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Oral Evidence

Taken before the Science and Technology Committee

on Monday 11 March 2013

Members present:

Andrew Miller (Chair)
Jim Dowd
Stephen Metcalfe
Stephen Mosley
Graham Stringer
David Tredinnick
Roger Williams

Examination of Witness


**Q1 Chair:** Sir John, welcome to what is likely to be your last session in front of us, unless there is some dire emergency that brings us together again. Let’s hope that is not the case. During your tenure, which is drawing to a close, what do you consider to have been the three top achievements in your office?

**Professor Beddington:** Thank you for your good wishes. I probably share your hope that we will not be seeing each other again. I would probably focus on three areas. The first one in essence is bureaucratic and it is managing to achieve a network of CSAs now covering every major Department. That has been very helpful. It has been supplemented quite recently by Dr Claire Craig, my deputy. We now have regular meetings of deputy chief scientific advisers. That is an interesting and important new development.

We have also established a community of scientists and engineers across government. We now have about 3,400 scientists and engineers in government out of a possible total of 12,000 or so, but, given that it started from zero when I walked in the door and asked who were the scientists and engineers in government and was told, “We don’t know,” I am quite pleased with that achievement. The other bureaucratic one is arguably to do with developing a science and evidence review programme in which we have reviewed the quality of scientific and engineering evidence in every Department now. We are just coming to the end of our review of the Treasury. Once that has been done, that is the lot, as it were. Those are the business and government matters that I have covered in the period.

The other area that has been fairly successful, in part with the help of this Committee, is the way in which science and engineering has now been brought centrally into the area of emergency and risk planning. In terms of the national risk register, essentially I now have sign-off and challenge across government on all the risks that government are addressing. For example, quite recently we had a meeting of the chief scientific advisers in which we looked at all the matters on the risk register, allocated them to Departments and asked them to think
about how they would deal with them and planning mechanisms, but it also acted as a challenge. That has been quite helpful.

In practice, when I took up the job, there was no such thing as a scientific advisory group in emergencies, so establishing that as a direct line of scientific advice into Cobra was a good achievement. GO-Science now tends to lead with the other appropriate Departments on thinking about potential emergencies. There are four for which I have been responsible: the swine flu; the ash cloud; Fukushima; and, slightly surprisingly, the very recent ash dieback. Those are areas where we have been providing advice to Cobra.

Another thing we have been doing, which is slightly more in the security world, is to have a whole series of exercises to test security issues. In particular, we have had one recently on space weather, and prior to the Olympic Games we had a series of table-top exercises in which we looked at possible scenarios in which there might be some form of attack or disruption of the games, sometimes terrorist-driven and sometimes not. We were closely involved with the Cabinet Office and the appropriate agencies in developing those ideas. That is the second area I would highlight.

I suppose I think about the third area as being my own. When I came into government there had been probably four decades of declining real food prices and essentially a corresponding neglect of the issue of food, water and energy security over the previous decades. In particular, in food, there had been a significant refocusing of the agenda in agricultural science away from food production towards more environmental impacts. Turning that round was helpful. With the help of my then private secretary, I coined the phrase “the perfect storm” in relation to food, water and energy security and how we needed to deal with those in the context of climate change. All of that is now way up both the UK and international agenda, and properly so. Those would be the three areas of success.

Q2 Chair: With the benefit of hindsight, do you wish you had got more involved with the FSA a little earlier?

Professor Beddington: Which FSA? Do you mean the Food Standards Agency?

Chair: Yes.

Professor Beddington: There are two, and I was involved with both.

Chair: I know there are two CIAs as well, so it is a bit confusing.

Professor Beddington: We have worked pretty closely with the Food Standards Agency from fairly early on. Andrew Wadge is one of the cadre of chief scientific advisers, and we have had a fair bit to do with them.

In terms of the latest problems that we have observed with the origin of beef products, which appear to be horse products and so on, perhaps with other adulterations, I am pretty content with the way that is being handled both within the Department of Health and the Food Standards Agency. So I do not have any regret in not having been involved with them.

The area where I would say there is probably regret is twofold, both connected to but outside my main responsibilities. One is scientific advice in Europe, which continues to be largely ignored, where quite often decisions are taken in the face of scientific advice, let alone in the light of it. The second one is more a political process. I do regret that the international bodies dealing with the reduction of greenhouse gas emissions have effectively failed to reach agreement on a legally binding international reduction. A couple of years back at the meeting in Durban, there was an enormous imperative that food security and agriculture should be brought into the climate change discussions. I chaired an international commission that put in a view that this really needed to be fundamental to the climate change discussions. That has not happened. There was disagreement in the international forums. I would not say that subsequently it has been kicked into the long grass, but I have not seen it emerging. Those are two quite significant regrets that I would single out.
Q3 Chair: In terms of things inside the government machine, do you wish you had had more influence over decisions like the closure of the FSS, for example?

Professor Beddington: I know that is one you have taken up in some detail with Bernard Silverman, chief scientific adviser in the Home Office, and I have spoken to this Committee previously about it. Decisions are going to be taken for financial reasons, and in a sense I was given a fait accompli in the case of that decision. In general, one area where I felt I should have thought harder about it was a reformation, as it were, of the Council for Science and Technology reporting directly to the PM. I should have taken more initiative prior to the change of Government. I took initiatives with the change of Government, but prior to that it could have done with a refresh with more businessmen and, in particular, having ex officio members from the four key academies. Those are two I would highlight as things I should probably have done.

With 20/20 hindsight, there are lots of things I would probably have phrased differently or ways I might have approached a meeting rather more carefully, but by and large I have been reasonably content.

Q4 Chair: By “phrased differently”, do you mean “more diplomatically” or “more bluntly”?

