HOUSE OF COMMONS

Science and Technology Committee

Oral evidence: GM foods and application of the precautionary principle in Europe, HC 328

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Written evidence from witnesses:

- Department for Environment, Food and Rural Affairs (Defra) and the Department for Business, Innovation and Skills (BIS)
- Food Standards Agency
- Advisory Committee on Releases to the Environment

Watch the meeting

Members present: Andrew Miller (Chair); Jim Dowd; Mr David Heath; Stephen Metcalfe; Stephen Mosley; Pamela Nash; Sarah Newton; David Tredinnick

Questions 406-486

Witnesses: **Professor Rosie Hails**, Chair, Advisory Committee on Releases to the Environment, **Professor Peter Gregory**, Chair, Advisory Committee on Novel Foods and Processes, and **Professor Guy Poppy**, Chief Scientific Adviser, Food Standards Agency, gave evidence.

Q406 Chair: Can I welcome the first panel to our session this morning? For the record, it would be helpful if you could introduce yourselves.

Professor Hails: I am Professor Rosemary Hails. I am science director for biodiversity and ecosystem science at the Centre for Ecology and Hydrology. I am here as chair of the Advisory Committee—to DEFRA—on Releases to the Environment. I am also a member of the Natural Capital Committee.

Professor Gregory: Hello; I am Professor Peter Gregory. I have two jobs. I am chief executive of East Malling Research, which focuses mainly on fruits and perennial crops in Kent. I am also professor of global food security at the University of Reading. I am here today as the chairman of the Advisory Committee on Novel Foods and Processes, which is a scientific advisory committee of the Food Standards Agency.

Professor Poppy: Hello; I am Guy Poppy. I also have two jobs; it seems to be the norm. I am the chief scientific adviser to the Food Standards Agency. I am also a professor of ecology at the University of Southampton, where I have undertaken work on GM for almost two decades.

Q407 Chair: To set the scene, it would be helpful if you could explain where your respective organisations fit, what role they play in the regulation and governance of GM foods and crops in the UK, to what degree there is overlap in the respective roles and whether there are any gaps in the structure.

Professor Hails: The current version of ACRE was established by section 124 of the Environmental Protection Act 1990. Since then, it has been reviewed a number of times to ensure that it remains fit for purpose.

Q408 Chair: Reviewed by whom?

Professor Hails: For example, there was a non-departmental public body cross-Government review in 2010. It retained its status after that. It is reviewed by DEFRA—by Government.

Our role is to provide advice on the risk that GMOs pose to the environment and to human health in the context of environmental exposure. We do not do food and feed safety or contained use; that is covered elsewhere. We also do not look at plants or organisms used in agriculture or veterinary medicine that are not produced by genetic modification. Occasionally we are also asked to provide advice to DEFRA on non-native organisms. That is a non-statutory role.

Professor Poppy: The Food Standards Agency is a non-ministerial Department, led by a board that is currently chaired by Tim Bennett and comprising a number of members. I am one of the executives who report to that board. The role that it has in this is as the competent authority for the GM food and feed regulation (EC) No 1829/2003. That means that it is responsible for the implementation, including authorisation and safety, of GM food and feed in the UK. We work closely with colleagues and have a series of independent scientific committees that advise the Food Standards Agency on a whole range of issues. In this particular case, the Advisory Committee on Novel Foods and Processes, which is chaired by Peter, provides that expert input to us.

Professor Gregory: As has already been stated, our committee is focused on food and feed. Do you mind if I call the Advisory Committee on Novel Foods and Processes ACNFP from now on? Until 2004, ACNFP had the remit to look at GM foods as well, but that was taken away to be dealt with by the European Food Safety Authority. All safety assessments of GM food now occur at European level, whereas all of the other novel foods that are introduced to the market are dealt with on a national basis. The UK is the competent national authority.

We provide advice to the Food Standards Agency on safety assessment. Basically, we do a risk assessment of any novel food that is going to be introduced to the market. Currently those novel foods are not GM foods, but we receive reports from the European Food Safety Authority in the same way as Rosie's committee does. We are able to liaise between our two departments; our two committees liaise on a regular basis about any likely changes.

Q409 Chair: None of you responded to my invitation to identify any gaps or overlaps in the structures. Are there any?

Professor Poppy: The important point—which I am sure we will come on to later—is whether there is a gap in the actual process, as against whether the process is being worked through properly. From my observation, in terms of how the scientific aspect of the risk assessment is being done, certainly, on behalf of the Food Standards Agency, we are very satisfied with the rigour and robustness with which the scientific risk assessment is being done.

Professor Hails: We have a central system in Europe, with applications for import or commercialisation being processed essentially by EFSA, as Peter mentioned, but we are then required to provide scientific advice to the UK Government to support the UK's voting position at EU level. That is how we interact with the EFSA process. We provide opinions on EFSA's risk assessments.

That is important for a couple of reasons. One is that Europe covers quite a range of farming systems and farming environments. Of course, we focus very much on the UK farming systems and farming environment. The other thing that varies quite a lot across Europe is the degree to which evidence-based advice influences policy. We strongly advocate evidence-based advice in support of policy in the UK.

Professor Poppy: I am sure we will come on to it, but there are probably two aspects. I mentioned that the process is sound, but there is perhaps the issue of how it is operating. Two issues that concern people are the time scale on which the process operates and how the risk decision is sometimes made for values beyond science, which get confused for scientific reasons for a decision. Many people are concerned about those two issues.

Q410 Chair: If you had the benefit of having a blank sheet of paper and were creating this regulatory structure now, would it be the same or different?

Professor Hails: I would start by saying that when the current regulations were first conceived, back in the 1980s, to focus on the method by which these organisms are produced, the scientific community was advising—rightly so—that this new recombinant DNA technology should be regulated. Since then, over the last few decades, we have got much greater in-depth knowledge of plant genomes—how they behave and their

variation—and the use of transgenic technology. We have a whole plethora of new techniques by which crop varieties can be produced.

It now turns out that the original construction of the regulations was not future proof. If we were constructing a new regulatory system, the scientific community and ACRE would advocate one that was trait based, rather than based on the method by which crops are produced. The only trait-based system is that in Canada. At the moment, if you were considering a crop that was very well known—maize, for example—and were inserting into it a trait the behaviour of which you understood very well and that had a long history of safe use, but that was produced by recombinant DNA technology, in the EU it would need to go through the regulatory system. If there were a trait-based system and you were looking at a history of safe use, it would not necessarily need to do so. We would advocate using novelty of the trait as the trigger for regulation.

Professor Gregory: Could I comment and give another example of where the current way of doing the regulation is going to run into trouble? My own field is perennial trees. Breeding perennial trees poses a number of particular problems, not least because many of them take many years to come into flower. If you want to do breeding, you really want something that flowers fairly regularly. In the United States there is now a plum that has been genetically modified. It has had a flowering gene inserted that enables the plum to flower in 18 months—and it flowers continuously. That is not something that you would want to happen in a crop, but as a breeding technology it is pretty good.

Let us say that you want a nice big, juicy plum. As Rosie was saying, that gives you an opportunity to cross, to breed and to get lots of children, as it were—lots of progeny—very quickly. Once you have done that, using the genetically modified tree, you can use standard breeding techniques and a technique called back-crossing to remove that genetic component and end up with your nice big, juicy plum. Is that a genetically modified plum? Under European regulation, it would appear that it is, because you have used a genetically modified plant to get that plum. Under American regulation, it is clearly not a genetically modified plum. The problem that the current regulation imposes is that, if you received this plum, there would be no way that you could ever detect that it had been produced in that way, because there is no genetically modified DNA in it. That is the way in which the technologies have moved on.

The question that you are asking about the current regulation is apposite, because there are already emerging problems with the way in which that is applied and whether you can enforce the regulation that currently exists.

Professor Poppy: I agree with my colleagues. The one cautious note I would sound in negotiations with the Commission and others is that, if we move towards a more trait-based approach, many of the issues that are considered in GM but not in other systems should not be moved across. I know that some people are concerned that it would complicate regulation for everything, rather than just overcomplicate it for GM. Be careful what you wish for.

Q411 David Tredinnick: I will focus on risk assessments for a moment. These questions are really for Professor Gregory and Professor Poppy. What do the risk assessments carried out by your committees involve?

Professor Hails: In answer to the last question, we talked about the trigger that creates the risk assessment. The second point is about the questions that are asked in the risk assessment process. I would then make a third distinction in that across the world there are differences in the information required to answer those questions.

We have just discussed the trigger. In Canada, for example, we have a trait-based trigger; in Europe we have a method or process-based trigger. Once that trigger has gone off, essentially the risk assessment process asks the same sort of questions—the structure is very similar. However, I would say that there is divergence again in the amount of information that is deemed sufficient to answer those questions. More recently, in particular, there is a direction of travel in Europe to ask for more and more information and, essentially, for each risk assessment to start from scratch, rather than necessarily take account of a history of safe use and other forms of information like that. That is the first point that I wanted to make.

Professor Gregory: Can I tell you how my committee does risk assessment, bearing in mind that I am talking about non-GM foods? I will relate that back to the EFSA procedure.

Essentially, we receive dossiers from companies that want to market a particular new product. Let us make it real. Recently we have received a series of dossiers from companies that want to market chia seeds. This is a new food in the context of European regulation; it is not something that has been eaten widely in Europe. When we receive the dossier, there is a standard set of areas that we have to assess. These are European-wide. There are essentially six criteria. What is the process for producing the food? Is there any likelihood of microbial contamination? Are there any microbial processes involved? What does the toxicology look like? Is there a likelihood of allergenicity, and so on?

For each of those, essentially we look at two things. Risk assessment is the product of two things: can you identify any hazard, and what is the probability—the likelihood—of that happening? That forms the basis for our risk assessment. It is that advice, which we then pass to the Food Standards Agency, which informs its voting when it goes to Europe. That is the main process. If a second company comes along and wants to supply chia seed, as has happened recently, it can do so under what is called a substantial equivalence assessment. All that it needs to prove is that its chia seed is very similar to the chia seed that is already marketed. We can then fast-track things.

