conventional farmer and I want to debunk a myth. Agriculture is responsible for only 10% of greenhouse production. Since 2000 to 2016, nitrous oxide, methane and ammonia levels have dropped by 10%. You suggested that if the EU in large part converted to organic farming, we would drop the contribution we were making to greenhouse gases. How many more acres would be needed to replace the production of food if you moved from conventional to organic agriculture?

Helen Browning: That goes back to Kerry's original question, I think, because nitrogen is such an important part of us maximising yield. That question, "How do you feed the world and do it sustainably?", is one that many of us are grappling with. Some of the solutions around that are more investment in organic systems so that they become more productive, particularly cereals—the real gap we have is around wheat—and the use of systems like agri-forestry, where you can get much more production per acre without going down a chemical route. The use of productive trees in the environment is going to be a big part of that.

We know we need to be reducing waste. We are wasting a lot of food and we are eating too much food. There are some big challenges around that too. We know that business as usual is not going to feed the planet because we are driving towards a more meat-based diet across the world and we know that those consumption patterns are going to have to shift

under any scenario if we are going to feed everybody healthily and well and look after the environment. You ask a big question that has a very complex series of answers but, again, research has shown that if you model that right, if you reduce our consumption of meat to a sensible level and if you employ some of these new technologies and strategies, that an organic approach is very capable of feeding people well and we would not need that many more acres to do it. We would just need to use those acres slightly differently.

Chair: I am going to cut off this fascinating slight sidetrack and take up back to nitrates and phosphate with Philip. Thank you.

Q147 **Mr Dunne:** I would like to touch on monitoring and enforcement. Mr Cottington, you have touched on some of the informal monitoring that is happening through the system through farm assurance schemes prompted by their customers, which I think it would be helpful to elaborate on a little. We have had evidence mostly about pollution events when things go wrong and limited numbers of EA officers to monitor and enforce. We have not heard very much about what is happening to monitor nitrate levels through NVZs by the farming community and other users. I would be interested if you could give us any insights into that.

Paul Cottington: The bottom line through it all is that farming is an exceptionally complicated business. There are many different aspects to what they are doing. Part of what is required is the fact that you have to produce products that are suitable for the wider society, and part of how you might achieve some of those standards is through using assurance schemes. There are different assurance schemes available. Red Tractor is a big one and then there would also be things like LEAF that companies like Waitrose will use. Thinking of Red Tractor, about 85% of all crop producers and combinable-crop farmers will be part of Red Tractor, and around 90% of dairy farmers. Within it there are requirements or standards that you have to meet. For what we are talking about here, there are nutrient management plans and there are inspectors who will come out on a yearly or one-and-a-half-yearly basis and make inspections according to those.

Q148 **Chair:** Inspect the paperwork or the land?

Paul Cottington: They will do both. Thinking for a dairy farmer particularly, one of the requirements is to meet SSAFO requirements, for the silage, slurry and agricultural fuel oil order. The inspector will come out and they will make an assessment of the slurry stores that you have and whether or not they are meeting the SSAFO regulations, and accordingly they will report back.

Q149 **Mr Dunne:** I am a member of the NFU and the CLA and we have just had our LEAF inspection. For the benefit of the wider Committee, are these inspections annual or compulsory? If you are saying that 80% of land use and 90% of dairy farmers are within inspection regimes, could you elaborate on that?

Paul Cottington: These are voluntary schemes that people have entered into. It is not compulsory to enter into it.

Q150 **Mr Dunne:** No, but how frequently do you get inspected? Do you lose your LEAF status if you do not get an inspection within—

Paul Cottington: You will have a regular inspection. I do not know for LEAF but certainly for Red Tractor it would be on a year or one-and-a-half-year basis. You can also have spot checks. If there is an incident or some sort of issue has arisen then you can get an immediate spot check, and then depending on the severity of the issue you could lose your certification. If there is an issue, it is the same as what happens with the Environment Agency if there is an enforcement or something like that. The majority of the time, you will be given a timeframe in which to sort it out. In general, it is having a plan in place. Do you have a plan in place to resolve the particular issue?

Q151 **Mr Dunne:** In relation to the more formal monitoring enforcement by the agencies, the RPA in the UK is obviously a devolved matter so it is different for each nation. We have had evidence that there are not enough people doing inspections. Can you give us a sense, in NVZ areas in particular, of what kind of inspection takes place of compliance with NVZ requirements?

Paul Cottington: For NVZs, whenever the Environment Agency goes out in an NVZ area they will be looking at NVZ compliance. The RPA will be doing a certain amount of random checking. I think it is 5% of all holdings that will get an inspection.

Q152 **Mr Dunne:** In relation to NVZs?

Paul Cottington: No, across all of the areas.

Q153 **Mr Dunne:** Compliance across the whole of the RPA?

Paul Cottington: Yes.

Q154 **Mr Dunne:** Specifically focusing on nitrates for the purposes of this inquiry, does it form a part of routine inspection by an RPA to check, as the Chair says, not just the paper records but the activity on the ground?

Paul Cottington: Yes.

Q155 **Mr Dunne:** It is routinely inspected?

Paul Cottington: It would be, yes.

Q156 **Mr Dunne:** For 5% of RPA recipients?

Paul Cottington: Yes.

Q157 **Mr Dunne:** Okay. Could you give us a view—maybe somebody else would like to respond to this as well—in relation to pollution incidents? How involved is the Environment Agency in monitoring and then following up in the event of an incident?

Fraser McAuley: I am not sure. I do not have any of that evidence at the moment. Perhaps we could submit something else, or someone else might be able to comment.