Professor Beddington: Both.

Chair: Perhaps we will have some examples as we go on this morning.

Professor Beddington: In some cases it might have been better to phrase things slightly more diplomatically; in others, it might have been better to do it more bluntly, but I think they are fine tuning. By and large, I do not lie awake at night thinking, “Oh, heavens. That was the most terrible mistake. I should never have done that.” The only thing I would point to is that, when I was in front of your predecessor Committee, it formed the view from my evidence that I supported homeopathy. Clearly, I could have phrased that better.

Q5 Chair: In terms of the things you are going to do before you pack your bags, so to speak, when you appeared before us as part of our inquiry into marine science you told us that you were looking at the national infrastructure required to maintain long-term measurements, such as ocean pH or salinity. Can you let us know when your conclusions will be available?

Professor Beddington: I had a meeting with the standing committee now set up, which will continue to be chaired by Mark Walport after I move on. That is trying to look at the issues of investment, particularly in monitoring. The problem, which I am sure this Committee is familiar with, is that quite often there is activity at the cutting edge of science that research councils are happy to fund. It then ceases to be cutting-edge science and becomes the commonplace of monitoring, and it is very difficult to see ways in which Government and individual Departments can take this up. We now have a group that is charged with looking at a whole series of observations critical to Government, some in the marine field—for example, the monitoring buoys that I think we discussed—but other ones involving space and things to do with more detailed monitoring of particular ecosystems and the sorts of problems where interventions have occurred but we have not monitored their activity.

The success is quite limited. We are at least having discussions about this issue and it is being shared across Departments and agencies. In a sense, we are trying to make certain that, at the very least, there is challenge so that, for example, a decision taken by an individual Department to suspend a particular programme of monitoring is not taken solely in terms of it being optimal for the Department concerned, but is looked at more from a global point of view. A key example of this historically, which was treated quite successfully but I suspect
will recur, was the decision by the Ministry of Defence to suspend all funding for the Hadley Centre for climate change. We had a three-month window in which to try to deal with that. What we have now set in place means that at least that window of notification will be significantly longer, not just for the Hadley Centre but for any decision to suspend particular activities.

Q6 Chair: When will this work be published?
Professor Beddington: I do not know. I am sorry; I should know that. I think the minutes are already published on the GO-Science website, but I will check and confirm that. There is nothing remotely secret about these discussions, and my working assumption would be that, alongside most of the other committees I chair, the minutes and the discussions will be on the website. I am afraid I cannot confirm whether they are on it at the moment, but certainly that would be the intention.

Q7 Stephen Mosley: At your introductory hearing before this Committee in 2007 you said: “I see my job as really trying to ensure that, when a new policy is made, it is based on the best possible scientific evidence that is available at the time.” Are you leaving behind an advisory structure that will allow that to happen?
Professor Beddington: Thank you, Mr Mosley. I have to say I was rather new on the block, as it were; indeed, I had not even got the job when I was before the Committee. I felt slightly distressed by the fact that I was working at Imperial College and being asked about my policy when I was chief scientist, but I managed, I hope. The first was the ability to obtain government agreement for chief scientific advisers across all key Departments. The second one is to do with culture. We have not often had real problems in my tenure, but there was the problem involving Professor Nutt and the then Home Secretary in which there was a real mess and scientific advice and the scientific advisory process did not seem to work. In discussions with this Committee, I was pleased to be involved in the development of principles of scientific advice in government, which have now been adopted as part of the ministerial code, and in a sense that protects this freedom of scientific advice.

The other area where I have been pleased to have some effect is bringing together scientific advisory committees across government and meeting regularly to discuss any concerns and complaints they have about the process. I think that has worked well. I have a chance of meeting this cadre of chief scientific advisers regularly, and in a sense they can raise issues that are worrying them, and there is then a discussion across government so that issues that go beyond one individual Department can be addressed. I am reasonably happy about it. The whole attitude is about the need to have a degree of scepticism, challenge and transparency.

Taking the case of emergencies, which at the time are quite fraught, all the evidence that goes into the SAGE committees is published on the website, including the minutes of the meetings and any background papers, so that if people are unhappy with advice that has come from SAGE, at least post hoc they can challenge it.

The other thing I have done, which has been important, is to make certain that the sort of advice that Government gets extends beyond just the usual suspects, as it were. In the case of the SAGE committees, experts from academia and industry sit on them. In the case of some of the other advisory groups, I started the Blackett reviews aimed at dealing with policy areas, normally in the domain of the security agencies or MOD, where we bring in both academia and industry to form these groups. Those are the things I would point to as mechanisms I have introduced that have been reasonably successful in achieving that.

Are there areas where I feel that things have not worked? The key issue is to decide what my job is and the job of the chief scientific advisers. Their job is to make certain that
nobody misunderstands the scientific advice, it is not used to bolster particular political policies but that the advice in a sense says, “This is the advice.” If a decision is taken, it can be taken for lots of reasons that are not to do with science, but I would be very worried—I do not think it has happened in my tenure—if decisions were taken in which the scientific advice, in a sense, has been used to bolster a political decision rather than provide independent advice on it.

Q8 Stephen Mosley: One of the changes that that is going through at the moment is the introduction of the What Works centres. Have you had much involvement in setting these up, and how will they be different from the existing scientific advisory networks?

Professor Beddington: I was involved in the early discussions of these issues and put my support into it both within the heads of analysis group, which is one of the key areas, and discussions in Cabinet Office. This is all part of the issue to make social science and research more professional in government, and these centres have the real potential to do that. At the moment, we are in some degree of limbo in that we do not have a chief social researcher or chief social scientist. I regret that since I have always advised that we should have one. The What Works centres, by working closely with the SRC and trying to pose questions about whether particular policy interventions need randomised control trials to assess them and so on, are only going to be good, but it is early days. We will have to see how it works, but as an initiative I strongly support it.

