OFFICIAL REPORT
AITHISG OIFIGEIL

Environment, Climate Change and Land Reform Committee

Tuesday 27 September 2016

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Tuesday 27 September 2016

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ENVIRONMENT, CLIMATE CHANGE AND LAND REFORM COMMITTEE
6th Meeting 2016, Session 5

CONVENER

*Graeme Dey (Angus South) (SNP)

DEPUTY CONVENER

*Maurice Golden (West Scotland) (Con)

COMMITTEE MEMBERS

Claudia Beamish (South Scotland) (Lab)
*Alexander Burnett (Aberdeenshire West) (Con)
*Finlay Carson (Galloway and West Dumfries) (Con)
*Kate Forbes (Skye, Lochaber and Badenoch) (SNP)
*Jenny Gilruth (Mid Fife and Glenrothes) (SNP)
*Emma Harper (South Scotland) (SNP)
*Angus MacDonald (Falkirk East) (SNP)
*Mark Ruskell (Mid Scotland and Fife) (Green)
*David Stewart (Highlands and Islands) (Lab)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Matthew Bell (Committee on Climate Change)
Lord Krebs of Wytham (Committee on Climate Change)
Ece Ozdemiroglu (Committee on Climate Change)

CLERK TO THE COMMITTEE

Lynn Tullis

LOCATION

The Robert Burns Room (CR1)

Scottish Parliament

Environment, Climate Change and Land Reform Committee

Tuesday 27 September 2016

[The Convener opened the meeting at 10:03]

Decision on Taking Business in Private

The Convener (Graeme Dey): Good morning and welcome to the sixth meeting of the Environment, Climate Change and Land Reform Committee. We have apologies from Claudia Beamish MSP.

The first item of business on the committee's agenda is to consider whether to take item 3 in private. Do we agree to do so?

Members *indicated agreement.*

Climate Change Adaptation Programme (Assessment)

10:03

The Convener: The second agenda item is to take evidence on the Committee on Climate Change's assessment of the Scottish climate change adaptation programme. We are joined by members of the adaptation sub-committee of the Committee on Climate Change. I welcome Lord Krebs, who is the chair of the adaptation sub-committee, and Ece Ozdemiroglu, who is a member of it and who seems, from her biography, to have extensive knowledge of its work. I welcome back after a brief absence Matthew Bell, who is the chief executive of the Committee on Climate Change.

As the panel members can imagine, we have a series of questions for them. I will kick off. Will you give a brief summary of your overall view of the picture that you found in Scotland?

Lord Krebs of Wytham (Committee on Climate Change): Thank you for inviting us to appear before the committee as witnesses, convener. We very much appreciate the opportunity to present our findings.

I remind members that the adaptation sub-committee is a sub-committee of the Committee on Climate Change. Under the Climate Change Act 2008, we are obliged to provide advice to Governments, including the Scottish Government, on the risks from climate change. When we are asked by the Governments of the United Kingdom to provide independent assessments of their climate change adaptation programmes, we are statutorily obliged to do so.

We are very pleased that the Scottish Government asked us to look at its first adaptation programme, which was published in 2014. We looked at the England programme, which was published a year before the Scotland programme, and did a report on that last year. In many ways, we followed the structure that we had for the England programme when we reported on your programme.

I will briefly give the headlines.

First, climate change is happening now; it is not purely out there in future decades. There are impacts in increased temperatures and sea level rises in Scotland, increased annual rainfall and quite possibly changes in the frequency and intensity of extreme weather events, although we cannot be sure about that. Those pressures from climate change come on top of many other pressures on the built and natural environment

from population growth, economic development and so on, of course.

We think that the Scottish climate change adaptation programme is a very good, positive start by the Scottish Government. We liked the simplicity of the structure of three themes, nine objectives and 148 policies and proposals. The structure is logical and simple, and the themes made sense.

We asked the people who were responsible for implementing those policies and proposals how they were getting on. As members will see in our document, most of the policies and proposals were reported as being either completed or on track. However, we highlighted the fact that most of the policies and proposals that are not completed do not have a set timescale or a clear senior owner, who could be someone in central Government or some other organisation. That is one point that we wish to draw to the committee's attention.