Helen Browning: My understanding is that the biggest problem here is diffuse pollution rather than specific incidences that are much more pinpointable to the polluter. That is one of the difficulties in the nitrate area. This is about stuff seeping down through the groundwater over a long period of time. It is very hard to identify which farm it has come from. While if there is an actual pollution incident the Environment Agency are hot on those things, it is much harder for everybody to deal with this kind of diffuse pollution problem, whether it is nitrates, pesticides or anything else.

I was interested that we are now introducing soil testing as part of the water measures from April this year. That, as I understand it, is to include nitrogen as well as phosphate potassium. In my view, because nitrogen is so labile I do not see much point in testing soil nitrogen. It is very fluctuating. I would say it is very important to start testing soil organic matter because if you can improve your soil organic matter you improve the holding capacity of the soil to hang onto whatever nutrients are there, including nitrogen, and you are helping to mitigate climate change and all these other things as well.

It is worth looking at why we have gone down the route of NPK and not PK organic matter as the things we should be testing for frequently. At the moment I think it is five-yearly. That is fine. It will also be important to make sure that testing is being done independently and that we are developing a database that will give us some of the information we need to try to work out how we are making progress on all our soils issues. These things are interconnected. You cannot just look at one of these issues on its own. You do need to look at a whole basket of issues and try to find the right strategies to deal with a whole suite of problems, not just one.

Q158 **Mr Dunne:** Thank you. Would you like to pick up on that? Any other suggestions for improving the monitoring regime would be helpful.

Fraser McAuley: I would add that the recent 25 Year Environment Plan did talk about introducing a metric to measure soil quality. I think our metric is going to be based on soil organic matter for the reason just mentioned, it is an indication of soil health and a high percentage can have benefits toward reducing erosion, minimising flood damage and so on.

The other point I would like to make about monitoring and enforcement is that there has to be the advice side of it alongside it. An example of that would be one of the key things we try to get farmers to look at, a visual assessment of soil. It is using a spade, cutting into the soil and assessing it. You need the skills to do that. As well as the soil testing, simple things like that can have big benefits for both the farmer and identifying soil quality.

Helen Browning: Counting your earthworms. Very important.

Aileen Lawson: Can I add something? In Northern Ireland we have recently developed a Sustainable Agricultural Land Management Strategy and one of those recommendations was to look at improving the baseline. It was about improving our knowledge of our soils and our knowledge of our water. One of the proposals was to look at real-time water monitoring so that they really know what is happening in catchments. Then we can identify problems and tackle those. The other thing was LIDAR mapping, which looks at nutrient pathways. Because, as I said earlier, our main issue was phosphates, which mainly travel overland, that would help us to identify the problem areas and tackle those.

Paul Cottingham: An issue certainly I have found around monitoring is that it tends to be done from one or two points for a whole catchment and therefore an individual farmer would look at the data that comes in and go, "This does not seem to apply to me". What generally helps—it is something we have noticed in the Wessex area—is when people are very connected with the data. When they have had porous pots or something like that to look at what is going into the groundwater or they have good data on all of the surface water around them, people have a lot more ownership of what is coming off their farms and are therefore much better able to take action.

Thinking about this in relation to NVZs, you will quite often have one failure point for a whole catchment. A farmer will look at that and go, "I am nowhere near that. My farming type is such that I will never have an impact in the way that is liable to cause a nitrate issue. Therefore why am I being included in this?" Part of all of this is: how do we improve our science and understanding?

Q159 **Mr Goodwill:** I would like for us to look in a bit more detail at the possible post-Brexit landscape. Obviously current policy may be not tailor-made for the UK in the same way, although as a directive there is more potential for local transposition to take account of local issues. Could I ask what you would see as being the opportunities to make our nitrate policy more in tune with what the UK needs? Do you feel that the current EU regulation is one that we should continue to adopt?

Fraser McAuley: I would say I do not think it is possible to have a singular nitrates policy. Nitrates need to be covered under a wider food, farming and environment policy and under that would be a land management contract that would identify these vital public benefits that can be provided for by farmers, things like reducing nitrogen use or improving nitrate use efficiency, improving biodiversity and also planting trees and other things outside of this discussion. There is a real opportunity to go down this way that has been outlined by the Secretary of State in his recent speeches. Adopting payment for public goods would allow farmers to be rewarded for the benefits they produce, as well as having that baseline to ensure that the overall standard is high enough to minimise leaching and pollution.

Q160 **Mr Goodwill:** Do you feel there are any areas where maybe we could build in additional flexibility where possibly what is being currently implemented so that we do not face infraction is less effective than other things we can do, or do you think that what we have done and what we continue to do is assisting us to meet our obligations?

Fraser McAuley: Agriculture transition and leaving the EU is something I would not be able to comment on now but we would see the existing regulations continued, and then a more focused system of incentivisation and advice to ensure that the overall standard of farmers' knowledge is improved and an opportunity for those who do want to deliver these benefits is made available to them.

Q161 **Mr Goodwill:** Turning to the NFU, do your members feel that there are some unnecessary or unfairly restrictive regulations, for example on timings of application of organic manures, that they would want to see changed in some way to help, or are they resigned to the fact that things will stay as they are?

Paul Cottingham: The constant complaint is about the flexibility, bureaucracy and bureaucratic burden. If I think down to South Devon where the weather is very good—though it has not been recently—there is a lot of sunshine and you get a lot of grass growth. In general, the farmers there have the ability to feed their grass a lot longer into the season. When you have things like what is called a closed period within NVZs, it is overtly restrictive and it does not reflect local conditions. What would tend to happen is that when you go into a closed period in the autumn/winter you have to have your slurry store emptied, which creates an issue because you then need to put that somewhere. Then at the end of the closed period you need to be able to empty it again because it has filled up. What you probably had during that whole period is some good grass growth and in general farmers would say there is a requirement there. Being able to have flexibility around something like that would be very good.