Q9 Stephen Mosley: In the five years that you have been chief scientific officer, which particular policies do you think might have been improved by greater scientific or engineering input?

Professor Beddington: Some of the energy policies. We could have moved much more quickly in deciding to go down a very substantial expansion of nuclear power. It was very clear quite early on that, in terms of meeting our climate change greenhouse gas reduction goals, we would have to expand a whole series of technologies. Nuclear is somewhat underplayed. I felt that the issues associated with the capabilities of our science and engineering to deal with nuclear were underinvested.

Q10 Stephen Mosley: Could I bring in another one: GM?

Professor Beddington: The GM story is slightly fraught. I am well on record as saying that I find the decisions being made in Europe being political rather than science-based. The issues are difficult in terms of the UK, and in my opening remarks I said I was really concerned about the way science advice works in Europe. In the case of GM, the idea that one has a for or against a particular technology is fundamentally mistaken. It is a particular GM organism. Has it the potential to solve problems that cannot be solved in another way? Has it been tested appropriately for both human health and environmental safety? These are issues, again, on an organism basis, but given those, it is pretty clear that there are some profound mistakes, not particularly with Ministers in the coalition Government where there has been support, but they are significantly constrained by the political activities and positions in Europe.

I have been really pleased about the problems addressed after the announcement of trials at Rothamsted on wheat which had in it a peppermint gene that produced an insect pheromone. There was a significant amount of noise in the non-governmental organisation community saying that these were a danger to the world as a whole, and there was a call for groups to combine and tear these up. I was particularly pleased about the way the scientists at Rothamsted came together in the media and challenged these opinions, and in a sense won the
debate. There is a long way to go. For example, the decision by the Government of the Philippines to start introducing rice with a vitamin A component is all to the good.

Where there is a substantial blocking minority, not on the basis of science but a political viewpoint, it makes it extraordinarily difficult to make these things work. It has not been helped by certain issues. For example, in a recent study published by a French scientist GM material was fed to a cohort of rats, implying that these rats produced tumours on the basis of that diet. That has been profoundly criticised throughout the academic world. There is a lot of material that says this is scientifically disgraceful. The intellectual debate is being won in part, but at the present moment, because of political views in Europe, we are unlikely to see it. It is a tragedy. Work done at various British labs particularly on blight-free potatoes, in which we use genes from another potato strain that is resistant to blight, could save the application of 20 incidents of pesticide use to control blight if we had these potatoes. It is extremely difficult. It is for political and not scientific reasons.

Q11 Jim Dowd: In response to Stephen’s question, you mentioned your network of departmental CSOs. Our counterpart in the House of Lords about 12 months ago published a report that expressed some concerns. However, you responded by saying that the network had never been stronger and it acted as a nerve centre for the flow of expert advice across government. Is that flow an even one? Are some parts of government better at either receiving or understanding what it is, and are there other parts that must try harder?

Professor Beddington: It is an interesting question. In terms of the basic House of Lords report, there were two phases to the Government’s response to it. The first phase indicated partial agreement, with recommendations and so on. I will answer your question. Subsequent to that, there was a meeting attended by Lord Krebs, who chairs the Committee, Sir Bob Kerslake, myself and Sir Nicholas Macpherson, to think about how Government could respond in a rather more amplifying and positive way. Effectively, that has now happened. For example, Government have agreed that I, or Mark Walport in two weeks’ time, would be involved. The GCSA would be responsible for reviewing the quality of work that a particular chief scientific adviser has done within their Department over the previous year, and that would be discussed with the permanent secretary at the performance level of CSAs.

The second phase is that the science and engineering reviews we have been developing do assess this and indicate how across government things are working; that is, which Department scores top, which comes second and so on. Those are quite useful because they are agreed with the permanent secretary. Once the permanent secretaries sign off on the review they are committed to taking on the recommendations made, and that is working pretty well at the moment. As I said, there is one left.

We are moving on to a new stage, which Mark Walport will be expected to take forward. We have a problem that I have characterised as the Forth road bridge. By the time you finish one you need to start on the other. We are looking for a new system where it will be the responsibility of the chief scientific adviser in the Department to review the way in which evidence has been used, including the amount of resources, but that review would be subject to external challenge by a panel appointed by the chief scientific adviser. If it is said, “Professor X has done a marvellous job within Department Y, and I thoroughly recommend him to you,” there will be an external challenge, so we will not have that.

If you ask me to make a judgment, I would say that they are vastly different. If we think about the amount of engineering and science that occurs in MOD and compare it with the Ministry of Justice, obviously there are vast differences in the quantity and type of material reviewed. It is quite awkward to compare it; you are comparing apples and oranges at some stage. To an extent everybody reaches the minimum criteria. I do not think we are in a situation where I would be in a position of writing to the permanent secretary and Secretary of
State to say, “The way that your Department uses science and engineering evidence is hopeless and needs to change.” On the other hand, it is fair to say that some Departments have come out better than others. For example, in our SEA review of the Department for Education we felt they were doing extremely well. The MOD got good responses, and so on. Those SEA reviews are quite detailed, but I would find it pretty hard to come to an overall balance or league table because they are so different.