The same set of processes applies to what EFSA does with GM foods. Essentially, the same framework of risk assessment is gone through. It may take a little longer; they may require other information than we do. Added to that, recently there has been the requirement for animal feeding studies to be done, but basically the process is the same.

Q412 David Tredinnick: Do you think that you add anything to the process carried out by the European Food Safety Authority? Are you running something in parallel to that?

Professor Gregory: In relation to GM food, it is EFSA that does it. Our additionality is in terms of doing the non-GM food.

Q413 David Tredinnick**:** In your view, are the risk assessments carried out on genetically modified crops more or less vigorous than the risk assessments carried out on other types of food products?

Professor Gregory: They are more rigorous in the sense that they now also require this additional animal feeding study. That is not something that we would necessarily require. Typically, they also require a higher level of authentication than we would for a non-GM food.

The final difference is that the non-GM foods are things that are essentially new to the European Union. To a large extent, up until now, most of the GM crops have been crops that we have been growing for some time and have a fair amount of knowledge about. In that sense, we are in danger of requiring quite a lot more detail than we would apply to the example that I gave of the chia seed. If a second chia seed comes along, we look at it and say, "This is very similar to the first. We can give it the approval to go ahead." If that were a GM food, it would require a lot more documentation. So, in that sense, it is a much more rigorous process.

Professor Poppy: EFSA has six months to undertake the risk assessment. As you have probably heard, the process often takes considerably longer than that—in some cases, many years. That is because it is able to stop the clock during the risk assessment to ask for further information. There is much discussion about that from companies providing these dossiers, who say, "We want real clarity on what sort of additional information you require so that this does not constantly come backwards and forwards."

In 2013, the Commission produced a new document that tried to articulate far more clearly the sort of information that was required for that risk assessment so that it would be a much faster process. The UK voted against that document because of the 90-day animal feed requirement. Rosie alluded to this point earlier. In terms of maize, soya and crops like that, unless there is a nutritional modification of the crop, there is no scientific basis, just because it is a new GM event, for why having a 90-day animal feeding trial, which is somewhat against the aim of reducing the number of animals involved in testing, would be useful in enhancing the risk assessment. That is why the UK voted against the 2013 modification.

Professor Hails: We need to be a bit careful about using words like rigorous and robust. If the information does not add anything to the process, it is becoming more onerous for no scientific reason. Within the environmental risk assessment, we see the same direction of travel, in that there is this pressure towards harmonising data requirements in Europe.

To harmonise things, essentially you require information on everything conceivable, to cover the full range. That is moving away from the way in which the risk assessment was initially conceived—the case-by-case approach, where you look at the crop and the trait, construct risk hypotheses and then ask for the information to answer those, rather than just asking for all of the information you could possibly conceive of. I would be nervous about using words like rigorous and robust, because it gives the wrong impression.

Q414 Mr Heath: That is an extremely valuable point, if I may say so. So-called harmonisation is the antithesis of risk assessment, in some ways. Professor Hails, I want to ask you about your own committee. As I understand it, it deals with GM and non-native species. Is that right?

Professor Hails: Yes.

Q415 Mr Heath: Are there other releases to the environment that would be or, potentially, could be a significant risk?

Professor Hails: No. Well, a non-native species could pose a very significant risk, so it is appropriate that we have that as part of our remit, but the process is rather different. When there are issues and we are asked by decision makers to comment on the risk assessment for a non-native species, it is much more driven by the case-by-case approach. We consider the specific example, construct risk hypotheses and ensure that the information has been provided to answer those. We can sometimes ask for focused monitoring in the environment after the release, if we feel that that is necessary. One recent example was the case of a psyllid to control Japanese knotweed, which was commented on by my committee.

Q416 Mr Heath: Is there not at least a potential illogicality in not dealing with what I can loosely call more conventional breeding methods and their outcomes? This may go back to what you were saying earlier about trait-based investigation. That class of organism may have exactly the same traits as a GM organism, but you do not do the work on it.

Professor Hails: Precisely. As I mentioned earlier, it would be much more scientifically justifiable for the trigger to be on the properties of the organism. If you are introducing a novel crop to this country, there may be something about its novelty that should be regulated to prevent it from becoming weedy or invasive. Yes, I would entirely agree with that.

Q417 Mr Heath: I am very aware of Professor Poppy's admonition that we should be careful what we wish for so that we do not end up with an overregulated—

Professor Hails: Absolutely. That is why it is all the more important that we focus on making the risk assessment process flexible, proportionate and efficient. If we wish for and succeed in constructing a regulatory system that has a different trigger, initially it is perfectly possible that we will capture more rather than less. It is, therefore, all the more important that the risk assessment process is fit for purpose.

Q418 Mr Heath: In case I have forgotten, there are no other organisations that deal with releases to the environment and fill in some of the gaps that you do not have within your remit.

Professor Hails: Non-GM crops are not regulated in the same way.

Q419 Stephen Metcalfe: Professor Hails, in your report you suggest that the EU regulatory framework is not in need of some tweaks—it needs a complete overhaul. Is that a fair summary?

Professor Hails: Moving to a trait-based system would be a complete overhaul. We also point out the fact that in other risk assessments, for pharmaceuticals and pesticides, you consider the benefits as well as the risks. That is something that we do not explicitly do at the moment.

Q420 Stephen Metcalfe: Do you think that, as they stand, the proposals that are under consideration are a significant improvement on where we are now?

Professor Hails: Are you referring to the cultivation proposal?

Stephen Metcalfe: Yes.

Professor Hails: We have not been involved in the cultivation proposal specifically, although we are aware of it. It seeks to overcome the deadlock that there currently is in Europe, but essentially it is a political construct rather than something that has a scientific evidence base.

Q421 Stephen **Metcalfe:** You talk about the phenotype-based system.

Professor Hails: Trait based—yes. There are a number of similar—

Q422 Stephen **Metcalfe:** My question is, are those interchangeable?

Professor Hails: Yes; they are.

Q423 Stephen Metcalfe: They are the same thing.

Professor Hails: Yes. Often people used to talk about product versus process. By product, we mean the phenotype or the trait—basically, the properties of the organism—rather than the process, which is all about the method by which it was produced.

One of the key problems now is that that method of recombinant DNA technology is defined in the legislation. Obviously, they did not have the foresight to see the range of methods by which we can manipulate genomes in much more precise and smaller ways that are within the bounds of natural variation. That was not foreseen, so now we have this slightly bizarre debate about whether or not a method is technically captured by the legislation. To some extent, that is a necessary but nonsensical debate. It has led to the point where there is confusion about whether or not certain techniques are going to be captured. Because the regulatory system is now very onerous, that lack of clarity is not helpful at all.

Q424 Stephen Metcalfe: But moving to a trait-based system would introduce some clarity.

Professor Hails: Defining novelty would also produce challenges, for sure, but it is more scientifically justifiable. The debate around whether something has novel properties that could potentially pose a hazard is rather more sensible than one about whether something is technically in or out of the legislation as it currently stands.

Professor Poppy: At this stage, it is important to highlight the difference between the risk assessment and the risk decision that is being made. In that sense, it is important to know that, since 2004, by far the majority of EFSA's risk assessments have been in favour of a GM food or release, yet since 2004 there has not been a single majority vote from the member states to the Commission's consultation with them. That is the issue; it is not the framework as such. You could have a very different risk assessment scheme, but if the member states, through block vote, decide to vote against it for non-scientific reasons, largely political, you will end up in exactly the same situation, the only difference being that the number of risk assessments that are done or the amount of data will drop. I do not think that you will have any change in the ultimate outcome.

Q425 Stephen Metcalfe: That is interesting. Professor Gregory, do you want to add anything to that?

Professor Gregory: No, that is absolutely right.

Q426 Pamela Nash: Good morning. I would like to concentrate on the new genetic crop technologies that we have and to look at how those are regulated at the moment and how they

could be regulated. We have touched on this already, but EFSA has said that in most cases the framework that currently exists is adequate for these new technologies. Can I ask for your views on that?

Professor Hails: EFSA produced a scientific opinion on the new technologies. We agreed with that scientific opinion. There are two issues. Again, I draw a distinction between where the trigger is activated and what happens after that trigger. Basically, what happens after that trigger would be adequate. The risk assessment framework is still appropriate for organisms produced by the new techniques. The issue is whether or not those new techniques are technically captured by the regulations.

Q427 Pamela Nash: Is it clear at the moment what the trigger is?

Professor Hails: In the context of these new techniques, it is not clear, because we did not envisage the many methods that are now being used. It is not technically clear whether or not this comes under the definition of recombinant DNA technology. Originally, that was all about moving genes between species that are not sexually compatible. These new techniques are about moving genes between species that are sexually compatible, altering the configuration or even just making a point change. They have filled in all of the grey space between conventional breeding and recombinant DNA technology. The issue is, where do you draw the line? Quite rightly, EFSA did not define where you should do that. Again, that is where it moves from being a scientific decision to being a political one.

Professor Poppy: Rosie is absolutely right. You are probably responding to reports such as that by the BBSRC on genome editing and epigenetic modifications. This is where the end trait is the key thing and we get away from the issue of whether or not they are GM in terms of how we define that. Some of the definitions that are used are incredibly complicated and quite different from the working definition that many of us use. That is an example of where a trait system would allow you the opportunity to be much more homed in on what this is about, rather than the semantics of, "Is it or isn't it?" However, I reiterate the point that it changes the risk assessment but does not ultimately change the risk management decision, which is a member state issue.