The other part is around record keeping. You will hear an awful lot of them saying, "We keep records and yet it achieves nothing". The requirements of NVZ for many livestock farmers is such that the system does not really change. Why on earth are they having to do all of these bits and pieces if it does not actively result in a change in what is going on? If we could get more flexibility around things like that and be much more farmer-focused and outcome-focused it would be a good thing.

Q162 **Mr Goodwill:** Would another example of that be the strong advice that one should not spread ammonium nitrate on frozen ground? It seems to be a blanket piece of advice notwithstanding the topography of the ground or whether it is likely to thaw or rain later in that same day. Are there things like that maybe the Government could look at in more detail?

Paul Cottingham: That is coming in as a rule anyway in the farming rules from 2 April. The crucial thing with all of that is that the farmers are going to need advice and guidance in terms of how to best implement it

and support it all. We are very welcoming of things like this advice-led approach but in order to make that worthwhile you need to have advice to be able to help people meet those things and understand what it means, why putting nitrogen or slurry on frozen ground does not have an agronomic benefit.

Q163 **Mr Goodwill:** Would anyone else like to come in on that?

Helen Browning: Clearly there is such an opportunity with Brexit for us to be doing things differently in a whole range of areas, and I think the land management contracts approach that seems to be on the cards is a very sensible one. The more we can move towards looking at outcomes, the better. I know that is not easy, but we were just now talking about the fact that if we could be monitoring outflows for farms, for instance individually, you would be able to give that data back to the farmers and make them more responsible for their own practices. Those kinds of approaches would be really helpful.

When you are looking at outcomes rather than trying to prescribe absolutely everything that a farmer does, you have the opportunity to stimulate more innovation as to how to manage the challenges. There may be different approaches or different solutions that work on different farms or in different localities. Clearly there is an opportunity for us to promote more farming like organic farming. There is an opportunity for us to be thinking more about the manufactured nitrogen. How do we disincentivise the use of that as far as we possibly can, albeit it that nitrogen, as has been said, is very important for crops overall? There is the opportunity to make sure that farmers are all protecting our manures as well as we possibly can. No farmer is blameless in the nitrate game, organic farmers included. We still are doing things that we should not be doing. Some of those might include not covering manure heaps and not composting properly.

Q164 **Mr Goodwill:** We heard from the water companies this morning that there is no evidence organic farming is less likely to contribute to nitrates in groundwater than any other farming type.

Helen Browning: I would dispute that evidence. In the evidence that I have seen, over the rotation organic farms are much less likely to get nitrate leaching. I worked on this myself as a research student 30 years ago. There is good evidence on that front.

Where we do have problems in organic systems is that we have leaky moments within the rotation. The leaky moment is when you are ploughing out your grassland to establish your cash crop. Innovation there is going to be very important. Research to move organic toward no-plough systems and the use of more perennial crops like trees is going to be increasingly important because we all need to be moving away from ploughing and tilling. Every time we till the soil we release nitrogen so some of these no-plough systems are going to be crucial. There is an opportunity to do quite a lot in these areas.

Within organic systems I would always advocate, where it is possible, spring ploughing out of your grass leys so that you are not leaving that ground with only a vulnerable winter cereal. A winter cereal crop does not take up much nitrogen over the winter. You need something far more productive than that, a cover crop, to hold that nitrogen in the system. Ploughing out in the spring and making your first cereal a spring cereal is the kind of shift we can make—if your ground allows you to do it, if you are not on terribly heavy ground—that can really make a difference to the amount of nitrogen that leaches. There is lots to do.

Q165 **Chair:** I want to hear from the Ulster Farmers' Union about post-Brexit because you have not said anything and I am curious.

Aileen Lawson: Yes. Obviously Brexit offers opportunities for more flexibility. EU regulation tends to be a blunt tool at dealing with a problem rather than a holistic approach and I would agree with what Paul has said on the likes of closed periods. Farming by calendar dates is extremely restrictive and it does not offer any flexibility.

Q166 **Chair:** What about farms that cross borders?

Aileen Lawson: Cross-border issues are obviously going to be important. Our environment runs cross-border. Our waterways run cross-border. There has to be some sort of a mechanism to allow us to tackle the problems on a cross-border basis and allow people the flexibility to farm. Obviously it is a massive challenge and obviously we do not want to see a hard border returning to Northern Ireland. We need a mechanism in order to let that happen.

Q167 **Chair:** You have just described opportunities but then said there must be a mechanism and it is really difficult.

Aileen Lawson: Yes. We have to find a balance. We have to find a solution to both those issues. Certainly the rules are different on both sides of the border at the minute. They are not the same. We have members with land on both sides of the border. They are used to adapting to that. It is how different they are going to be, and we do not know. The sooner we know that information the sooner we can get on with dealing with businesses and getting businesses to adapt.

Q168 **Mr Goodwill:** To follow on from that, three of the four river basins affecting Ulster are shared. You have said, "We do not want a hard border". It is a porous border for water as well. How do you think that may work in the future if we have different regimes on both sides of the border in terms of tackling the common problems of high nitrate levels?

Aileen Lawson: We do have different regimes at the minute, within an EU framework. It really depends on how far we deviate from that framework. The rules south of the border are different from what they are in Northern Ireland but we both comply with the EU Nitrates Directive and the EU Water Framework Directive. It depends on how much of a deviation there is going to be from those EU standards.

Q169 **Mr Goodwill:** More generally, to the whole panel, obviously when the

Nitrates Directive came in some countries like Germany applied it to the whole country, which at the time I recall—I was in the European Parliament—was seen as a bit of a cop-out, rather than directing it to where the particular issues were. Denmark has a policy applied to the whole country that has been particularly effective. Would you say that we should be continuing to concentrate on the hotspots, the NVZs, or should we adopt a whole country approach to possibly improve the overall situation?