We are only two years into a five-year programme, and we recognise that this is a first step on the path. For the areas of concern that we highlighted we used a simple red, amber and green traffic-light scoring system, as members will have seen. Most of the areas that we looked at scored amber and green, but we highlighted two areas as red. One of those areas was soil vulnerability and agriculture and the other was development in flood-risk areas. We may wish to delve into those issues in a bit more detail.

In many areas, we found it difficult to get data on whether vulnerability or, to put it another way, resilience was increasing or decreasing. There is a question about the availability of data.

We drew heavily on ClimateXChange, which did a great job of providing data, and we checked our conclusions with many stakeholders in Scotland. For example, we checked soil vulnerability conclusions with the National Farmers Union Scotland. We did quite a bit of consultation to ensure that our findings were robust.

There are some very good examples of local action, in Glasgow in particular. We highlighted in an illustrative example in a box a number of community-level actions to alleviate flood risk.

Members can take heart from the fact that stuff is happening. There has been a positive start and the Government is taking climate adaptation and resilience seriously, but there is still more work to be done. That is not surprising when Scotland is only two years into the first five-year programme. A second adaptation programme will, of course, be published in 2019.

The Convener: Thank you for that introduction. We will delve into some of those points.

England is a year ahead of Scotland. How does our performance compare with England's performance? What is England doing better than we are and what are we doing better than it is?

Lord Krebs: It is difficult to make direct comparisons between England and Scotland. The England programme had a much larger number of individual actions—more than 370—which are called policies and proposals in Scotland. We gave a similar proportion of those a red score, so you will see in the score sheet that England and Scotland are pretty comparable. However, I felt that the Scottish programme was more focused and had a more manageable number of objectives.

The state of the natural environment, which is very important in Scotland, is generally better in Scotland that it is in England, although there are some areas of concern. For example, the loss of upland peat is an important issue in both England and Scotland. England is more susceptible to future risks from high temperatures and water shortage than Scotland is likely to be, although Scotland is not immune to those risks.

I do not know whether Matthew Bell has anything to add.

Matthew Bell (Committee on Climate Change): That is a good summary. The important thing is trying to understand what are the most vital areas in Scotland and how those are distinct from areas in England. As Lord Krebs said, agriculture and forestry are proportionately more important in Scotland than in England, so it is arguably more important here to think carefully about threats to agriculture and forestry.

We highlighted a few opportunities in England for businesses, but arguably there are more such opportunities in Scotland. We noted that the Scottish CCAP did not have a lot in it about business, despite both risks and opportunities for business being highlighted in some of the climate change risk assessments that preceded it, whereas the English national adaptation programme has a more comprehensive section on business. That difference is worth thinking about when considering how to incorporate business more centrally in some of the Scottish considerations.

The Convener: Okay. Jenny Gilruth has a supplementary question.

Jenny Gilruth (Mid Fife and Glenrothes) (SNP): The report talks about effective engagement and refers to the Climate Change (Scotland) Act 2009, which requires the Government to engage with stakeholders, and specifically with employers and trade unions. My question is about case studies of good practice in that area. Can you highlight examples of where

trade unions or employers have worked effectively in that field?

Matthew Bell: One of the notable differences—this is partly linked to the previous question—is that there is much more about communication and engagement around climate change in the Scottish programme than in the English programme. As Lord Krebs alluded to, we have seen Adaptation Scotland and stakeholder groups in Scotland picking up on engagement and making sure that it is clear. The important thing is drilling down into specific areas. For example, on agriculture and soils, what is the nature of the engagement that has to take place with the farming community and the forestry community? We highlighted significant risk to commercial forestry, which could be partly exacerbated by climate change.

We also looked at flooding and flood risks, and considered whether local authorities are carrying out the required assessment of flood risk and whether there is the required level of engagement at the local community level to ensure that information is available. Local authorities might use those things to decide how to weigh up the evidence and consider whether to prioritise different areas and whether development in a flood plain is sensible. It is about ensuring that the information is available and that local authorities and local planning officers understand that they need to carry out assessments before making a decision. It is important to drill down into the local areas that are relevant to each of the sectors that are highlighted.

The Convener: We will move on to the issue of the natural environment, and Maurice Golden will start with a question about biodiversity.