**Q12 Jim Dowd:** Is that for fear of upsetting somebody?

**Professor Beddington:** Absolutely; I am known for it. You clearly have the potential for how you want things to improve. That is why having these reviews being signed off jointly by the permanent secretary and the CSA is the right answer. Essentially, I inherited from my predecessor a situation in which there was a review. It wrote a report, usually after about two years. The Department then spent a fair bit of time refuting the report, or arguing against particular points, and one was in a completely confrontational and non-productive situation. To an extent I inherited one or two of these. I tried to preserve the independence of the reviews. If this was what the independent panel was saying—they are independent of Government—that would be the view, subject to due diligence, that I would accept. You then have a much better chance of saying to the permanent secretary, “This is what these people are saying is the problem in your Department. If you have evidence to say that is incorrect, I am more than happy to look at it, but, if you don’t and you feel you can’t refute it, that is the recommendation they should adopt and I would expect you to adopt it.” I have not had a problem with that as a process. It may be it is a tad less confrontational than some would like, but I have found it works pretty well.

**Q13 Jim Dowd:** In response to Stephen’s earlier question, you mentioned your obvious and active support for the role of the chief social scientist. I am led to believe that, since Professor Wiles left his post in 2010, that has been conducted by a couple of civil servants, one in each Department, but the Government are now going to explore the merits of creating the post of chief social scientist. Do you have any explanation for their change of heart? Is it because it just does not work very well, or is there a more enlightened understanding that they are not getting the best information in this area that they could by the process they have adopted?

**Professor Beddington:** Paul Wiles moved on. That was very convenient. He was a social researcher and was chief scientist in the Home Office. We then appointed Bernard Silverman, who is not a social researcher but a statistician. We noticed a real loss. I certainly noticed that input at the highest level at meetings of the chief scientific advisers, and I decided to pass that on. A number of Committees, including this one, and the House of Lords Committee took it up and said, “This is not sensible.” I agreed with them and made a recommendation that we should have it. We explored a number of mechanisms, none of which was acceptable. One of them was that I offered to part-fund a chief social science researcher in my Department and the Treasury would part-fund that. We could not reach agreement on that. It was at a time when there was fairly considerable austerity, which has not gone away.

There are things we have explored subsequently that are still in discussion. We have a new appointment of chief scientific adviser in the Department for Communities and Local Government. That position is being filled in the interim by a civil servant within the Department. I have already seen advertisements in draft for a replacement from outside. The specification would include the potential for it to be a social researcher. If that was the case, my strong recommendation would be that that individual would take over as government chief social researcher, because the Communities and Local Government appointment is
partial; it is for three days, or whatever. Other mechanisms are under discussion and we will do it. My view is that this is not satisfactory. There is a need to have somebody at the highest level in social research. We did have it, and it was successful. I do say that we lack it. That is not to say we do not get advice on social research and that advice is not good, but overall, that senior challenge function is missing, and I regret it.

Q14 Jim Dowd: By extension, given that the case for a government social scientist is so strong, why is there not a case for a government chief engineering adviser?

Professor Beddington: Do you know—my staff anticipated that question?

Jim Dowd: I confess that in the days when I had a proper job I was an engineer, but that is not why I have asked it.

Professor Beddington: There is a real issue to bring engineering much higher up into the advice that Government gets. I still do not feel that there is any particular merit in having a government chief engineer, but there is a lot of merit in thinking that an engineer could occupy the post of government chief scientific adviser. I also think there is real merit in thinking that a number of our chief scientific advisers should be engineers.

If I think about recent appointments, the latest appointment to the Foreign Office as chief scientific adviser is Robin Grimes, who is a nuclear engineer working in materials at Imperial; the appointment as chief scientific adviser to Transport is Rod Smith, who was recently president of the Institution of Mechanical Engineers; John Perkins, who is appointed as BIS chief scientific adviser, is a chemical engineer; and Jeremy Watson, who is chief scientific adviser to Communities and Local Government, was also an engineer.

If I look around my Wednesday morning breakfast table, there is a group of engineers, a group of natural scientists—physicists and so on—a group of three medics, and one or two people with maths and stats backgrounds. So it is quite a mix. I have a real concern that, if there was a government chief engineer, how would they link in and where would you draw the line between science and engineering advice, because there is a continuum? I have resisted that. In social research I do not resist; I think it is sensible.

The other thing that I think is important is this. In Departments where they have engineering problems but do not have a chief scientific adviser who is an engineer, of which Energy and Climate Change is a classic example, I have recommended—they have done so in DECC—the appointment of a chief engineer. That is the way I would get round it. Recently, I got a letter which said, “You spend all this time talking about a chief social researcher, but don’t you need a chief chemist?” Then it would be a chief physicist, molecular biologist and so on. There are lines to be drawn. My successor is a medic by background, but his successor could well be an engineer, and we have had engineers as chief scientific advisers in the past.

Q15 Chair: To go back to your comments on social science, you are aware that this Committee expressed some frustration about the way its Report on the census had bounced around various Government Departments until the parcel stopped. Do you think that underlines the point you are making that nobody has really taken ownership of social science?

Professor Beddington: I was not closely involved in this, except reading the Report of your Committee, its recommendations and seeing how Government had responded to them. As to whether there should be a Minister responsible for social research, in the way that David Willetts is responsible for science, I do not know. I do not have strong views either way. It is absolutely essential to make certain that we get appropriate challenge of social research that leads to policy in Government. One of the ways that is done is by close involvement of a number of social researchers, social economists and so on, on the Government’s science advisory councils. Paul Boyle, chief executive of ESRC, sits on a number of key Government committees to provide advice. For example, he has been involved
in the development of the What Works centres with ESRC support. I do understand your concerns. I would have thought that this is something where you might well look to my successor to see whether he can help, which in rugby parlance is known as a hospital pass, isn’t it?

Q16 Stephen Metcalfe: I want to talk about the Foresight projects in a minute. Before that, I want to pick up a couple of things in your earlier evidence. You said that the closure of the FSS was presented to you as a fait accompli. Could you briefly expand on that? You had no involvement prior to that.