Aileen Lawson: If I may go first, in Northern Ireland we have a total territory approach. The whole country does comply with the Nitrates Directive. That was because the problems in Northern Ireland are widespread. We have two loughs, the main Lough Neagh in the middle and the Lough Erne system in the west. Pretty much the whole of Northern Ireland drains into those two main water bodies. We decided to go total territory and that has worked well. It has been difficult, it has been challenging, but the fact that every farmer in Northern Ireland complies with the same rules is almost easier because you can produce widespread guidance for everybody. Everybody is policed in the same way. Everybody was offered grant aid assistance to bring slurry storage up to date and up to new standard. That resulted in over £200 million of slurry storage investment being put in place in Northern Ireland, which allowed us then to improve our water quality.

Fraser McAuley: The new farming rules for water that come into effect in April of this year cover the whole of England. Therefore it is making sure all farmers in that area comply with these rules. NVZs, nitrate vulnerable zones, account for 58% of the area in the country. The rules associated with NVZs are quite complicated and there are quite a lot of calculations you need to carry out. I speak to farmers quite a bit who are attempting to comply with them and deal with them as best they can. I believe they are reviewed every four years. I would follow the review and see what the evidence suggests their full impact is and whether they should be changed or the designations moved at all.

Paul Cottingham: We always advocate that it should be a science-based approach and therefore in local areas where there is an issue.

A slightly tangential benefit is that on a four-yearly basis, thinking of the southwest, you will have areas that appear. What that means is an opportunity to go out to those farms and to speak about the issue. You highlight, potentially, a nitrogen issue. They will also then challenge it. Look at the evidence. You might perhaps go, in terms of source apportionment, "This might be more to do with sewerage treatment works or an urban area" or something like that.

Also, there is the ability to do appeals. You can appeal an area where the trend is downward and there are measures in place to prevent the area going back into a nitrate vulnerable zone. There have been areas that have been removed as a result of that. That provides an incentive for people to be doing good and also to be putting in measures that will prevent it going back into a bad state.

Q170 **Colin Clark:** DEFRA say the new farming rules for water will save an estimated £392 million for farm businesses and £309 million in environmental benefits. Do you agree with these figures?

Jane Salter: I would wonder what the baseline for this is because I know that a lot of that best practice is already in place. For example, 8% to 6% of improved soils are already sampled, though not for organic matter and I agree we should do that. Our data in this area is quite poor. Nobody really listens to me when I talk about the data but without those benchmarks we are not going to be able to properly measure progress or review what has already been achieved.

Q171 **Colin Clark:** Perhaps they are overestimating, do you think?

Jane Salter: Yes, I think so, but it is because there is a lack of investment in national statistics around agriculture generally, because of funding cuts. If we are going to see the success of the 25 Year Environment Plan, we also have to invest in the survey data that will enable us to map changes in farming practice. We do not know what takes place now at a fine scale and therefore we cannot measure what we might achieve in 25 years' time. That is why Government struggle themselves, because there is not sufficient funds available to survey the situation properly.

Fraser McAuley: I would agree that a baseline needs to be known in order to see what improvements can be made but there are also a lot of procedures or farming techniques that we know benefit soil organic matter, nitrate leaching or any other pollution issues. For those we do know already, there is a lot of scientific evidence to support that. I would suggest there that some of those actions need to be supported as soon as possible.

Helen Browning: I have no idea whether those figures are right or not but there are a number of things I would build on. On the idea that we need to be doing more monitoring, I mentioned earlier on my experience of shifting away from using manufactured nitrogen and the fact that we, as organic farmers, have to have nutrient budgets. We do a budget for every field every year that looks at the offtakes and what we are putting back on by way of manure. That to me seems like common, standard good practice that we should all be doing. We should all be testing our soils regularly. We should all be adjusting our manure usage according to what we have taken off those fields and using those manures as if they were proper fertilisers.

I had assumed, if I am honest, that everybody, organic or not, was doing this kind of thing now, that none of us were still putting all those manures on the fields closest to the buildings and then buying fertiliser to spread on the further away ones, and that we were all doing nutrient budgets. I was shocked, speaking to farmers last year, to find that this is still not common practice. We do need to make sure we are doing some of those core things well right now.

Who knows whether your figures are right? It might be much higher than that. I have no idea.

Q172 **Colin Clark:** They are not my figures. They are the Department's figures.

Would you agree with that? Do we not record everything that is applied in an NVZ and have fertiliser plans?

Paul Cottington: Yes, you would have to do crop requirements and you would have to have risk maps in terms of where you would be spreading. You would have to have a plan of where you were looking to apply and when you would be applying manufactured and organic—

Q173 **Colin Clark:** It is recorded in NVZs. How much of the land is covered by NVZs?

Paul Cottington: It is around 50%.

Fraser McAuley: It is 58% of England.

Q174 **Colin Clark:** The majority would have to be doing—

Paul Cottington: Yes, and you would also be doing crop requirements anyway under your farm assurance for Red Tractor. What is needed along with all of this, crucial to all of this, is making sure that a farm is viable and making sure that this is reflected in your balance. What people do need are better tools to enable them to make the right decisions. Currently, an awful lot of the tools—things like PLANET—are exceptionally complicated. You need to have free tools that enable people to make the right decisions about where they are going to put the nutrients in order to get the best yields for their crops, with the most appropriate crop in the right place.

Q175 **Colin Clark:** I am conscious of time. Does anyone else have something burning to say? I will move on to the next question.

The RSPB said that farmers who are meeting their cross compliance requirements will already be meeting their new legal obligations under the new farming rules for water. Would you agree with this? If so, how will it deliver benefits?