Maurice Golden (West Scotland) (Con): What are the priorities for ensuring that Scotland's biodiversity can adapt to the impacts of climate change? How has Scotland managed to establish a biodiversity baseline? In other words, do we have the data to assess how our biodiversity will be challenged and how it can ultimately adapt?

10:15

Lord Krebs: Ece Ozdemiroglu will respond to those questions.

Ece Ozdemiroglu (Committee on Climate Change): One priority is soil quality and biodiversity, and the other important one is the marine environment. Better understanding of the impacts of climate change on the marine ecosystems, from plankton levels to fisheries, is required, and one of our recommendations is that that is a research priority.

We are mindful of the other pressures on biodiversity from human use and how they affect the resilience and preparedness of the environment for the pressure from climate change, which is why we have concentrated on major users in Scotland such as agriculture and forestry. In forestry, one of the risks from climate change is the faster and wider spread of current and new pests and diseases. The forest stock could be more diverse to reduce the risk of larger sections of the stock being affected by a new pest or disease or the spread of a current one, and actions are being taken in that regard. So, the top three priorities should perhaps be improving soil quality, understanding better the impacts of climate change on the marine environment and achieving better diversity in the forestry sector.

Lord Krebs: Maurice Golden asked whether there are baselines from which to monitor trends. The answer is that there are in some areas; for example, there is very good temporal trend data about bird populations. Some of the farmland and upland bird populations are continuing to decline, despite the measures that are trying to halt that. We looked at the evidence on the condition of water bodies and it appeared to be very positive. The proportion of designated sites in favourable ecological condition is steadily increasing. There are therefore temporal trends for the quality of habitats, designated sites and particular species; some are going up and are positive, but some are going down and are negative. The response to that is partly a matter of undertaking research to understand the causes of declines and partly a matter of encouraging those responsible for managing the land and the countryside to ensure that they do so in a way that encourages biodiversity.

Maurice Golden also asked about what will make Scotland's biodiversity more resilient to climate change. That is a very interesting question, because one thing that might happen as a result of climate change is that new species will arrive and old species will disappear. Should one therefore try to conserve what is here now or should one be preparing the environment to cope with what comes in the future? That is a very interesting research question. However, the general conclusion that we have reached on the basis of the available literature is that if habitats, whether freshwater, marine or terrestrial, are in good ecological condition, however that is defined, they will be resilient to climate change and will accept the new species that will arrive and thrive as old ones become extinct because of climate change. The issue is therefore management of the environment to have habitats that are in good ecological condition and are not polluted, and management of the current biodiversity to good levels.

Maurice Golden: So what are the areas that lack data and perhaps require further data gathering? How can we progress that?

Lord Krebs: You might come to this when we talk more about agriculture, but Ece Ozdemiroglu highlighted concerns about agricultural soils and their carbon content. You might think that that is not part of biodiversity, but soils contain a very rich fauna and flora of microorganisms that help to maintain soil fertility. Ece also highlighted the marine environment, and we have seen evidence that for some of the key plankton species that support certain food chains, the cold-water species are being replaced by warm-water species, which are less nutritious and have a lower fat content. That could impact on the whole food chain, so from the point of view of the resilience of fisheries, we need to understand more about changes in plankton.

Otherwise, there is peatland—we may well come back to that. Peatland restoration is a major and continuing priority for Scotland. Even though you have done good work, there is a lot more to be done.

A lot of the responsibility for the more iconic species—birds and mammals that the public would recognise as biodiversity—lies with a combination of landowners and the regulatory bodies that advise on conservation. It is a picture with many actors in it and there is no simple answer.

Matthew Bell: As you know, it comes under the rubric of the biodiversity strategy, which sets out the level of ambition that is required. It is a question of making sure that concrete measures are in place to monitor that ambition.

For example, the biodiversity strategy sets out an ambition that 15 per cent of degraded ecosystems will be under restoration by 2020. Are we monitoring whether that will be the case? Do we have a clear understanding of what is happening? As Lord Krebs mentioned in the introduction, the next programme is due in 2019, and 2019 and 2020 are relatively nearby. What is the ambition beyond 2020? How do we make sure that we are monitoring the relevant baselines, as Maurice Golden said—whether that is in relation to terrestrial or marine animals—so that we know whether the changes are heading in the right direction? That is a theme that we pick up throughout the report.