Professor Beddington: I was told after the decision had been taken to close it down, privatise it or whatever. I raised it with the person most closely involved with this—Bernard Silverman in the Home Office. I have followed the developments and the evidence that he and the regulator gave to this Committee recently. I was not asked. With 20/20 hindsight, maybe I should have been. Bernard himself was given a fait accompli, and arguably, that is not the right way to go. The key here is that we need to make certain that we have the forensic science to serve the needs of Government, and hopefully the evidence that they are providing and the way in which this has developed appears to be moving, at least on my reading of it, in the right direction, but I will look with interest at what this Committee has to say.

Q17 Stephen Metcalfe: Professor Silverman was surprised that he was not invited. We were all surprised that no scientific advice was sought prior to the closure. Given that it was the Forensic Science Service, you would have thought someone might have asked a scientific adviser, but we are looking into that. You mentioned cases where scientific advice is being used to bolster a particular political policy. Do you have any evidence that scientific evidence can be distorted by politicians to get a particular outcome? If that were the case, how would you flag that up? What would the mechanism be to highlight that someone was using scientific evidence inappropriately?

Professor Beddington: I have not had experience of that in a gross way. There were a couple of occasions when a Secretary of State announced that they were going to take a policy decision irrespective of scientific advice. The one that I recall well related to the recommendations on the classification of drugs. The then Home Secretary wrote in one of the newspapers the weekend before the very report was received that, irrespective of the report, she was going to take a decision. I wrote to her and said, “This is not the way we do it.” That was the intervention. If I felt there was a decision by a Secretary of State or Minister in a Government Department that had fundamentally distorted the science, I would see my job as being twofold. First, I would say to the chief scientific adviser, “Were you asked about this? Have you signed off on this? Do you agree?” If the answers were that they had not been consulted and did not agree, then, together with them, I would raise it with the Secretary of State. I would look to the chief scientific adviser to raise it with the permanent secretary. That is the way I would deal with it initially. Depending on the result of those consultations, one would have to decide whether there needed to be an open letter or, in my case, I could write with concern about this to the Prime Minister or Cabinet Secretary.

Q18 Stephen Metcalfe: At some point in that process you would feel obliged to go public and make sure that the public were aware of what the actual science was, not necessarily the way it was put forward. I am not suggesting that this has been done.

Professor Beddington: To an extent, this is a personal answer. Suppose somebody said something like, “GM material is fundamentally unstable; it has a real potential of mutation,” and stuff like that. I would immediately say, “This is completely unsupported by the science,” and I would take on whoever had done that, but I have not had experience like
that, except the one case I referred to when, in a sense, the decision had been taken, “We do not care what the science says; we are going to do this anyway.”

**Q19 Stephen Metcalfe:** But that is slightly different. It is not hiding behind the science; it is saying, “We’re ignoring it.”

**Professor Beddington:** Exactly.

**Q20 Stephen Metcalfe:** If I may move on to the Foresight unit, I think I am right in saying that its focus has been on food, energy and water security. You talked about that a little earlier. Is that because those are areas you had some interest in from your own background, or is it because of the existence of ministerial support in these areas? How did those come into being?

**Professor Beddington:** In terms of the evidence and the ones that have been published, in 2008 there was one on mental capital and wellbeing, which was completely different. It was thinking about interventions during the lifespan to improve mental capital and wellbeing. The next one was on land use futures, which looked at the way we should be thinking about our planning system to address some of the problems. Then there was the one you refer to. It was a very substantial report on global food and farming, and, related to it, a report on international migration. Of the last two that have been published, one was on the future of high-speed trading in financial systems and the other was the future of identity. That is the latest one we have published. There are a few smaller ones. I do not think those are overly biased in terms of food and farming.

I inherited a particular mechanism for deciding on what was chosen as a Foresight report or study area. That was originally in an advisory group with a mix of stakeholders, including some chief scientists. For example, Clive Cookson, the *Financial Times* science correspondent, was one of the people who sat on these committees. We write around to the stakeholder community, both in the UK and elsewhere—we define the stakeholder community quite widely—and say, “What do you think?” Usually, you get a long list of 30 or so and then move to a shortish list of about eight. We have discussions to scope some of these that we can look through, and then we decide how we do it. The food and farming one was very much chosen by that process. To give you an idea, the future of computer trading followed a suggestion from the director of the Joint Research Centre in Brussels. I do not think it is coming in at ministerial whim.

The one we have recently done on international disasters was, however, at the request of the then Secretary of State for International Development, which followed on a recommendation from Lord Ashdown that we needed more science in addressing humanitarian disasters.

We have two in progress now. One of them, which is well down the track, is about the future of manufacturing. That came about because of a general feeling that we needed to think about this as an area. Technology is changing rapidly and one needed to look into the future. They were not just engineering issues but social and economic issues as well. We have one that we have been scoping, which Mark Walport will decide how to take further, on the future of cities. The one on manufacturing will report in the autumn; we have had early discussions on the one about cities. I do not know what will happen after that and what the process will be, but because these studies involve quite a lot of resources we have tried to consult pretty widely to get some degree of consensus that these are appropriate areas.

**Q21 Stephen Metcalfe:** I accept there has been a wide range of projects. Of all those projects, which do you think has had the most impact or influence over Government policy?
Professor Beddington: Many of them have had a fair bit of impact. At the end of the year Foresight does a review of its activities that is published, but one year on after each project we look to see what has actually happened. As you are probably aware, for the Foresight group we have a number of people whose job it is to try to drive impact, so it is not just a study that goes on a shelf and is never used again.