Paul Cottington: I have already had notes from farmers saying they are concerned about where their animals are accessing rivers and therefore whether or not they would be compliant with the new rules. For example, they have access across a river to go to other fields or they use that point for drinking and therefore if there is poaching, would that mean that they have broken the rules? If they have, what support is there in order for them to be able to put in new water sources?

Q176 **Colin Clark:** Interestingly enough, in Scotland we already have that.

Paul Cottington: You have, yes.

Q177 **Colin Clark:** We are encouraged to—

Paul Cottington: You have shared boundary rules, yes. There is a concern about what the changes will be and what these things will mean

locally, particularly in areas where there might be things like flooding, where you have wet fences or something like that. What does it mean? There is also the fact that some poaching is good for the ecology. It is good for invertebrates and things like that. How do you maintain a balance?

Q178 **Chair:** What do you mean by “poaching”?

Paul Cottingham: “Poaching” is where you would have a piece of grass and then the animals would go across and muddy it up. It can sometimes be a mucky point in a field but it will have shallow water in it that warms up quicker than the other areas and therefore is good for things like invertebrates.

Fraser McAuley: If the new farming rules for water and soil can ensure cross compliance is communicated better to all farmers, it is a positive. Not all farmers are part of BPS or countryside stewardship. There is just the baseline regulation for them. There is a lot of good information in there that a lot of farmers are already acting on. It needs to be built on in the future in terms of further guidance about what else can be improved because the baseline that could be improved by adopting some of these rules would not necessarily be enough to deliver the benefits that the public wants in future, hence why there needs to be further policy developed after we leave the EU, which would reflect these potential benefits farmers can deliver.

Q179 **Colin Clark:** My last question: these new farming rules for water are mandatory measures, as are the cross-compliance measures under the existing CAP. Are there any other measures that you think should be made mandatory, bringing benefits for both farmers and the environment? Difficult to ask an audience of people who are probably, “Farmers do not want any more rules”. The last thing they probably want is something that is more mandatory.

Aileen Lawson: We have different rules. It is a completely different regime, but certainly what we would find is that regulation and rules do not deliver water quality on the whole. They deliver a certain element, but to get improvement, I think what you need to do is work on a holistic basis in catchments with farmers on the ground, get local people involved in the work. There are three examples of good projects of that happening that have seen really good results and farmers have bought into that, where you can get good information about what is going on in a certain catchment and work in that area because the blunt tools in regulation, do not deliver an awful lot to tackle those unique water quality problems in local areas.

Jane Salter: Yes, I would agree. The regulations do play a role and this new culture around the new rules is good, insofar as they are not as prescriptive as the EU approach. I think these will give farmers options from a menu to achieve an outcome, which is something that I think we need to keep on the table as an opportunity through Brexit. Maybe we will not need, in the longer term, so much stick if the industry takes more

and more of the slice of the cake. Because we have such a good attitude now, it would seem a shame to use a stick and push farmers and their advisers back from the huge investment that they are making.

In the organisation I work with, £9 million is spent every year training the advisers in environmental protection, £50 million in the research for sustainability, because our members have sustainability commitment goals. It would be a tragic thing if we did not partner, use the combination of the regulatory framework and the industry goodwill and effort that has developed over the last 30 years since the awareness has grown. We would look for more partnership working, as the water companies have said, so that we do not backtrack, because once you have lost the trust in this generation, it will never come back.

Helen Browning: Once you have lost the viability, too, of the farming sector. I think there is a need to make sure that we are doing things that will allow farmers to still make a living. The framework we need to put in place needs to have the right carrots and sticks and we need to get that balance right in order to be able to ensure that you do have really well-performing—physically, financially and environmentally—farming. We need to make sure we are rewarding the already virtuous. There are lots of farmers doing good things and we need to make sure that they are not penalised by the fact they have gone ahead of the game and done the good things before they have been required or paid to do so.

Two or three things to add in there. I have talked about organic matter. I think we need a much bigger focus on that. That is one of the key things we could be monitoring and driving. We need to be thinking about some of the very large and intensive livestock units and using the manures out of those in the right way, because they can provide a potential resource, but they can also be a liability. Some things—like even outdoor systems of livestock, more and more people are moving towards that. With wintering, which is a great thing for the animals in many ways, we have pig systems, sow systems that are outside. The requirement to move though particularly outdoor pig units on a very regular basis is crucial if you are not going to get massive amounts of nitrate leaching from underneath those units. You leave a sow unit on a ground for two or three years at a time, you are going to have a huge spot problem in those places.

I think there are some areas where we will need to look a bit harder, but we need to get this balance, this framework, absolutely right, not just from the nitrate point of view, but from a whole host of other perspectives too.

Q180 **Joan Ryan:** Defra is publishing an overarching clean air strategy later this year. What are you expecting in terms of ammonia emissions? Jane, do you want to start?

Jane Salter: Yes. I am expecting, with my crystal ball, that the codes of good practice for mitigating ammonia will become more important and that elements of those codes may be generally binding in future in order

to support the reduction in ammonia emissions. The industry knows exactly where they are from and is taking an active part to reach the targets. There will be an economic gap. Some of the measures are technically feasible, but they are not economically feasible within the time, so I think we need to look at that. But the fertiliser industry especially knows what the targets are and will deliver on them.

Fraser McAuley: I attended a workshop with Defra on the clean air strategy to look at some of the ways in which agriculture can mitigate ammonia emissions. They talked about some of the targets they need to hit in the future. I think some of the requirements they are suggesting around improved slurry handling on livestock units, improved slurry storage and then there is also likely to be some restrictions on larger-scale dairies were some of the ideas that were talked about.

One thing I would say, some of the ideas they did suggest were good on paper. However, the difficulty in practically implementing them in a good timeframe might place undue pressure on contractors and people who build the slurry storage required as part of the strategy. I would agree with what Jane has just said, fully aware of the importance of it, and I think farmers would be more than happy to get involved and do what they can to reduce ammonia emissions.