The Convener: Finlay Carson has a brief supplementary on biodiversity.

Finlay Carson (Galloway and West Dumfries) (Con): It is on the back of Maurice Golden's question. Do we have well enough developed models looking into the future to address all the issues that have been mentioned? When we look at the sustainability of razor clams, scallops, salmon or whatever, are we investing enough to offset what I would suggest is a significant risk? Are the models there to look at every factor?

For example, we concentrate a lot on water quality when it comes to salmon, but we should not ignore the fact that feedstock—the plankton or whatever in the North Atlantic—may change and that may have a more significant impact on our salmon stocks. Is there enough investment in putting together future models to predict such potential problems?

Lord Krebs: That depends on what "enough" is. The understanding of those basic processes—for example, the marine food chain—is not a uniquely Scottish problem. One should not assume that Scotland has to invest independently of everybody else. A lot of the work on sustainable fisheries management is done internationally through international bodies such as the International Council for the Exploration of the Sea and the European Union or, at a UK level, through the fisheries laboratory at Lowestoft—the Centre for Environment, Fisheries and Aquaculture Science.

On whether enough research is being done, I guess that any scientist—I am a scientist by background—would say, "Please can I have a bit more money so that I can do a bit more research?" However, I emphasise that there is an international body of knowledge. The fish and the plankton on which the fish feed do not belong to particular countries; they are a shared resource, and we have to treat them as such and manage them and research the factors on an international basis.

The Convener: You said that they are a shared resource, but are we effectively sharing the information that is being gathered?

Lord Krebs: I am not sure that I am in a position to say whether the information could be shared more effectively. The bulk of the scientific work on both modelling and collecting the data to support the models is ultimately published in peer-reviewed literature. That is the gold standard for research, to ensure its credibility. If the information exists in the so-called grey literature, hidden in somebody's back pocket, we do not know how reliable it is. Once it has been out there and has been tested and peer-reviewed, we can treat it as a reasonably robust contribution.

The Convener: Thank you. We move on to agriculture and soils.

Mark Ruskell (Mid Scotland and Fife) (Green): I want to ask about food, farming and agriculture, which appears to be a stand-out point in the report on adaptation and the previous report on mitigation. In the adaptation report, you highlight a number of areas of voluntary action and

co-ordination and point to the potential role of the land use strategy. To what extent can we get real progress in the area through those voluntary measures, or are we perhaps looking to make real progress in the area through a wholesale review of agricultural policy?

I noticed that the French, for example, have just made agroecology the central objective of their agriculture policy. Do we need to make more fundamental shifts or can we continue to make tweaks, looking at best practice?

Lord Krebs: I will not talk about the mitigation side because you covered that two weeks ago with Matthew Bell. On the adaptation side, your question is really about whether we need more mandatory or quasi-mandatory intervention to improve the sustainability of agriculture.

Soil quality is declining and it is not purely due to climate change. Climate change will exacerbate the declines in quality that are due to unsustainable methods of intensive farming. The fact that it is happening shows that whatever we are doing at the moment is not sufficient, otherwise the quality would not be declining.

Establishing why what we are doing is not sufficient is more complicated. Is it because of a lack of information? Is it because the current subsidy incentives do not incentivise more sustainable management practices? Do there have to be changes in regulations? I do not have a clear answer other than to say that the use of public funds to support agriculture, which of course is substantial, ought to take into account the long-term sustainability of our farming for the future.

Matthew Bell: It is worth emphasising that the Government has a clear and ambitious statement on soils to make sure that they are protected for existing and future generations. That is a laudable ambition. The question is, are the actions following on? That is partly what Mark Ruskell is asking—are the actions following on that will ensure that that is the case?

Right now, two things are missing and one of them is a theme that we have raised in the past—we need to make sure that the monitoring and the evidence are in place to understand whether what is being done is sufficient. As you will have seen in the report, we have bits of evidence about soil carbon and coverage and whether soils are being eroded because of lack of coverage. However, we do not have a comprehensive picture of soil fertility and the impact of the combination of demographic change, urbanisation and climate change on soil fertility and agricultural production.