Professor Gregory: That is absolutely right. That is what we see, too. The survey that EFSA did of the new technologies was shared between our two committees; we commented jointly on that. Of course, there will be other new technologies that we do not know. This is a rapidly evolving field, so to have a regulatory framework that ties you to a process—or an interpretation of a process—is at the margins of credibility now and, if you take the example that I gave of a plum, it is going to make life very difficult. It will involve many more non-scientific judgments than we would like to see. The UK generally feels that the risk assessment side of things should be based on science. We make a very strong case for that in the written documentation that has been produced. Of course, the management of that risk involves political factors. That is beyond the remit of our committees.

Q428 Pamela Nash: What is the alternative? What should the framework look like in order to prepare us to look at the new technologies that are coming forward?

Professor Gregory: There are two things, as my colleagues have said. One is that we need to move towards a trait-based approach. In other words, as I might express it, we should look at the product that is being produced, whether it is a crop or whether it is a food. We should look at its properties and do the risk assessment on the basis of that product. That is one aspect of the regulation.

When you move to the risk management side of things—the political decision—I do not know how you deal with that in a regulatory framework if, for example, a group of politicians have it in their manifesto that they will not accept anything that is produced by this particular technology. That is not something that it is easy to regulate for. It seems to me that that is where the principal problem currently lies. You cannot get a majority vote because at that management level, which deals with implementation of the decision, there is no agreement across Europe.

Professor Poppy: This is probably where the issue of the precautionary principle comes in. The precautionary principle is a tool principally for risk managers. Risk assessment, if it has unknowns, tends to go back to the individuals and say, "We want you to offer more certainty associated with this identified hazard." That is why the process can take a long time. They stop the clock in this six-month period while they are going back to say, "We need clarity on this particular issue." The precautionary principle is more to do with the risk managers rather than the risk assessment. My colleagues who go to Brussels regularly argue that the precautionary principle never needs to be applied within the risk assessment, because the risk assessment asks for more data where it sees a need for that, anyhow.

If we come to the people making the decisions, the issue there is the reason why they are making the decisions that they are making. If, as risk managers, they are making those decisions for non-scientific reasons, one cannot argue with that, but they need to be transparent and explicit that that is the case. Where there is confusion, it is because sometimes they use the precautionary principle to say that they are making these decisions on scientific grounds, based on a theoretical hazard. It is impossible to prove that something is totally safe. You could spend many years and millions of pounds looking for extremely rare events, but people could still say, "You may still not have found it." The precautionary principle is being used as a scientific reason in the management decision when it is not. People may be making their decision for other reasons.

Q429 Pamela Nash: There are lots of foods that are detrimental to health that we perfectly accept in society without a single regulation.

Professor Poppy: Absolutely.

Professor Gregory: The other point to make is that in Europe we are also seeing a move away from risk assessment to merely stating hazard. We have seen that, for example, in the pesticide regulations. My committee regularly looks to assess hazard. It starts with the

hazard—is there a likelihood that this could be detrimental? Then you look at the probability, and then you look for the data to sustain or otherwise your hypothesis of that particular hazard. However, it has to be done on a case-by-case basis, because the hazards that might emerge in chia seeds, for example, would be fundamentally different from those in a new oil produced from algae. So you have to do it on a case-by-case basis. You have to create hypotheses about what the hazards might be and then you look for the evidence either to substantiate or to dismiss those hypotheses.

Q430 Pamela Nash: I have a couple more questions, to round off. Will there be an impact on this area of research and possible products if they are treated in a blanket way as genetically modified crops? Where are we in terms of a time line on these technologies? When can we expect to see this be an issue? When will they come through regulation?

Professor Poppy: On these issues it is sometimes difficult to link cause and effect; sometimes you have to correlate information. However, the suggestion that major biotech companies are moving away somewhat from the European market is one indication, perhaps, that this is having consequences for European or UK consumers in many ways. That is illustrated if you compare the number of field trials. Rosie will have more information on this than I do, but in recent years there have been 4,000 field trials in the US—which, I accept, is a much bigger country—and only four in the UK. It is having consequences in terms of the willingness of industry and, to some extent, the scientists in universities and research institutes to pursue work in this area. Most of them really want to see their work have an impact; it is not just about generating academic papers. The message they are receiving back is that the European environment is perhaps not as welcoming of what they are doing or that it is less likely to have an ultimate impact there than it would elsewhere. I think that there are consequences.

Professor Hails: They are well aware of what is happening at the moment to applications to grow GM crops commercially, which must influence them. Now we have only eight applications in the system. One of them has been there since 1996, I think; 12 applications have been withdrawn. They were submitted to the system and, basically, those who submitted them have now given up. That backdrop is not encouraging.

Professor Gregory: Can I add to that, having been director of the Scottish Crop Research Institute in Dundee for six years and now at East Malling? In the 1980s, East Malling was researching genetically modified apples and the browning of apples. It had a gene and was growing these things in the field, without any problem at all. In Scotland, the Scottish Crop Research Institute was growing genetically modified potatoes in the field in the early 1990s. All of that work has stopped.

If I had a young crop scientist who was looking to make their mark, would I advise them to stay in the UK to pursue their career? You would have to think very hard about giving that advice, given what has happened—the move of resource out of this country and away from Europe to the United States and now, increasingly, to China. I am sure that you heard that when you took evidence from Syngenta. The atmosphere that has been generated over

the last two decades in this area has not allowed the UK to exploit its excellent previous record in plant and crop research. It has had a major effect and continues to do so.

Professor Poppy: One of the issues present in the days when I was working in this area, in the '90s, was: why take any risk if there is not a benefit? That was often something consumers raised. When one looks at the more modern generation of crops, which are often modifying the output, one begins to see the benefits. For instance, we know from a food point of view that one of the issues in making crisps, which one might challenge in terms of whether or not it is a good food, is acrylamide, which is a serious food issue. There are GM potatoes in research trials that would have a significantly reduced level of acrylamide having been through the crisp process. In that sense you can see an end product of significant benefit to a consumer, whereas reducing herbicide or insecticide use might be seen more as a benefit to the farmer rather than to them as a consumer. One would argue that one does not want to lose that type of potential benefit to the consumer by putting blanket bans on things.

Q431 Sarah Newton: Professor Gregory, in your previous statements to us you mentioned the excellent work going on in Scotland back in the 1980s, and the dreadful loss to us that all of this has now stopped. I would like to talk a bit about the devolved Administrations. The UK Government have said that decisions about GM are devolved. The Scottish Government—correct me if I am wrong—have taken a fairly open anti-GM position, and Wales probably even stronger. To all of the panellists, to what extent are you involved in advising the devolved Administrations on matters to do with GM?

Professor Gregory: I can deal with that in two ways. First, my committee has representatives from the devolved Administrations on it. We provide advice to the UK Government, so I am not directly involved in providing advice to the devolved Administrations. Currently, my committee deals with things on a UK-wide basis.

In relation to Scotland and GM crops, my experience from my six years up there was that the Scottish Government were very definite in their view that they did not wish to see GM crops planted. That had a significant effect on the research programmes undertaken in Scotland and also on the possible collaborations between scientists in Scotland, funded by the Scottish Government, and other parts of the UK, but I do not think I can say more than that.

Professor Poppy: I can comment. In terms of food, the Food Standards Agency is the competent UK authority, and that still holds when Food Standards Scotland evolves in April this year. There is a key question in relation to the risk assessment and the decision. I do not think the devolved Administrations have a different opinion on the risk assessment whatsoever. The science does not change. How science is done and interpreted in the risk assessment makes no difference, whether you are in Wales, Northern Ireland, Scotland or England. That does not change. You see the differences in Wales and Scotland in terms of making a decision using issues other than just the science. They have a different view on that and have different reasons for making a decision. As long as why they are doing it is transparent, people might challenge it but they will understand and accept it. If it becomes

blurred and they are making decisions partly on issues surrounding the uncertainty of the science, that is problematic and people would be concerned.

Professor Hails: Just like Peter's committee, we also have observers from the devolved Administrations on our committee. They are free to contribute or comment as they see fit. They have responded favourably to all the reviews there have been of ACRE, and we have not yet been in a position where they have gone against our advice. They have always agreed with our advice. The distinction that Guy made between the scientific essence of our work and then the decision is a good one to make.

Q432 Sarah Newton: If it is not your job to advise them, where do they get advice from? I understand they sit on your committees, but where do they seek advice practically to help them make these decisions, albeit they may end up being political decisions and they ignore the science? What is the mechanism for them? From whom do they go and take their advice?

Professor Poppy: I can talk to you about the food side of things. In each of the devolved Administrations, there is an advisory group that works closely with the Food Standards Agency's board and executive. In fact, the board contains members from each of those advisory groups and there is significant consultation between them. That group consults and listens to the views of stakeholders in the relevant country so that the Board's advice to Ministers in the devolved administrations is informed not only by the scientific risk assessment, but also be any other relevant factors that apply.

Professor Gregory: I have nothing to add to that.

Q433 Sarah Newton: You do not really know where they are getting their advice from.

Professor Gregory: In terms of risk assessment they get their advice from us. We provide that for the UK Government, and the devolved Administrations are there. I am afraid I do not know what the devolved Administrations then do within their countries.

Professor Hails: Likewise.

Q434 Sarah Newton: You might not be able to answer this question then. To what extent do you think that the decisions the devolved Administrations are making are evidence based?

Professor Poppy: I come back to the point I made earlier. I would have concern if the decision is being made on issues surrounding uncertainty of the science if, say, Scotland is coming to a very different decision from England in looking at the risk assessment. I do not think it is. If, however, the decision as to whether to grow crops in Scotland, as against England, is being made on issues to do with wanting to create what they see as a greener environment, a GM-free zone and so on, that is incorporating value-based as opposed to science-based issues, which Sir Mark Walport talked about. People are within their rights

to have those, but it needs to be clear that that is the reason being used and there is not some scientific evidence that is being interpreted differently.

Q435 Stephen Mosley: On this Committee we have scientific experts who provide us with information, but if a member of the public wants to learn more about the techniques available in genetically modified crops or regulation where should they turn?