For example, the mental capital and wellbeing report was pretty central to the inclusion of mental wellbeing as a strategic aim of the MRC’s strategic plan, which started the following year. The report on land use futures was used as a core document by DEFRA in the White Paper on the natural environment in 2010-11 and by Communities and Local Government as a basis for planning priorities. The report on food and farming went straight into DEFRA. That formed the central core of DEFRA’s food strategy. It went into the Food and Agriculture Organisation and the World Agriculture Watch. The Gates Foundation used it in developing its agriculture development strategy; the World Bank used it in developing its ideas on climate and agriculture as a link. It has had very substantial effect. In addition, for example, the report on migration and global environmental change worked well with UN refugee agencies, the European Commission, and so on.

Computer trading is slightly different in style. There, it was almost confrontational, because the results of the computer trading report, which we had published as an interim report in September 2011, were at real variance with recommendations coming out of the European Commission and European Parliament. Once this was published, we engaged both with the Commission and the relevant pieces of the European Union to deal with this. Effectively, the report was saying that some of the interventions being proposed would make things worse. I took a group over to meet the European Parliament. We had regular meetings with the Commission; we presented it to the European Securities and Markets Authority, and so on. That has been turned round, and the development of Commission regulation of high-speed trading has been influenced by this. Unusually for this report, we have also linked in with chief executives on the buy side of financial trading but also owners of stock exchanges and so on. We have been linking in quite widely on that stakeholder community. It has also had quite a lot of press, some saying, “These people are lackeys to the high-speed trading industry,” or, “These people are completely obsessed with regulation,” or whatever. It got a lot of reporting in the technical press. Some of it was positive and some negative, but by and large the report had a fair old effect. The future of identity is the latest one and it is too early to say.

Q22 David Tredinnick: You have described water security as a priority; you referred to it earlier on. Has this issue moved up the political agenda during your time as GCSA, and what progress has been made with the UK Water Research and Innovation Framework?

Professor Beddington: Latterly progress has been reasonable. It was significantly underplayed as an issue. I started a group called the UK Water Research and Innovation Partnership, which moved across the whole stakeholder community and involved water companies, water regulators, academics working in it and some research council researchers in water. That has met fairly regularly. Typically, about 30 to 40 people come, and I chair those meetings. The UK Water Research and Innovation Partnership, in which key Government Departments like DEFRA and DFID are involved, is taking that forward. More could be done. These are the early stages. The whole issue of water has been thought about probably in a slightly myopic way and is concerned entirely with flooding—properly so. Flooding is a massive problem, and we need to be thinking about it, but in terms of the UK as a whole there have been some studies looking at the likely effect of changes in climate on weather patterns, as a result of which we may have problems of both surfeit and drought, as we saw in one year last year.
Much more needs to be done. As to the sorts of lessons that we had in 2012, we started the year with the Secretary of State saying, “We are now moving into a drought stage,” followed by six or seven months of heavy rainfall. It is work in progress, but it does need to come up the agenda.

**Q23 David Tredinnick:** Do you think there is a lack of political support to address these issues? Earlier in your remarks you alluded to a difference in the approach that you took to the Labour Government from that to the coalition Government. Last month in particular we heard from the Centre for Ecology and Hydrology that their view was that “lack of political support” was a fundamental problem.

*Professor Beddington:* I believe this Committee took evidence in late February, did it not? I have only seen the evidence; I have not been involved in detailed discussion, but we have something really exciting, in the sense that we do have a lot of very able engineers and scientists who work in this field. We are not using them to greatest benefit in terms of either export markets or dealing with our own problems, so much more can be done.

The problems in the UK pale into insignificance compared with the problems that we are likely to see in the developing world. I have engaged with DFID, who recognise this. The chief scientist and his deputy and I were discussing this only about a week ago. The biggest problem that is going to emerge is what is going to happen in Africa in the next dozen years. You will get a population increase of 500 million, most of which will be concentrated in cities. The real issue is how to get bulk water but also a degree of sanitation into what in 12 years will be 1,000 cities about the size of Edinburgh.

**Q24 David Tredinnick:** As an aside, is there a possibility of the Treaty of Lake Victoria, which apportions water to the countries surrounding it, being revised, and does that worry you?

*Professor Beddington:* I think so. I have not looked at that particular treaty, but the issues are great. One of the potentials for optimism is the discovery by the British Geological Survey of very large amounts of sub-surface water. There are substantial aquifers. If the estimates are anything like correct, they could provide sustainable use of aquifers, but the history of exploitation of aquifers is pretty dire. For example, in north-west India you now have real over-exploitation and salinity of aquifers. A lot needs to be done on the basis of better water management and monitoring.

**Q25 David Tredinnick:** Turning to Europe, the Committee also heard that the UK was apparently being “shredded”—that was the word—during discussions in Europe on water policy. Do you think there are lessons that DEFRA should be taking—for example, the Swedish Water House, the Danish Water Forum, or any other forum for that matter?

*Professor Beddington:* I am not party to that, but I am more than happy to raise it with Ian Boyd, the chief scientific adviser in DEFRA, and say, “Look, what’s going on?” I had not realised there was a significant problem and that the UK was seen as being very behind in Europe. I had certainly seen it as an issue that we needed to address more fundamentally in the UK. The UK Water Research and Innovation Partnership was looking to resource that so it could represent the UK at EU forums. That initiative would cost relatively little amounts of finance but could be done. This is an extremely competent body technically so maybe it will be able to help, and I will take that as an action to raise with Professor Boyd.

**Q26 David Tredinnick:** You touched earlier on homeopathic medicine. One of the ways you can increase the potency of homeopathic medicine is to dilute it in water, as we are on the subject. Do you think it is time that science spent more effort on trying to understand
how the reverse scale of prescribing in homeopathy works, given its widespread use across the world? I am thinking particularly of France, where it is available in about every single chemist.