One more thing, if I could, is that there is a bit of a contention between nitrates and ammonia, because the guidance is to incorporate nitrogen as quickly as possible into the soil, which improves air quality, but then that is going to have a negative effect on the nitrates leaching through the groundwater into the river systems. That contention between the two areas suggests there needs to be a more holistic approach that encompasses pesticides as well as nitrates and fertilisers and slurry storage.

Q181 **Joan Ryan:** Can I bring everyone else in? From what you said, air quality is often portrayed as an urban issue and I have pretty much an urban constituency, so I am more aware of that side of things. However, have you all fed into the clean air strategy and do you think that looking at ammonia along with NO₂ in urban air pollutions is the correct approach, or picking up on some of what you were saying, would it be better to look at nitrogen pollution in its various forms in a single strategy? Everybody can come in on this.

Chair: Okay, let's bring it out. Who has fed into the clean air strategy? Any of you? Only CLA and Soil Association? Three of you, fine. Let's hear from the people who have put in then.

Helen Browning: Our overall take is that it is important to look at nitrogen as a whole, rather than just trying to divvy up all the different forms in different strategies. I completely appreciate some of the tensions we have between how we handle some of this stuff. One of the areas where we see big ammonia emissions is from very intensive livestock systems. That is where a lot of this is generated and there is recent evidence showing that animals living outside are less problematic,

because it binds more quickly and you do not get those big concentrations. I think there are some really interesting tensions around some of this. Again, manufactured nitrogen, the over-supply of nitrogen to the system, is creating some of those ammonia problems, but it is often associated with these very high-density livestock systems.

Paul Cottingham: We will send in a copy of our response to you, but the crucial things are that it is very important this goes generally across all forms of nutrient use and how farming is managed, which is about how do you embed best practice. It is about things like using low emission techniques and making sure that they are appropriate for a particular area. Along with all of this, you get to areas of thinking of the more intensive larger businesses, which will be controlled under IPCC, Integrated Pollution Prevention Control, where there will be a requirement to use best available techniques. It is making sure that you also have join-up with all of the other regulations and techniques for managing issues.

Q182 **Chair:** Anyone want to hazard why ammonia emissions have increased by 3% between 2015 and 2016? Any theories as to why that may have been?

Jane Salter: My understanding was the increase of use of anaerobic digestate and the increasing proportion of urea fertilisers.

Q183 **Chair:** We are going to come on to urea. You think it is an AD issue potentially?

Jane Salter: A combination. Having spoken with the Defra team, who talked to the inventory team, I understand they are the two reasons, an increase in anaerobic digestate, ie the digestate from the AD process, and also an increase in the use of urea fertilisers by comparison to ammonium nitrate based.

Helen Browning: That will be because urea is cheaper at the moment than ammonium nitrate.

Jane Salter: Yes, but it is to do with world supply and demand and it is likely to drop back.

Q184 **Chair:** Is it feasible to ban the use of urea, as Germany is planning to do from 2020?

Jane Salter: I think it is feasible to make that one of a number of binding requirements, so a farmer could be obliged to reduce his ammonia emissions by X, Y or Z, and one of those should be to use a mitigation technique to reduce the ammonia. It could be buying a product with an inhibitor, but the efficacy of the inhibitors, we do not have those data, so there is a big range in how efficiently those treated urea fertilisers perform. I would like to see that we get the scientific data in place before any binding rule comes in. But the industry is not backing off from the fact that it will not import the better product. We do not make urea here, by the way, it is just imported. We need to make sure that we have the scientific data behind it before we go into this.

Q185 **Joan Ryan:** A previous expert scientist has said that Defra does not seem to consistently ask for contributions from experts, so we do not have that and we do not have data. It does seem a little bit—

Jane Salter: Sorry, I do not understand the question.

Joan Ryan: We were told in relation to witnesses we had previously that there is an opportunity for a more coherent and holistic approach, an overarching nutrient strategy, which would tackle all sources of nitrogen. We have been told by scientists that Defra does not seem to consistently ask for contributions from experts. Do you pick that up in your contact with Defra?

Jane Salter: Maybe it is not consistent, but certainly the people that I have dealt with of late around this issue are highly engaged with the academics. I do not see a problem currently. I think it may have been intermittent in the past.

Q186 **Joan Ryan:** Where does the lack of data come from then?

Jane Salter: My comment about lack of data?

Joan Ryan: Yes.

Jane Salter: My comment is around the data on farming practices. You need data on farming practices in order to inform the national inventories and it is that that we are lacking. We do not know what happens on the ground robustly enough to extrapolate those mitigation techniques into the inventory.

Q187 **Joan Ryan:** You think they would need both, wouldn't you, the data and the scientific expertise?

Jane Salter: You do need both. The academics may well have said, "We are short on the activity data on farms in order to populate the inventory". That is maybe where the comment came from.

Joan Ryan: Possibly.

Q188 **Mr Goodwill:** If I could follow up on urea, obviously there are climatic considerations in terms of the amount of ammonia loss from urea applications. Obviously farmers tend to use it early in the season, when it is colder and less likely for that to happen. Germany has banned urea, but they have a warmer climate. Is there enough data out there to indicate how much is lost? Farmers always assume that it is not unit for unit, you have 40% urea and 34.5% ammonium nitrate, and you cannot assume all that will be available. Is there enough data out there to make a decision on banning or restricting the use of urea?

Fraser McAuley: I would say Germany planning on banning in 2020 is very close and I do think not think that would be applicable in the UK, particularly in light of the EU exit looming on the horizon. I would also say that it is in farmers' interests first to look after their business and looking after their business would involve ensuring they spread the minimum amount of urea at the correct time, which it has to be above a

particular soil temperature and also have some moisture on the way, whether that is through morning dew or through a bit of rain.