Professor Gregory: In terms of my committee's work, we publish all of our minutes; they are available on the website. For example, the papers that are shared between us are available on the website. When we do a safety assessment and a dossier initially comes forward, an outline of that is placed on the website. When we have made a preliminary safety assessment, it is put on the website for public comment. We take account of those public comments in making our final recommendation, so there is quite a deal of transparency. The information is there on the ACNFP website. I stress that that is principally for non-GM foods. For GM foods, EFSA's opinions are typically available on its websites, so most of this material is publicly available.

Professor Poppy: The Food Standards Agency in general prides itself on open policy making. At the first board meeting I went to I was really surprised to see members of the public and a Twitter feed in which people could ask questions about what had been discussed and why decisions were being made as they were. That is a really good example of open policy making. EFSA is also very keen to be as open and transparent as possible with its decision making and the policy making associated with its risk assessments; and it is talking to the UK, which it sees as an ideal model that it would like to adopt at European level. We are ahead of the curve on that.

Professor Hails: All of ACRE's meetings are now open to the public. Just like Peter's committee, all of our minutes and working papers are on the website. We also hold another kind of public meeting. For example, a couple of years ago we had an open meeting on GM insects where we invited people to speak. We had an audience and questions and debates around issues. Sometimes we hold those kinds of focused information-gathering meetings also, which are open to the public.

Q436 Stephen Mosley: One of the statutory functions of the FSA is to provide advice and information to the public on matters of general interest relating to food. How well do you think the FSA does in producing information not just about GM but the new technologies that are coming forward?

Professor Gregory: In terms of what ACNFP does, we are in fact the only advisory committee within the FSA that does not hold its meetings in public, for the reason that we are receiving commercially sensitive material in dossiers, but, in so far as we can, all of that material is put on the website. We also hold a public meeting on an annual basis. The last public meeting attracted 50 people. We use that as an opportunity to inform as to what we have been doing, but over the last three years we have also held a series of workshops

in which we solicit views on issues which we know are coming down the track—for example, on nanotechnology as applied in foods and the whole issue of how you calculate a safe dose. The feedback and public interaction we have had at those sessions has been extremely useful to us in some aspects of our risk assessment process. In so far as we can, we are completely open and transparent and open to receiving advice from the public. So, as an outsider, having seen how the Food Standards Agency compares with some other Government Departments, I think you can be very proud of the way it deals with those issues.

Q437 Stephen Mosley: Coming back on that, you are an expert and you understand the topic inside out; members of the public out there do not. I am interested in how you are working to make sure members of the public, who do not have that detailed scientific background, understand the basics and get an honest scientific view of it.

Professor Gregory: In a sense we are experts, but I always say I could never be a member of my committee. I could be its chairman but never a member, because I do not have that. It is important not to underestimate the scientific knowledge that exists within the general public. Not all but many of the people who come to those meetings have a great deal of knowledge which they are seeking in one sense to improve but also share with us.

Professor Poppy: We work with consumers a lot to get an understanding of what issues concern them. Interestingly, in the recent surveys we have been doing GM is quite low down the list of concerns. For instance, antimicrobials in feed and food safety when eating out and so on are much higher than GM, if you ask people about their concerns. We also have a consumer representative on each of our advisory committees. Peter has two consumer representatives. These are individuals and the consumers total many millions, and the question is: how do you get information to or from them?

One of the major campaigns in the FSA at the moment is to do with campylobacter, which is the most serious food poisoning issue. You may be aware that last June we ran the Don't Wash Your Chicken campaign using social media. That reached multiple millions of people at a key time of year when campylobacter is prevalent in the industry and people tend to be barbequing and potentially not cooking food quite as well as they would at other times of the year. That was a way in which we were able to use a modern method of communication to get the message across to many others.

In the evolving strategy from 2015 to 2020 we are quite interested in a whole range of issues that relate to the consumer's interest in food. We recognise that it would be foolish and naive to do that in isolation. It would be good to work alongside lots of organisations and other Government Departments on some of those issues. If you take food waste as a key issue where GM can have a contribution interestingly, because it has multiple relevance, the best strategy would be to work across Government with various Departments that are interested in that to produce a systems-type solution rather than address it in terms of how one Department views waste but it then becomes more of an issue for another Department.

Q438 Stephen Mosley: Can I bring it back specifically to genetically modified and ask about that particular area?

Professor Poppy: I know that other people have come in front of the Committee, including Rosie, and highlighted the trait aspect of GM. I do not think it should be singled out in such a way that it is vastly different from anything else. As an adviser, having a GM debate as such is not necessarily a sensible thing. It would be interesting to accept that there are issues to do with food security. If we do not address some of these broader issues, food prices will go up and a whole other range of issues will happen. The move by BRIC countries to more meat and dairy products will have big implications for food availability and price. That is there and it is going to happen. What is a useful debate and the Food Standards Agency has started to talk about is communicating with the public through a range of means in terms of innovation, technologies and approaches to address this big question and, rather than flag up one by itself, to work in an interactive way to say that these issues are happening and one cannot ignore them, but what are the ways in which we can look at them and try to offer this two-way dialogue on these issues?

Professor Hails: I would like to say something in support of that, which links to other work in the Natural Capital Committee, in that in the UK we expect a number of benefits from farmland. Of course, food and fibre are a very important reason for having farmland in the first place, but it also shapes our landscape; it provides the basis of the food chain for much of our wild life and also recreational opportunities through access to farmland. The debate should be around sustainable intensification, as Guy indicated, but also how we are going to manage our farming systems to balance the different benefits from the farmland, because we cannot have everything. We need to have a debate about what farming systems are going to deliver what suite of benefits. GM is a part of that but a very small part of it.

Q439 Stephen Mosley: I fully understand that, but there is a "but" here. On the FSA website where you talk about novel technologies, you list GM, animal cloning and nanotechnology. Do you think it is useful to highlight it in that way?

Professor Poppy: That is a good question. They are probably the modern technologies that people have heard of and which the consumers in these surveys would bring to our attention, which is why we have done that. As an adviser to the Food Standards Agency, I would echo what Rosie says. I think a more useful way forward is to highlight the fact that business as usual is not the solution. Is it more precautionary to move forward carefully and consider a range of options and ensure you make appropriate decisions based on the evidence, or to stay put because of the unknown unknowns? That is a question I ask undergraduates at the university.

Q440 Jim Dowd: The most precautionary position you could take is to do nothing, is it not? Professor Poppy, although I think it predates your involvement with the FSA, the failed public dialogue exercise of 2009 is well documented. In your estimation, has the FSA learned anything from that, and, if so, what?

Professor Poppy: What it has learned is that, first, to single out a specific controversial issue like GM and have an extremely wide-ranging panel required to oversee something like that is likely to have problems associated with it in getting agreement on what is the best way forward. I understand that was a major issue in why the process started to cause concern.

Secondly, moving forward, the useful aspect is to say that, if UK consumers are to have access to affordable food that is safe to eat and is authentic in terms of being what it says it is, issues like sustainable intensification or new technologies need to be examined, because business as usual is not the option. What we have probably learned is that, rather than single out anything like GM, we should approach a question that cannot be ignored and discuss how to go about answering that bigger question.

Q441 Jim Dowd: In that context, the House of Lords Science and Technology Committee recommended that the FSA should "cultivate a culture of direct open and timely dialogue with the public". Could you give us a brief outline of how that is coming along?

Professor Gregory: Guy is relatively new, as you have realised, at the Food Standards Agency. I have been in post since 2009. I am not employed by the Food Standards Agency. I would simply say that quite a number of things have changed since that failed dialogue. For example, the Food Standards Agency has set up a social science research committee, alongside its other advisory committees, and that has brought together many of those consumer interests and public interests in a co-ordinated way. The other thing that has happened since then is that the Food Standards Agency also has a general advisory committee for science—a so-called GACS committee—which brings together all of its advisory committees. That provides a much more focused way of having the sorts of dialogues you are talking about in the future.

Professor Poppy: First, next Tuesday I am meeting the chairman of Sciencewise, which was the organisation we worked with in 2009, to see how we can address this wider question. So we are starting that level of consultation. Secondly, we are actively involved in the GO-Science *Which?* dialogue with the public, which is picking up some of the issues but from a broader perspective. I think we have shown signs of beginning to participate having learned from that experience.

Professor Hails: A more general observation on why it is difficult to debate controversial issues like GM is that there is quite a wide set of interpretations as to what constitutes evidence. Scientists will have one view of what constitutes evidence; social scientists might have a different view; and a member of the public might have another view. What they read in the newspapers constitutes evidence for them. Any future public dialogue

needs to navigate that territory very carefully. It is an absolute minefield; it is very difficult.

Q442 Jim Dowd: I think you have covered it in general, but is there not a need for a continuing and developing dialogue with the public on the subject regarding it?

Professor Hails: Yes, absolutely.

Professor Poppy: But the bigger global food security question and the implication that has for all UK consumers cannot be ignored. So, the dialogue needs to be: how do we prepare ourselves in the UK to have the best food future in relation to what that is, not pick one particular thing and have a dialogue about that?

Chair: Can I thank the panel very much for their attendance this morning? It has been very helpful to us. We will go straight on to our second panel, if we may.

Witnesses*:* **Lord de Mauley**, Parliamentary Under-Secretary of State for Natural Environment and Science, Department for Environment, Food and Rural Affairs, and **George Freeman MP**, Parliamentary Under-Secretary of State for Life Sciences, Department for Health and the Department for Business, Innovation and Skills, gave evidence.

Q443 Chair: Gentlemen, thank you very much for coming this morning, with apologies for running a few minutes late. As you heard, it is a particularly interesting evidence session. If I may start off with you, Mr Freeman, for clarity, when was it decided that your remit would include agricultural biotechnology, and what exactly is your role in this field?