**Professor Beddington:** The difficulty I have here is that I think the fundamental science underlying homeopathy is misconceived. I think the CMO in front of this Committee said it was nonsense.

**Q27 David Tredinnick:** He said it was rubbish, actually. It tends to evoke terrifically strong emotions. Isn’t the problem that science has not yet worked out how it works, rather like for many centuries scientists thought the sun went round the earth and subsequently discovered it was the other way round, and the Ptolemaic system was discredited? Isn’t there a real problem here for science? In India, part of the health department is called AYUSH; it is made up of Ayurvedic specialists who work in herbal medicine, yoga and homeopathic medicine, and there are quite a few colleges there. Aren’t we lagging behind and science needs to redouble its efforts to try to understand this reverse scale of prescribing?

**Professor Beddington:** The issue is what I term the Galileo fallacy. Galileo, as you commented, was persecuted. He disagreed with the consensus. He was a genius and he was right. To take it out of homeopathy, a number of climate sceptics believe that because they disagree with the consensus they are right and will be shown to be correct. In the case of homeopathy, I would not argue remotely that there is any need to investigate it further. The fundamental physics and chemistry of it are sufficiently discredited that the issue is more psychological and the placebo effect. The details of what you give people seem to me to be manifestly nonsensical in terms of the underlying science, but there is absolutely no doubt that there is a placebo effect, which I believe both the CMO and I have said. As to whether that is worth examining in great detail, it is a matter of looking at other research priorities, but trying to look at dilutions that essentially are beyond the scale of any molecular activity would not be something I would recommend.

**David Tredinnick:** At the moment some—

**Chair:** We need to move on, if we may. I think you have made yourself clear, Sir John.

**Q28 Graham Stringer:** In one of your earlier answers you were slightly critical of the energy policy in being slow in developing nuclear power. Do you think there is any merit in Professor Helm’s criticisms of our energy policy, which are rather more comprehensive? Are you familiar with his book “The Carbon Crunch”?

**Professor Beddington:** I have not read the book; I have read commentaries on his commentaries, as it were. There are two or three really fundamental energy issues. The first is: what is the energy mix going to be? Does any particular energy mix have the potential to meet our climate goals and provide energy security? There is a very large number of possible mixes—more nuclear, more wind, more carbon capture and storage, more demand reduction and so on. In a sense, those are the necessary criteria.

You then move to something that takes it out of my domain, which is the economics of it. Whether it would be sensible to rely substantially more on investment in gas for an interim period of 10 or 20 years, which I understand is Professor Helm’s view, is a perfectly reasonable point, but the question is economic rather than scientific.

The science problems are: can we have a mix of energy that will meet our greenhouse gas obligations under the Climate Change Act, and can we do that safely? One of the things that the Council for Science and Technology is taking up—we are meeting the Prime Minister this week and will be discussing energy policy with him—is whether the significant planned increase in the amount of renewables being developed over the 10 and 20 years’ scope is
properly manageable within our grid on our current technology. We are planning to do that. Indeed, CST has already written to the Prime Minister about that issue, so it is work in progress. In the Council of Science and Technology we have a small group that is already working on this, and I am sure it will be writing a public document to the Prime Minister quite soon. I am afraid that I have not studied Professor Helm in detail.

**Q29 Graham Stringer:** This is slightly unfair if you have not, but you clearly understand the basic thread of what he is saying, which is that the current policies are counterproductive because we are exporting our carbon dioxide. If the objective is to reduce carbon dioxide, which it is, it is not achieving it and it would be better to use gas as a transitional stage to a greener economy. The real scientific part of his argument is that then there would be a new generation of renewables that would be much more efficient than the ones we are using now. Have you looked at that? That is a more profound criticism of the policy than just being slow on nuclear energy.

**Professor Beddington:** I think it is fair comment to expand on that point. These things come from an engineering and science background but they move very quickly into the economic domain: what things are costing and the efficiencies of various technologies that currently are quite expensive, offshore wind being the most obvious. As technology develops, are you going to see the price of energy produced by offshore wind drop? The expectations are that it will, but there is nothing fundamental that would guarantee it.

An interesting area is the potential for the UK to produce its own gas. You may recall that I commissioned the Royal Academy of Engineering and the Royal Society to look at the potential environmental impact of the development of a shale gas industry in the UK. Eventually, they said that, as long as the regulations are properly implemented, it should be fine. An interesting article has just come out in *Nature*. Somebody has looked at peaking of productivity in gas and oil exploration using fracking technology in the USA. It shows very early peaking after two or three years. I have only just read the article, but these are the sorts of questions we need to ask. For example, is the price of gas likely to remain low for a decade or so? Again, it goes to economics rather than science.

**Q30 Graham Stringer:** There is an interesting transition to the next question I am going to ask. The issue around fracking in the north-west and Blackpool was a success for the Government in reassuring people that there would not be earthquakes all over the place if fracking took place. People understood that, and the geologists explained it themselves. We live in a society that is increasingly distrustful of all authority—scientific and political. Do you think that during your time in this job you have helped to increase trust in science, or has it decreased? Could you have done more, effectively? It is very important that the public do trust science.