Farmers who take care and ensure they do that are going to reduce the ammonia emissions anyway. I do not think it is feasible to suggest that that would be suitable in 2020. I think there are other measures that can be used, improving use of manures, as we have talked earlier, but I do not think a blanket ban in 2020 would help the industry or the wider public in some of the targets we need.

Jane Salter: I do think we need UK emission factors. We have European ones at the moment, which we will use in the UK inventory. Because of our maritime climate, the variability of ammonia loss from urea will be probably greater than the standard European figures. Losses of ammonia from urea can range from 5% to 50%, so if managed well, if farmers follow all the guideline rules, they can keep the losses at the lower end of the range without a ban.

Q189 **Mr Goodwill:** We have stopped using it on our farm, but it is because of the variability in quality and you cannot spread it 24 metres accurately, not for the reason given, but I have never had any good information about how much I am wasting by putting urea on instead of ammonium nitrate or ammonium sulphate.

Jane Salter: The industry would prefer a more holistic approach, where farmers are given the tools to measure the actual nitrogen use efficiency of their products and their techniques in that year and then it would be a ground-up approach.

Q190 **Chair:** Also the new fertiliser directive that is coming out—it is a regulation, it is part of the circular economy package—looks at banning ammonium carbonate fertilisers. Is that something that you all support?

Jane Salter: Yes, absolutely, ammonium carbonate. Yes, agreed.

Q191 **Chair:** Does everyone agree with that? Sorry, what is the NFU's problem with it?

Paul Cottingham: I must admit that I have not looked into it.

Q192 **Chair:** It is not that, no, you do not support it?

Jane Salter: It is not used anyway, so it is not a problem.

Q193 **Chair:** Okay. How feasible would it be to design slurry as a waste, requiring specific regulation for storage and handling and use on land?

Helen Browning: How to design it? How to design systems for it, sorry?

Chair: Yes. How feasible is it to make a regulated waste?

Mr Goodwill: There was a proposal 20 years ago and it was binned because it was seen as you would have get all the tractors and trailers registered as waste transportation vehicles and all that sort of thing.

Q194 **Chair:** This has come from the NFU and the Soil Association's evidence.

Is it feasible to designate it as a waste, a bit like the sludge that comes out of sewage works?

Helen Browning: My take on it is that we need to make it a precious resource that farmers want to look after, rather than having to over-prescribe around all the rules about exactly what you can do everywhere. I think if we can give farmers the information and we can make sure that they really value the waste, that would be a great thing. I think we have very intensive big lots of waste, of farming manure in one place as slurry systems, that sort of thing. I think you do need to look very hard at those intensive livestock systems and make sure that there is not a pollution risk from those systems. AD might be part of that, for instance, in terms of managing that. I will need to check our own evidence, but if I understand you correctly, regulating everything around the use of manures on small-scale farm would be possibly a pretty traumatic thing to put farmers through, but I can come back to you a bit more on that if need be.

Paul Cottingham: I am not sure what the benefit would be from doing all of that. You already have in place things like the SAFO regulations, which control how you store it. You also have these farming regulations that are going to be controlling meeting requirements. What we should be trying to encourage—

Q195 **Chair:** I think this is the water companies as well, because they are concerned that people are chucking it on willy-nilly, in a bit like the way that you were describing just close to home, over-applying it et cetera, then they are dealing with the run-off and we, the water bill payers, are paying for the cost of clean-up.

Paul Cottingham: That would be a climatic issue, where I presume there has been a rainfall—

Q196 **Chair:** No, it is a management and handling issue. It is not climatic. It is people understanding when to spread it and clearly people—

Helen Browning: How to store it.

Chair: How to store it et cetera. It is not just—

Paul Cottingham: Yes. Through assurance schemes, you already have to do crop comps, you have to have your manure management plan, which shows you where you are going to be using it and at what time of year you are going to be using it, so you have to be—

Q197 **Chair:** That is not regulation, is it? That is just—

Paul Cottingham: It is not, no. No, it is in farming rules. That is now.

Q198 **Mr Goodwill:** If my memory serves me right, when I was on the European Parliament's Environment Committee when this was discussed, there was always going to be an exemption for use of waste on that particular farm. It was only when you exported waste to a different farm that it would then come into compliance. Of course that would go against what we heard from the Soil Association, that we need to encourage

intensive units to move their nitrate-containing waste on to other more extensive agricultural arable units.

Helen Browning: Yes, that is crucial.

Paul Cottingham: It is interesting. On that point, one of the areas down in South Dorset, the reason why the NVZ system works very well is because there is a large dairy farm there that has an excess of slurry and it works very well with the other tenanted farms that connect to it, which are arable, and they meet their nitrogen requirement. That I think is a crucial thing, how do you develop collaboration and co-operation between people?

Jane Salter: To add that, I think we have to admit there is probably a gap in the grassland area, the livestock area, in terms of advice, delivery. We are trying to make good that gap by training the feed advisers, 1,000 of them, to help farmers with their manure management problems. But it is going to be slow, because what has happened in the arable side, the livestock side do not have that same support. There is no ownership for the management of muck as there is in the same way ownership for the management of other imports. It sort of falls between everyone's responsibility area, so designated advice to support farmers in the livestock areas will be key. Industry will make its provisions, but anything that can be done to help support the catchment sensitive farming work in with the grassland livestock farm areas can only help. It is a neglected area that the industry needs to help. We need to provide more support.