George Freeman: Chair, thank you for the chance to be here and to clarify that. As the first Minister for Life Sciences, my predominant responsibility is for medical life sciences and research. I am a Minister at BIS and DH, but the Prime Minister has asked me to take a strategic role at BIS to promote the bio-economy and the importance of bioscience more broadly, working with Ministers in other Departments on food, medicine and energy to make sure we are laying a foundation to harness the extraordinary potential of bioscience, biotechnology and industrial biotechnology across the board. I have no specific ministerial responsibilities for DEFRA-related issues and agriculture. My only role is to stand in for Greg Clark, the Science Minister, as co-chair of the agri-tech industrial strategy leadership council, which I have yet to do.

Perhaps I may take this opportunity to say that I was formerly chair of the all-party group on agriculture, science and technology. I come from a farming background. I declare an interest. I have a very small shareholding in a traditional agricultural seeds company which has no GM-related interests.

Q444 Chair: We might ask you: why not? Lord de Mauley, is there a structural relationship between the two Departments in this particular field?

Lord de Mauley: My Department's primary role of course is as a regulator, so in that sense we look at seeds and crops, GM and other, in that way. The relationship with BIS is perhaps enhanced by the recently announced agri-tech strategy where we work seamlessly to promote new technologies through that entity.

Q445 Chair: You heard the tail end of the last session and the discussion around public engagement and the need for that to be around food security, how we feed the growing population of the planet and so on. What role do you see for genetic crop technologies in tackling the challenges of global food security?

George Freeman: At the very highest level, as a strategic UK view, we see enormous opportunities globally for British science and leadership in genetics and genetic science across the board. Part of our industrial strategy is to make sure that our deep scientific leadership is being used to support inward investment from emerging economies facing extraordinary pressures of food security, which will demand big applications of science. You know, Chair, that the world has to double[1] world food production in the next 30 to 40 years on the same amount of land with less water and energy. These are phenomenal global grand challenges that will require science. We want to see inward investment in our science base, but we also want to see our science used to develop the products that will help the world achieve that phenomenal global grand challenge. So, at BIS, the policies are to support that investment in skills in the research base—in the cluster—and DEFRA obviously leads on the incorporation of those technologies in our own supply chain.

Lord de Mauley: A number of authoritative reports have indicated that GM technology should be seen as an important option in improving crop production. There was a major report last year entitled "Planting the future" by the European Academies Science Advisory Council, and a recent report to the Prime Minister by his Council for Science and Technology. GM offers the potential to increase production and maintain it when it might otherwise be reduced with crops that resist disease or pest damage, or which can thrive in difficult climatic conditions. GM crops are also being developed with enhanced nutritional qualities, but it is important that it is not seen as a silver bullet and the solution to all of our agricultural problems. It is one important technology among many whose potential we need to explore.

[1] The witness later clarified that, it is recognised that there is a variety of expert opinions as to the increase in food production needed. – Estimates vary from 50% by 2030 to 70-100% by 2050 *The Resource Outlook to 2050: By How Much do Land, Water and Crop Yields Need to Increase by 2050?* - Prepared for the FAO Expert Meeting on 'How to Feed the World in 2050', 24–26 June 2009, Rome).

Q446 Chair: You clearly have a responsibility in dealing with the issue not just across the UK but in terms of the European dimension as well. Different countries within the UK are expressing different views, and we have an EU regulatory structure with massively differing opinions about its effectiveness. What are the Government doing to try to resolve the current issues in the EU regulatory structure? Can it be achieved by tinkering with the functions, or does it need a complete overhaul?

Lord de Mauley: As you are well aware, we have just been through a major round of negotiation on the cultivation proposal. We have got to a position which is not what the UK would ideally have liked, but we are where we are. What we have to do is consider what we do now. There are several strands to that, one of which is to continue to engage strongly with the three pillars of the EU institution, which we were doing and will continue to do: the Council, the Commission and MEPs.

What we should also be doing, and are starting to do, is to speak to the agri-biotechnology industry to gauge its view on the prospects for GM developments in the UK and EU in the light of the agreement to allow more national discretion within the framework. They will want to see how the EU deals with the outstanding applications for GM cultivation approval, and we will be arguing for decisions to be reached on these as soon as possible. One thing that has been achieved is that the barriers to that should now be dropped having reached the agreement we have.

We hope that the industry will still find it worthwhile trying to gain market access for GM cultivation in those parts of the EU that are open to the possibility. Taking a long-term view as GM production continues to expand outside Europe and the range of beneficial GM traits is increased, such as drought-tolerant crops which are now being grown in the US, and people become increasingly aware of that, it should become increasingly difficult for the EU to set its face against widespread acceptance of the technology. We will continue to engage with them.

Regardless of the EU situation, we have a world-class plant science base, which you have seen amply paraded before you over the course of your evidence-gathering sessions, which could provide commercial opportunities for the development of new GM crops. It will be a key agricultural technology for the 21st century, and it is important that we maintain UK research in that area.

Q447 David Tredinnick: I want to ask you about the deliberate release directive and the amendment. The chair of the Agricultural Biotechnology Council has expressed concern that in practice this amendment could be "more a licence to ban than a licence to operate". Is that a concern of yours? Do you think it is justified?

Lord de Mauley: As I have said, it does not go as far as we want it. I would go as far as to say that I was disappointed with the outcome.

Q448 David Tredinnick: You touched on it just now.

Lord de Mauley: Exactly. We are concerned, indeed, that it will stifle our ability to benefit from GM technology.

Q449 David Tredinnick: Are there any crops currently stuck in the regulatory system that might be of value to UK farmers and could potentially be released by this amendment?

Lord de Mauley: There are crops stuck in the system. I am fairly sure that none of them would be applicable in the United Kingdom.

Q450 David Tredinnick: If this amendment is adopted, how will the Government manage the current differences between their policy on the cultivation of genetically modified crops and those of the devolved Administrations? Do the devolved Administrations have different arrangements?

Lord de Mauley: By way of background to our position on the devolved Administrations, we recognise and we must respect the fact that they do not share our general outlook on GM crops. We work very closely with them; we liaise with them before determining our position on EU discussions, and we believe that these arrangements work well. The focus over recent months has been on the negotiations on the cultivation proposal, and they have supported us because it would have enabled them to make their own decisions either along the route we hoped we were going or indeed along this route. On the safety of GM crops, all UK Ministers, including those in the DAs, receive the same independent expert scientific advice from the ACRE.

Coming back to your specific question, to the extent that the current state of the proposal is that it is unlikely there will be major progress on GM crops, I am not sure there will be huge scope for disagreement with the DAs, unfortunately in a way, because we want to make more progress, but we are where we are.

George Freeman: It is worth remembering that in Scotland, Northern Ireland and Wales we have great centres of scientific excellence and research. As a UK Minister, I am shortly to complete a visit to all of those areas to highlight that our cluster is well beyond Oxford, Cambridge and London; it goes out across the United Kingdom. Part of our challenge will be—I totally respect the views of the devolved Administrations—to make sure that we are a place that attracts investment to do the research but also has a framework that allows investors, companies and countries to put that research into practice. There is a tension in our ability to secure investment as a research centre if we cannot do field trials.

We are also very strong in animal genetics, particularly in Scotland. Roslin and that cluster is world class and does some important veterinary animal health and agricultural science. I do not know whether your inquiry is looking at animal genetics as well, but we should not forget that we also lead the world in some of that, and that is an important part of it.

Q451 Chair: Before we leave that particular topic, if the deliberate release directive is enacted in its current form, what do you expect the impact to be?

Lord de Mauley: It is subject to formal adoption by the Parliament, which is likely to be in the spring. It will mean that decisions on whether or not to cultivate EU-approved GM crops can now be taken at member state level. That is something we strongly support, and so it should undo the logjam in EU approvals and allow applications to be authorised quicker than hitherto. Our concern is that we still need GM crops to be authorised at EU level before they can be grown here, and because the proposal will allow other member states to implement GM bans not based on scientific evidence it may deter companies from making applications for EU approval. EU-sanctioned bans could prejudice their marketing of GM seeds in third countries. We argued in the negotiations strongly for an approach that would sideline the possibility of national bans, but we did not receive enough support from other member states to achieve this. We now need to see what impact the proposal will have in practice. It could provide an easier route to market for GM crops that pass the EU safety assessment process, albeit the market will be limited to those member states or regions that are open to GM cultivation. We will be pressing for the outstanding applications for EU approval to be authorised as soon as possible.

Q452 Chair: It must put you in a rather difficult position. When you have Administrations like the Scottish Government saying, "No, because it would damage our rich cultural heritage"—in other words, a non-scientific political judgment—if I were a Minister in another EU jurisdiction wanting to block anything you were seeking to do, I would throw that in your face.

Lord de Mauley: It is the job of Ministers to face difficult situations.

Chair: Yes.

Q453 Stephen Metcalfe: Many of the witnesses we have heard from have spoken about the need to change the EU regulatory framework to look at trait-based rather than process-based assessment. There is also a desire to see the risks as well as the benefits to be looked at by the risk assessors. I think I heard you say you agree, but perhaps you could confirm that directly—that that would be a sensible move. If you do agree, how are you going to pursue that or push that to our European friends?

Lord de Mauley: As we said in our written evidence to the Committee, we recognise the argument by the CST and other scientific groups in favour of product or trait-based regulation. The reality, though, is that there is no realistic prospect of the EU departing from a GM-specific regulatory regime in the foreseeable future. If a proposal were made to go down that route, I take Professor Poppy's point very strongly that there is a very real possibility of ending up with the unsatisfactory GM regime simply being applied more

generally to any novel crop. We need to tread very carefully with this idea. Our immediate focus is on trying to improve the existing GM regime.