**Professor Beddington:** It is really important. One of the examples I gave was about the scientists at Rothamsted, who engaged with the media and were able to answer questions about the GM technology that they developed. That is a good example of how scientists have got to do that. The area where we have been able to allay some concerns is in the field of radiation problems following the Fukushima disaster. The message that I put out during the crisis was that there was not a problem. There was insufficient radiation, even in the worst case and worst weather, to present problems for our citizens in Tokyo, or indeed the rest of Japan. I am absolutely sure the science was right and it has been proven subsequently to be the case, but you have an issue that you need to engage with the public. One of the things that I did at the time was to have a series of telephone conversations organised by the embassy but which anybody could phone into and ask questions. That seemed to work extremely well in calming the fears of the UK expatriate population.
We could do a lot more of that. There is a real potential to address some of these issues. I accept your point that there is a real potential in the community to doubt advice, whether it comes from government scientists, academic scientists or conservation organisations. We need to engage much more carefully with that. One of the concerns that have arisen recently is about radiation. The World Health Organisation indicated that the effect of radiation post-Fukushima was tiny and there would be no detectable increase in morbidity or mortality following it. It was a well balanced report. They got experts from all over the world in radiation medicine and epidemiology, and the spokesman for Greenpeace said it was a completely political report that went against scientific evidence. That is part of the democratic process, but there is a real problem that non-governmental organisations will tend to dismiss science, even when it is there, if it is inconvenient for their agenda.

Graham Stringer: I agree with that.

Q31 Roger Williams: During the time you have done your job you have given people a greater understanding of and confidence in science, but I want to ask you a little about your interaction with Government and Ministers. Do you believe that during your time you have had sufficient access to the Cabinet and high-level decision makers?

Professor Beddington: First, in terms of my links with the Prime Minister, who essentially is the person I report to, since May 2010—I asked my office to look it up—I have written to him over 40 times on different science subjects. I have not seen him and banged the table, but I have written to him on 40 occasions.

Q32 Roger Williams: How many times has he replied to you?

Professor Beddington: Regularly; I usually have a reply. In fact, it would be unusual not to have a reply.

Secondly, in terms of links with Ministers it depends. Let’s think about it. David Willetts, the Science Minister, I see pretty much twice or three times a month. Foresight brings in links with Ministers; they sponsor them. On manufacturing, it is Vince Cable; on computer trading, it was Treasury Ministers Mark Hoban initially and then Greg Clark; on food, which was under the previous Government, it is Stephen O’Brien and Jim Paice; for mental capital, it was Bill Rammell; and on the built environment it was Caroline Flint. In linking with CST, I have met with Michael Gove, Andrew Lansley, Jeremy Hunt, and Charles Hendry when he was Minister for Energy. I meet various MOD Ministers on that Department’s R and D spend. I always have the opportunity; if I want to, I can do it.

Q33 Roger Williams: Do you have to go to their study?

Professor Beddington: They have chief scientific advisers and they can come to me.

Let me think. I pretty much invariably go to the Secretary of State’s office rather than the Minister coming to the chief scientific adviser’s office. It is usually slightly more commodious, apart from anything else. If there is an issue, I am absolutely confident that I can get access. I have never had a situation where a Secretary of State has said, “I’m not seeing this damn chief scientist; it’s a waste of my time.” I have seen pretty much most of Cabinet when there has been an issue, but I do not feel it is part of my job to go round and say, “It’s April; it’s time I saw the Secretary of State for Transport.”

Q34 Roger Williams: Perhaps you could tell us a little about how your relationship has differed between this and the previous Government.

Professor Beddington: The correct answer here is to say that my position is non-political and that is the appropriate position to be in. By contrast, my counterpart in the USA is a political appointment and, when George Bush handed over to Obama, he took up the
place. I think “non-political” is the right way to do it, and I do not think I should comment any further.

**Q35 Roger Williams:** Could you look into the future a little? Would you say that the role of the chief scientific adviser to the Government will be a more important one in future than it is at the moment?

**Professor Beddington:** It probably has to be. If we think about the major Government agendas to do with growth, science and engineering is going to be fundamental to achieving economic growth in this country. Therefore, the education of scientists and engineers will be absolutely critical. As to the problems facing us, whether they are resource-related or, for example, what the chief medical officer has been saying today about the problems of antibiotic resistance, the need to engage with and have chief scientific advice is absolutely fundamental. Poor Ian Boyd, who took up his position in September—I was involved in the panel who appointed him—has since had to deal in strict order with ash dieback disease; the problem of badger culling; drought that turned into flooding; and he is currently looking at pesticides that deal with bees. He has been in the job for five months, so he is a fairly good example of some of these key issues.

We now have a cadre of chief scientific advisers. Before you came in, Mr Williams, I talked about the fact that we also had deputy chief scientists who now have regular meetings under my own deputy. We have got science advisory councils and committees across Government that provide it. All that is there, but I do not think it is going to be enough, and down the tracks we will need a lot more.

**Chair:** That leads us very neatly to a final, very short question from Graham.

**Q36 Graham Stringer:** In a sense, you have answered the question about legacy, but can you tell us what advice you will be giving to your successor?

**Professor Beddington:** I have known Mark Walport for 20-odd years. We were at Imperial College together, and he has been an old hand as a member of the Council of Science and Technology since I took it up. The key issues are: plain language; if there is uncertainty, say so; and be transparent. Those are three slightly laconic versions. I shall be talking to him about different individuals, problems and so on. His appointment was announced relatively early on, and I have been able to introduce him to all the chief scientific advisers. He now knows them personally; he has attended meetings and so on. It is an enormously challenging job. I suppose I would send him a note saying, “You’re really lucky; it’s a great job.”

**Q37 Chair:** Sir John, we have had you in front of us about eight times since I have been in the Chair. You have always been very frank and positive with the Committee about the role you have fulfilled. Of the many predecessors of yours that I have known, it has been a very fruitful relationship between this Committee and you. I know I am speaking on behalf of the whole Committee when we say we wish you every success for your future. Thank you very much for attending today.

**Professor Beddington:** Thank you, Chairman.