Helen Browning: I think one of the other areas where we need to provide more support is in the investment that farmers need to make to have the right facilities. It is hard on any not enormous farm today to justify the kind of facilities that you need to manage your manures really well. I think if we go down the route that we probably should do of trying to get practice into the right place, we need to help farmers make that transition in terms of their facilities. There has been grant aid available for things like slurry covers and that kind of thing. I would like to see proper composting facilities on farms so we are stabilising a lot of the nutrients before we are applying them to the land in the first place.

Obviously some of the nitrogen inhibitors may be helpful there as well. I think we need to make sure that farmers can afford to make the transition into better systems that are going to minimise the risk from nitrate and all other potential pollutants from their valuable manures.

Q199 **Glyn Davies:** My question is aimed principally at the NFU and the UFU, but not solely, I don't think. Having spent the first part of my life draining land with Government support, very significant Government support, I now find that wetlands are five times more effective than the best-managed land in preventing nitrate going into the atmosphere. Suddenly everything has gone into reverse. Being a public-spirited fellow, I joined in this in a big way. I am really interested why the wetlands, bogs or whatever else, are just not developing as one might have expected they would do when there is financial support for that to happen. Why isn't it

happening?

Paul Cottington: I certainly see within the south-west there is the creation of an awful lot more wetlands, so whether that is in the Combe areas in North Devon or lower areas down in Somerset, so people are involved in creating it through schemes. There is also the thinking of the Hampshire Avon, which Penny Johnes has done a lot of work on. There are lots of people who have been involved in doing river restoration, which has been about reconnecting the flood plain and creating wetlands there. Yes, there is a lot, but then there is an awful lot of benefit to having good control of water on your farm and having good drainage and being able to manage that. It is all about when you make your application and where that then goes to. It is crucial, so it is about looking at your crop requirements and again what you are putting on.

Q200 **Glyn Davies:** You are telling us it is happening, when the sort of information that I have is that it isn't. There is a scheme in place for development of new wetlands and they are just not happening on any scale. Are you telling me that they are?

Paul Cottington: I am not sure of what the scale would be needed in order for it to be significant, but I have and do see wetland creation schemes.

Aileen Lawson: There are some wetland schemes in Northern Ireland as well, but again, as I said earlier, Northern Ireland is generally poorly drained soils and our rocks are lower permeability, so you do not have the same issue of nitrates leaching down through the surface, so it is slightly different. But a lot of our ground, our land in Northern Ireland, has been drained as well in order to support the agriculture and the farmers who work there. That has really been the way they have developed their businesses over the years.

Q201 **Glyn Davies:** Are we thinking about this in big enough of a scale? I want to ask you to reflect on something that I am particularly keen on and it is something called the Pumlumon scheme. I have tried to get a debate on this three or four times in the adjournment debate and failed. There is something stopping me ever getting this up in the ballot, but this is rewetting 100,000 acres on Pumlumon. The driving force for it has been flood alleviation on the whole Severn Valley down through England—it ought to be something the English MPs are all hugely keen on as well—and also biodiversity. It is terrific for biodiversity if you flood a huge area. Do you think we should be getting in on doing a big scheme? Because there is no way it can happen without a compensatory payment scheme of quite a large scale for the farmers, clearly it would be less productive land. Do you there is scope for schemes of that scale and so on?

Paul Cottington: The difficulty with doing these kind of things, it is not land management change, this is land use change, and it is about something that is quite often in perpetuity. If I think of some of the mires South West Water has been doing on Dartmoor and Exmoor, where they have been blocking some of the ditches up in the moorland there, the changes there are in perpetuity and the returns to the farmer tend to be

minimal. It is paid for through the water companies and ostensibly through their CSR—corporate social responsibility—side of things. It is not showing a massive value to them. The change for the farmer, and I am thinking of one particular farmer up on Exmoor, has been quite swingeing. They have had to reduce their livestock numbers an awful lot; they have to put in more drinking water troughs, which come with costs. It is about trying to make it so it is viable.

This starts moving into delivery of natural capital, because you are also looking at things like carbon and things like that. What we do not have at the moment are all of those markets and therefore the ability to be able to reward the landowner/farmer for the provision of these other services.

Interestingly, we had an Uplands conference in the south-west a month and a half or so ago and we asked the question of the farmers, "Do you see natural capital as an opportunity?" and about 80%-odd of them saw it as an opportunity for their business, so what has to happen is trying to convert that feeling of goodwill and seeing it as an opportunity into a realistic business opportunity that will work for them.

Q202 **Colin Clark:** Can I ask a general question of everyone? I think it is accepted that wetlands are beneficial in terms of control of nitrates. What do you think Government needs to do to have the development of wetlands taken up on a large scale, on a much larger scale than that? We have been talking forestry quite a lot. I hear a lot of discussion about forestry, but I hardly ever hear any discussion about expanding wetlands and it is probably more effective.

Helen Browning: I think Paul has just given quite a good sense of the kind of schemes we need to have in place if you are going to give farmers the confidence and the viability to go into those schemes. I think it is quite daunting for farmers themselves if you have been always taught—as you indicated when you started your piece—that to be a good farmer, you drain your land and you get as much food off it as possible. Switching to thinking being a good farmer is now about reducing the productive capacity of my land and either growing more trees or wetting the land again in itself, quite apart from the schemes, that is quite a challenge, a cultural challenge, I think, to our farmers. But if we get the frameworks in place, if we get long-term payments in place that allow farmers to go down those routes, then I think that farmers will join together and do that kind of stuff. It could have huge benefits for biodiversity, for carbon capture.

On the management of our waterways too, we have spent the last few hundred years straightening out our rivers and we all know now that by slowing down flows, even in drained land you can do a huge amount to improve the silt going into our rivers. You can do all sorts of things if you can start to slow water flow down through the landscape. I think these landscape scale projects are really exciting, quite daunting, but really need thinking through and the right kind of long-term support in place to make them viable.

Chair: We are going to leave the session there. Thank you all very much indeed for coming.