George Freeman: I think you have flagged up a really important point. There is a dangerous trend towards regulating by process rather than product. My strong preference is that we regulate by product. If there were to be some presumption against genetic science as a process base, it could have potentially disastrous consequences, not just in agriculture but right across. Lord de Mauley mentioned that one of the most exciting and important areas is where food and medicine are beginning to coalesce. Nutraceuticals and functional foods—foods with enhanced health benefits and claims—are going to be a very big growth area in the 21st century. If we were to see some process-based discrimination against genetics, it could be hugely damaging to the European economy and therefore to us.

In terms of the science of genetics, it is complicated. This Committee can deal with it, but it is a complex subject for the rest of Parliament, let alone in the Dog and Duck. Somehow we need to open up public understanding of the range of different technologies and applications, and point out that traditional breeding—Mendelian, sort of caveman seed choice—is a very slow and clumsy form of genetic manipulation of seed stock. There is all the difference in the world between using traits that are naturally occurring. Some of the potato science uses genes naturally occurring in wild-type potato crops to bring enhanced qualities into an agricultural crop. There is a difference between that and full-on genetic modification and GMOs—genetically modified organisms. We somehow need to grow public understanding of the range of these technologies, which have already been used extensively sometimes for hundreds and thousands of years.

Q454 Stephen Metcalfe: As to the first part of what you said related to the presumption towards trait or product rather than process, I agree with you entirely, but does that not sit slightly at odds with what Lord de Mauley said is going to be practically achievable?

George Freeman: I do not think so. I think we are articulating the same ambition. Lord de Mauley has responsibility for dealing with the reality of negotiating through a very complex European structure. I was merely signalling that our intent would be to try and mitigate against a kind of process-based, discriminatory legislative framework.

Q455 Stephen Metcalfe: That brings me back to the last part of my first question. How are you going to promote that view across Europe so that we do not end up regulating genetics out of scientific advancements?

George Freeman: DEFRA is leading on this. Greg Clark as Science Minister is going out to see the Commission and the new Science and Technology Commissioner this month or next.[2] I will be leading a delegation to highlight the importance of genetics across food

[2] The witness later clarified that, Greg Clark as Science Minister will be meeting the new Research, Science and

and medicine and a number of other concerns of evolving technologies that we want Europe to be ahead of and leading on, but DEFRA obviously leads on agricultural matters.

Lord de Mauley: I mentioned earlier that we engage with the three pillars of the EU through the process of the cultivation proposal, and we will continue to do that unstintingly. One has to be realistic about what one can achieve, but we must strain every sinew to continue that process.

Q456 Stephen Metcalfe: Moving on to the Baulcombe report briefly, it recommended a new research programme termed PubGM. How would you respond to that recommendation?

Lord de Mauley: My officials have had an initial discussion with the main proponent of the PubGM concept, Professor Jonathan Jones. It looks interesting, but we need to understand in more detail how it might work in practice and the funding implications at a time when there is a general need to constrain public expenditure. We are continuing to look at it. We want to talk to others about it. In particular, the BBSRC will have an interest.

George Freeman: This is one area where BIS and Defra responsibilities cross over. BIS is responsible for BBSRC. BBSRC is actively looking at this and at that report. As part of our agri-tech strategy, we very clearly set out a commitment to look at the current spend on agricultural research across the whole raft of Government. It totals roughly £400 million a year, but it is in a lot of different pots. Part of the agri-tech approach is about giving it a coherent strategy. One of the priorities we have set is to look at where Government should better be focusing its scarce and valuable investment to maximum effect to support co-investment where industry might not be able to. This may well sit within that as an area where industry is struggling to have the confidence to invest. We need to make sure we keep our skill base.

Q457 Stephen Metcalfe: Do you have any idea of the time scale of assessing the benefits of PubGM and when you might make a decision on those sorts of things?

Lord de Mauley: I think it is probably too—

Stephen Metcalfe: It is too early.

Lord de Mauley: I am not in a position to give you a time scale, but we are certainly looking at it and talking about it.

Innovation Commissioner in London in March.

Q458 Chair: Just before we leave this particular point on the Baulcombe report, one of its recommendations was that the commercial cultivation of genetically modified crops should be made at a national level. Is that just interesting or is that something you agree with?

Lord de Mauley: It was at the fundamental core of the original proposal that was put forward by the Commission, which we were very much in favour of. We have ended up with about half of it. As I said, member states now have the complete freedom to ban. What we wanted was for member states to have the complete freedom to make a decision in our direction.

Q459 Pamela Nash: Five years ago the Royal Society recommended a "grand challenge" initiative to encourage research into global food crop security. Do the Government remain supportive of the challenge, and what financial support have the Government given to this initiative?

Lord de Mauley: Yes. In recent years a great deal has been done in relation to agricultural research that addresses the recommendations made in that report. Can I give you a few examples? It slightly depends on how long the Committee has got because there is quite a lot to be said.

The global food security strategic plan has been established, which recognises that food will need to be produced from less land and with lower inputs, and in the context of global climate change and declining resources. The UK's main public sector funders have joined forces to develop and implement the global food security programme. Collectively, the participants spend about £350 million a year directly on food-related research. As to the agri-tech strategy, which is funded to the tune of £160 million, £10 million of that is specifically earmarked for work for developing countries. The BBSRC has provided long-term funding for an integrated multi-institution wheat research programme, to study the diversity of traits available for academic research in commercial breeding. A soil security programme has been established to help understand how soils function and deliver a range of ecosystem services, such as food production and sustainable agriculture, and how they can resist and recover from changing conditions such as extreme climatic events. A third of BBSRC's doctoral training partnerships are targeted at food security projects. This programme is BBSRC's flagship training mechanism investing £25 million per annum in postgraduate training across the UK. I could go on, but does that give you a flavour of what is happening?

Q460 Pamela Nash: I am sorry if I missed it, but did you give a figure there for the Royal Society's "grand challenge"? Has money been invested, particularly, in the Royal Society?

Lord de Mauley: I think I probably need to add up a whole lot of figures, which I am not in a position to do at the moment.

Q461 Pamela Nash: Would you be able to write to us later to give us that information?

Lord de Mauley: Yes, of course.

Q462 Pamela Nash: Some of the subjects you mentioned, and particularly soil science, have been identified as neglected subject areas. Have the Government identified these subject areas as areas of priority? Soil science is one. Other examples have been given as botany and agronomy. What is the Government's policy on that and is that a focus for financial support?

Lord de Mauley: Each of the ones you have mentioned is considered to be important components of research. Would you like to add anything on research?

George Freeman: As part of the agri-tech strategy, this was specifically tackled.[3] We have tabled and used the leadership council in that strategy as a forum to make sure that the public sector spending priorities reflect what the wider community supply chain and consumers see as the priorities[4] – We specifically highlighted soil science and agronomy within that, really to open up some public accountability on that £400 million figure – It was something of a surprise to pretty much everybody that we were spending so much on[5] agricultural and related research. It was in so many different pots that there was not really any strategic oversight of it.

Q463 Pamela Nash: To be clear, Minister, it is not just the areas that are popular that I am concerned about, but it is the areas of research science that are neglected that should be prioritised.

George Freeman: I understand the point. We highlighted the challenge that we need to look and make sure we are not neglecting areas that are important. Soil science and agronomy, the two which you mentioned, were specifically tabled, and they are currently being looked at by the agri-tech leadership council.[6]

Q464 Pamela Nash: But they are areas that will not attract private investors. I think that is the idea. We have seen much in the written evidence that we have had—and it is public knowledge—about the need for sustainable intensification of food production. How does that concept feed into Government policy?

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[3] The witness later clarified that, the Leadership Council, as part of the strategy, has been looking at the agri-tech spending priorities. This is different from the public sector spending priorities. Therefore, he should have said "We have used the leadership council for the strategy as a forum to make sure that agri-tech spending priorities…".

[4] The witness later clarified that, he should have said "Soil science and agronomy fall within these priorities."

[5] The witness later clarified that, where he is referring to £400 million on page 24 (Q456), this sum covers the whole agri-food chain from lab research to farming, food manufacturing and retailers.

[6] The witness later clarified that, soil and agronomy were not uniquely looked at by the Leadership Council, but are among a number of areas that the Council looked at.

Lord de Mauley: The agri-tech strategy is a good place to start, because it acknowledges that, on the one hand, globally, we have to increase food production so that we can feed 9 billion people by 2050, but, on the other hand, at the same time, we must maintain the biodiversity and ecological quality of our land. Indeed, that is one of the key areas, and one of the panel members that you have just had in front of you made the point that GM does offer, potentially, that benefit.

George Freeman: If you take that grand challenge—and it is worth repeating—we have got to nearly double[7] global food production in 30 or 40 years on the same amount of land, using less water and energy. That is a phenomenal global challenge. I don't think that any respected opinion in the world thinks we are going to achieve it without using genetics. In fact, the real issue for this country is that the world is rapidly embracing the use of genetics, not just GMOs, but, more broadly, genetics in agriculture, to help, whether it is disease-resistant crops or drought-resistant crops.

What we were trying to do in the agri-tech strategy was to say that that is important, but so are a range of other technologies that help us deliver more from less. We have somehow got to deliver more food from less, and that is every bit as much about low plastics, low water, satellite-guided tractors, precision farming, spraying less, spraying only those bits of a field that have disease, using optics, imaging and satellite technology to be much more precise. The precision-farming element, just like precision medicine, will cut out a huge amount of waste. We do not see genetics as the magical and golden answer to all of this, although, in using the word "golden", the golden rice breakthrough is, potentially, pretty significant for millions of people around the world. What we are trying to do is to say that we need a deep investment in genetics but we also need to look at a whole range of other technologies, which is why it was called the agri-tech strategy and not agricultural genetics.

Q465 Pamela Nash: Obviously we are focusing, and we have been, on crops and food production, but it is not just food. It is a variety of things, including medicine. Yesterday, the Secretary of State for Health mentioned in his statement to the House that there was difficulty in getting the medicines needed for the Ebola victim at the moment because one of the vital ingredients comes from modified tobacco plants. What are your views on that, and what can be done to make sure that this does not happen again?

George Freeman: Yes. It is a really important point. That is why I mentioned that both Greg Clark, as Science Minister, and myself as Life Sciences Minister, are going to the Commission and the European Parliament to highlight that the pace of change in this sector is creating all sorts of opportunities.[8] With some of the public health, animal health

[7] The witness later clarified that, it is recognised that there is a variety of expert opinions as to the increase in food production needed. – Estimates vary from 50% by 2030 to 70-100% by 2050 *The Resource Outlook to 2050: By How Much do Land, Water and Crop Yields Need to Increase by 2050?* - Prepared for the FAO Expert Meeting on 'How to Feed the World in 2050', 24–26 June 2009, Rome).

[8] The witness later clarified that, he should have said "That is why I mentioned that Greg Clark, as Science Minister, will be meeting the Research, Science and Innovation Commissioner and I, as Life Sciences Minister,

and plant health challenges—we have seen ash dieback and other very rapidly developing infectious diseases, as well as an antimicrobial challenge facing the world—we need to think about genetics and using our genetic leadership and insight to work out how we can harness those technologies across the board. You are raising a really important point. We need to move this debate on from where it has slightly been locked in the public discourse, as GMOs and genetically modified food, to a much broader discussion about how we embrace the extraordinary benefits of genetics across health, and, more broadly, animal health, plant health, agricultural sustainability, productivity, the ecosystem and habitat development. It is a much broader discussion than that.

Q466 Pamela Nash: Absolutely. I have a final question for you, Minister. The last time we met was at Kew Gardens when we were discussing its future. You said this morning how much the Government prioritise the area of plant science. How does that fit in not just with the cuts but with the unpredictability of the funding that has been given to Kew Gardens? Do you not think that that has a very negative impact on plant science as a whole in the UK?

Lord de Mauley: I was quite clear when we met before Christmas that what is happening at Kew is going to improve Kew's science. There is a specific science strategy which is tying in exactly with the restructuring that is going on. So I do not see any conflict with what we are saying here.

Q467 Pamela Nash: We did explore that further in a previous session and I appreciate that is not why you are here today, but I believe it has an impact on areas of research.

George Freeman: If I could just add a couple of points on the skills, the investment in our skills leadership is a core plank of the agri-tech strategy. It is not glamorous, but it is incredibly important that in plant science and other areas we are investing for tomorrow and to make sure that we have a pipeline. I have just looked at the figures provided by the BBSRC. A third of our doctoral training partnerships are now targeted at food security-related projects. The BBSRC is spending £25 million a year on postgraduate training across 44 institutions in the UK. Within the agri-tech strategy, Professor Bob Webb is leading a very high-quality piece of work, looking at the deep skills and the pipeline of skills that we need for this area in the next decade.

Q468 Sarah Newton: I am really pleased with what the Minister was saying about innovation being broader than genetic modification, because we have had quite a lot of evidence, especially from academics, saying that they felt there was an excessive focus on GMOs and it was locking out in terms of technologies. You have acknowledged that problem, but could you respond to us a bit more fully about the steps that you are taking so

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will be going to the Commission and the European Parliament to highlight that the pace of change in this sector is creating all sorts of opportunities".

that other technologies are not crowded out or blocked out, and we have all the tools in our toolkit to tackle these huge challenges that you have highlighted this morning?

George Freeman: Thank you. I will perhaps start on the agri-tech strategy because this is precisely what we wanted to do. There are two centrally-funded streams of work. The Agri-Tech Catalyst Fund is based on the Biomedical Catalyst Fund, which has been incredibly successful at attracting quick co-investment into a large number of projects. Basically, if you have agricultural technology projects and submit a successful application to help to deliver more from less, to reduce the footprint—if you have a technology that has that potential and it is protectable—and if you have a private sector investor, you are immediately eligible for 50/50[9] Government-matched funding. I think that the latest figures show—somebody may correct me—that something like 60 projects are already up and running. These were very specific. The call makes clear that this is across the whole board—a whole range of technologies. It is technology blind. It includes everything from satellite-guided tractors, to new forms of engineering, to plastics with low environmental impact, packaging in the field of horticulture and mainstream agriculture. There is a great breadth. We could write to the Committee with the details, if that is helpful.

Sarah Newton: That would be really helpful.

George Freeman: The other key part of the programme is a commitment to fund a series of regional agri-tech innovation centres. This is, really, about recognising that regionally and sectorally, in the sector, we have particular concentrations. In East Anglia, where my constituency is, there is a particular strength in plant science. In the north-east, there is a particular strength in pig farming and advances in low-impact, higher-output technologies. In the north of England and Scotland, in animal health, there are various clusters of excellence. That work programme is about funding centres of innovation linked to the agricultural supply chain in those regions. My vision is that, wherever you are in the country, you will be no more than an hour or so from an agricultural innovation centre. It will be pulling the best science and practice out of agricultural colleges and universities, and putting it into use in the field. It is a real commitment to make sure that practical, field-based innovations do not sit lost in a lab but are used by real farmers in real time. There is a real commitment to try and make sure that we are not just backing one deep technology, but we are trying to back technologies that will support more from less as farmers and growers find a use for them.

Q469 Sarah Newton: Thank you; and I look forward to welcoming you down to the south-west so that you can let us know where our centre of excellence is going to be. Lord de Mauley, you wanted to come in.

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[9] The witness later clarified that, the 50/50 government/private sector funding ratio refers to the lifetime of the Catalyst programme. For specific projects this ratio varies. Within the overall aim of 50/50 government/private sector funding, the grants for which a partner is eligible depend on the nature of the partner and the project category that they are targeting e.g. the Government contribution to the total grant is lower for Late Stage projects – because they are nearer market, and the private sector is expected to bear more of the cost - than for Early Stage ones.

Lord de Mauley: Thank you. I thought it was worth just going back to your evidence session on 5 November when Dr Paul Burrows, the BBSRC's director of policy, said that he did not recognise the idea that GM research has benefited massively from public funding relative to other aspects of plant science. It is simply not borne out by the figures. The BBSRC is the major public funder of plant science. It invests about £70 million a year on basic research, of which about £4 million a year is directed at work involving the production of the production of a GM crop to explore the potential use of novel traits, such as disease resistance. Having said that, it is important to say that the BBSRC also funds work where GM is used as a laboratory tool to improve the understanding of how plants function at the genetic level but which is not necessarily geared specifically towards the creation of a GM crop trait.

Q470 Sarah Newton: Thank you. Let me move on slightly because I am aware of other colleagues who want to ask questions. Other evidence that we received said that insufficient regard was given to the interface between social values and science. I will quote from the Nuffield Council on Bioethics, which stated that "support for innovation should be determined more prominently by social values rather than by market values alone". We did hear from the previous panel that often the evidence of science is going ahead but there just is not public support for it. Do you agree with this Nuffield Council statement, and, if so, what can you do both to monitor and to help move the public on to incorporate more of their concerns and address their concerns within the policy?

George Freeman: The Nuffield Council is raising a very important point, which runs across my portfolio, that the pace of science, particularly in the broader life sciences, including medicine, energy and industrial biotechnology, are unlocking extraordinary possibilities, but unless we carry public opinion with us, unless we carry public support, parliamentary support and media support, we will end up being very good at the science and not able to implement and adopt. That runs across a lot of the areas that I am concerned with, such as data and genetics. It is a very important issue and a real challenge.

Within BIS we fund, recognising the importance of it, the Sciencewise programme, which is about making sure that, across Government, public dialogue and public discourse is, as best we can, built into policy making, and that is a commitment across Government.

You asked what we can do. Strategically, there are two important things. The first is to constantly reassure the public that public safety and public benefit is our absolute priority, and that is absolutely sacrosanct. In the same breath, we have to highlight the benefits to consumers in agriculture. I am very struck that, in the medical field, people do not question the benefits of genetics, really. Most people can see that it might be the insight that helps to avoid a heart attack, a rare disease or a child suffering from some appalling disease today, which is why we are investing in genome research for medicine, and it is enjoying very strong public support.

In agriculture, we have lost, in some ways, that argument about the benefits, and we need to be stressing that these benefits are not just for farmers to grow more. They are not just commercial benefits. If we start there, we would give a distorted impression. We need to

talk about the environmental benefits, such as being able to grow food in places where today you can't, and drought-resistant crops, and allowing third-world farmers to grow food where today they cannot, as well as allowing us to minimise the environmental footprint. We need to stress those benefits.

As for evidence, this point came up earlier on public opinion and it is interesting to look at it. The Institute of Grocery Distribution, as you will be aware, do periodic surveys. They report this year that most UK consumers now describe themselves as neutral towards GM foods, whatever is meant by that. The FSA tracker survey suggests that GM is now of less concern to consumers than it was some time ago, and the 2014 Public Attitude to Science Survey reported that more people think that the benefits of GM crops now outweigh the risks. These are tentative data, but I think they suggest, in answer to your question, that we have to continually reassure but also promote the benefits. I think that the public and consumers see the problems and they will begin to support this whole area more, provided they are reassured and understand them.

Lord de Mauley: I will not repeat what George said because I absolutely wholeheartedly agree with it. What I can say is that Ministers have spoken out to highlight the robust nature of the safety controls over GM. An example is Owen Paterson's widely reported speech at Rothamsted in 2013. This message has been consistently conveyed in contacts with stakeholders, including the public, in replies to correspondence and so on. The Government website carries information on the GM regime and material such as the CST 2014 advice to the Prime Minister, which confirmed that regulated GM crops are as safe as their conventional counterparts. We have heard about the Food Standards Agency website. We are doing what we can. One could probably always do more, but, on the other hand, there is a danger of raising expectations and then only for them to be dashed because we are not allowed to grow GM crops. One has to be proportionate and pragmatic.

Q471 Stephen Mosley: In a previous session we heard about the danger of over-zealous use of the precautionary principle. When Sir Mark Walport came to see us in November he described the precautionary principle as, basically, "Do a full evaluation of the science before you make a decision." What is the Government's understanding of the precautionary principle and how does it differ from the normal versions that are published?

Lord de Mauley: I broadly agree with what Sir Mark said—that the precautionary principle, essentially, means that you do a full science-based evaluation before making a decision, thinking about the consequences of both action and inaction. As he also said, the issue within the EU is not so much with the principle itself but that the idea of precaution is being misused to block or deter innovations such as GM, which are politically controversial.

Q472 Stephen Mosley: Okay. When have the Government used the precautionary principle, then, in decision making?

Lord de Mauley: In the context of GM, the precautionary principle is exercised at the EU level, so it is to the extent that we participate in that. It is important to say that safety has to be our top priority. One has to be appropriately careful about new technologies, and the precautionary principle is a useful concept. The problem is that it is misunderstood and at times wrongly applied.

Q473 Stephen Mosley: So what do we do about that then? How do we ensure that the precautionary principle is correctly applied?

Lord de Mauley: It is, to some extent, about the reality of politics. We have to keep pressing in the EU for a more proportionate approach.

George Freeman: There is an issue. The precautionary principle is one of those phrases that can be used and harnessed by those who are not so much interested in proportion but in complete opposition. The danger, and Sir Mark touched on this in his comments, is that it is one of those concepts that in the corridors of Europe can be used by those who are just flatly opposed to any genetics. There are those who seriously want to see the European Union turn its back on genetics in agriculture. Our strong position is that we want Europe to put in place a framework that allows European science to lead in this global grand challenge and for Britain to lead within it. But, ultimately, if we cannot get the European Union in the right place, if the politics in Europe—one has to respect people of other political movements who are very opposed to it—are such that it means that the precautionary principle is consistently used not in the way in which it was originally intended but to block, then we have to look at other ways in which we can make sure that, here, we interpret it in the way that our electorate and consumers expect it to be used, which is not as a block but as a reassurance that we are taking public health and public safety seriously.

Q474 Jim Dowd: I would like to look, briefly, at technology appraisal. Do you consider technology appraisal to be primarily a scientific or a political process?

Lord de Mauley: Are you asking about the risk assessment process?

Jim Dowd: Generally, yes. I will say yes for now.

Lord de Mauley: I am sorry, but are you specifically asking about the EU process?

Q475 Jim Dowd: That, in part, and how the Government approach it. Are you confident that you have the information you need to judge whether Britain, and society generally, would or might consider an acceptable level of risk when assessing new agricultural technologies? How do you assess risk? How do you balance the social considerations against the scientific?

Lord de Mauley: I am confident that the EU risk assessment process is more than robust enough to ensure that authorised GM products, for example, will be as safe as their non-GM counterparts. We have a concern that, over time, the EU processes become disproportionately burdensome and that this is adding to the deterrent effect of the EU regime, which is discouraging R and D in commercial developments. On the risk assessment side of things, which is the job that is done by the scientific professionals, we are arguing for the requirements to be applied in a way that is pragmatic and proportionate. One then comes to the risk management process, which is, as I see it, the job of politicians. That is where there is scope for different approaches between countries, as we have seen. That is where the problem arises.

Q476 Jim Dowd: That is part of my question. What I was looking for is how you define and at what threshold you identify acceptable risk, or what you regard as unacceptable, given that the Minister said previously that a lot of the views on this in the EU are driven not by the evidence but by the politics of it.

Lord de Mauley: It is quite a difficult one to answer in the grand scheme of things because, for example, one looks at individual crops on a case-by-case basis or whatever. It might be worth going back to the hazard-based versus risk-based approach, which the informed understand but the wider public do not. My concern is that the approach typically taken at the European decision-making level is an unpreparedness to accept any form of hazard, however remote the chance of it happening is, whereas our approach is what we call a risk-based approach, which applies a likelihood of such a hazard actually happening.

Q477 Jim Dowd: Given, as has been referred to, the disparate views across the EU—let's not mince words—and the Commission has abandoned any idea that there can be a single policy across the EU and is leaving it to individual members to decide this matter, is it indeed possible that there can be a single regulatory EU-wide regime to cover all those disparate views?

Lord de Mauley: I do not quite see it like that. I see that there is not enough discretion to member states. There is discretion to member states to stop the process. There is not the discretion to individual member states to proceed. That is the problem, as I see it.

Q478 Jim Dowd: I take your point. My final point is to Mr Freeman. You said that there is no dispute accompanying the medical applications of genetic technology. I have to say that we undertook a short inquiry into mitochondrial disease, and that was not our experience.

George Freeman: I perhaps should have said much less. Given the extraordinary application of genetics in medicine, it is striking—and there are areas of particular sensitivity—that some of the stem cell science raises particular issues. You are right that

there are, sometimes, ethical issues which are non-technical, but our approach always is to do the technical assessment first, and then to advise Government that it is safe; then, in some cases, there are ethical considerations. We have it in medicine. It may be that this is going to grow as science accelerates and Parliament needs to be able to deal with these issues. It is part of the work of this Committee, obviously.

Chair: David, you can have the last word.

Q479 Mr Heath: Thank you. Mr Freeman, you kindly gave us some public attitude information a little earlier. It is nearly two years now since Owen Paterson and I, when we were in the Department, kicked off a renewed debate on this subject. Do either of you feel that the general public is let's not say wiser but better informed about the subject now than it was then?

George Freeman: There is data, and I would not put too much on them. There is more than one source. There are three or four bits of data that suggest in the last couple of years that public opinion has firmed up a little, with people saying, "I'm neutral on it." I don't see a huge risk that frightens people in the same way. I think that people want to see the benefits. The falling support has been stopped, and the signs are that the public are there now to be shown the benefits and they understand some of the problems. I do not think that we are there at all. I do not think there is a groundswell of public support for this in the way that there is in other countries around the world. I was very struck at the first meeting I chaired of the all-party parliamentary group on agricultural science. It was a group of banana farmers and consumers from Uganda. I thought they had come to find out how we were leading the world in banana genetics. Actually, it was far from it. They were coming to show us the extraordinary work they were doing on genetics in tropical agriculture to reduce pesticide use and the big public support for it.

We have made a small stride and we are beginning to build a bit of public support, but we are still way behind where the rest of the world is. I believe that the next few years will determine whether Europe and Britain get left behind. It may be that it is only when we do start to get left behind that then public opinion will change and people will start to say, "Why aren't we getting these health-enhancing crops here? Why aren't we seeing blight-resistant potatoes grown here in Britain that would reduce the average of 15 blight sprays every year?" It may be that it is only when people start to see that we are getting left behind that public opinion shifts, with people saying, "We don't want to be left behind. We want to see these benefits here for us."

Q480 Mr Heath: Whose job is it to lead that debate? Is it the Government? Is it the industry? Is it science?

George Freeman: It is all of the above. We have a role in Government. As Lord de Mauley said, the crucial role is to reassure this Government that we are putting safety first and we are using science to make sure that we are putting the public interest first. The industry has a role, but actually consumers have a role.

Q481 Mr Heath: Do consumers have a role in educating themselves?

George Freeman: Consumers have a role. We need to be listening and inviting consumers to contribute to policy. They need to explain what it is they are concerned about. Retailers have a big role. We need retailers who understand consumers very well to start to unpack what it is that consumers want to see, particularly in this nutraceutical function of food area. Everyone has a responsibility on this. I don't think it is just Government. We need to be cognisant of the fact that, in the public mood at the moment, few things alienate public support more than a combination of big government, big science, big business and big money. We somehow need to make sure that the voice of the smaller farmer and the consumer out there, consuming and growing, is heard as well—that their voice is in this as well. If it all looks too big, there is a danger, however well-intentioned, that we leave people behind.

Q482 Mr Heath: Lord de Mauley, is DEFRA continuing to take on the *Daily Mail* with their Frankenstein foods at every opportunity?

Lord de Mauley: Let me address your question in a different way. George is absolutely right in that everyone has a role to play. It is the Government's role as much as anyone else's, although I was struck by the conversion of Michael Lynas to the GM cause. An event like that and the fact that someone like that is prepared to speak out who has been so opposed to it before does seem to make a big difference to the public. Our general sense is that media coverage of GM issues is much more balanced than it was 10 years ago. All one can ask for is balance.

George Freeman: A very important point is this. Do you remember, when the scientists at Rothamsted came out in their white coats in the face of that demonstration themselves—not the PR, the head of PR or government relations—and took them off and said, "We are just people doing our jobs. We believe in it. Please will you let us do what we trained to do"? I think that is very powerful. People respect that and everyone does have a responsibility.

Q483 Mr Heath: It is interesting that we have Frankenstein foods but never Frankenstein vaccines. I have never heard the expression. Does Sciencewise have any role in this? This is a BIS construct. Do you see it as having a role?

George Freeman: Yes, I do. I mentioned it earlier. It is part of promoting and building a public dialogue, a public discourse, a public understanding, and the feeding in of public

views across policy making. It is one tool in the toolbox. Parliament has a role, as do Committees like this. Somehow, we need to build a broader conversation about understanding the power of genetics. The more we can move it away from pure GMOs, across the power of genetics in the 21st century, to allow us to do things that have been hitherto unimaginable, it is in that context that public support is more likely to be rebuilt.

Q484 Mr Heath: So it should not worry about its funding finishing in March of this year.

George Freeman: That is a matter for the Chancellor, but you will have read his recent speeches on science and the importance of science. I can't put words into his mouth, but I think he has put his money where his mouth is in terms of ring-fencing the science budget and making a deep commitment to science and the signalling of that.

Q485 Chair: But you would like the Chancellor to continue that funding, would you not?

George Freeman: I am very keen to see funding for science and the role of science in our long-term economic plan, yes.

Q486 Mr Heath: March 2015 is fairly approximate to now.

George Freeman: It is about seven weeks away, isn't it?

Chair: Gentlemen, thank you very much for your attendance this morning.