We need to make sure that we understand whether progress is being made. Currently, the schemes are largely voluntary but, as Lord Krebs said, there are also considerable financial incentives, including through the common agricultural policy. If we had evidence that sufficient progress was not being made, that would allow us to say that it was time to rethink and to move forward with different levels of measures. However, right now the evidence base is patchy so we are trying to draw conclusions from a patchy evidence base.

Mark Ruskell: Are you able to drill down in particular areas of particular sectors within agriculture that you think are problematic?

Lord Krebs: I am not sure.

Mark Ruskell: Are we talking about lowlands, are we talking about uplands—

Lord Krebs: If the uplands relate to peat restoration, there are certainly significant issues there. In the lowlands, certain kinds of crops are more prone to produce soil compaction and are therefore likely to produce run-off in extreme rainfall events. I do not have a clear answer—that is why I am hedging a bit—but I think that particular farming practices will be more damaging to soils than others.

I should also say that this is not a Scotland-unique problem in the UK. We found similar patterns in England. For example, the evidence in East Anglia, which has the most fertile soils in England, is that if current trends continue, the rich peat topsoil will disappear within about a generation and then we will be down to the mineral soils underneath, which are much less fertile.

It is a UK-wide problem—and probably a beyond UK-wide problem—that current farming practices are essentially mining natural capital as though it was a depleting resource rather than husbanding it for the long-term future. We have to think broadly about the relationship between current food production and future food production. We do not want to do our grandchildren down.

10:30

Ece Ozdemiroglu: I point to one of the sources that we quoted in the report. There is a map showing the soil erosion risk not so much by sector but by area of Scotland. It seems that the middle of the east coast is at the highest risk of soil erosion.

Lord Krebs: That would be the most intensively farmed area.

The Convener: You have touched already on peatlands. Recommendation 4 in your report calls on the Scottish Government and Scottish Natural Heritage to put in place by the end of 2017 a

peatland restoration target for 2030 along with a properly monitored delivery programme. How important is that and why?

Ece Ozdemiroglu: Peatlands are important because of soil biodiversity but they can also be considered part of mitigation, which we will not cover. They are an important resource because they can serve both policies. There are intentions, targets and action plans so, rather than identifying a gap in the policy, the recommendation was made because more specific and more time-bound actions would improve the visibility and implementation of the plan.

Lord Krebs: Peatlands are important partly for the ecosystems services that they provide, which are carbon storage and water retention. Well-managed upland peat acts like a sponge but, if the peat has been gullied, gripped and drained, the water goes straight down into the valley and causes problems, often in built-up areas below.

Peatland management is partly a resilience issue from the point of view of mitigation and adaptation. It is also an issue partly because peatlands are important natural habitats. Scotland is richly endowed with upland peat and, therefore, has a responsibility to maintain that habitat for its own sake in addition to the economic benefits that will derive from maintaining it in good state. Traditionally, many land management practices have been hostile to maintaining peat in good state because the land has been used for other purposes, such as grazing, forestry or grouse shooting, all of which involved treating peat in a way that makes it drain and die out rather than keeping it wet and resilient. Climate change is a further pressure on top of those existing pressures.

The Convener: This may be a question for Matthew Bell but, if we set what you just said alongside mitigation in relation to peatlands and the fact that we are not measuring the benefits of upland peatlands or of rewetting, is it not clear that, overall, we are really missing a trick in climate change terms?

Matthew Bell: Yes. Soils—and agriculture and forestry more generally—cut across resilience, the production of food, the prevention of flooding and everything else on which Lord Krebs just touched, as well as emissions reductions, because they provide ways of storing carbon into the future. It is useful to focus on them as an area that helps us to address both problems if we get the approach right. The data and evidence are less readily available on soils than in some other areas, such as cities or renewable energy, in which the starting point is always understanding how quickly things are changing before we think about what measures need to be put in place. We can benefit both sides of that equation on peatlands.

The Convener: That is useful, thank you.

Angus MacDonald (Falkirk East) (SNP): On Friday—I hope that I may give a plug—I attended a large bog restoration project that has recently been completed on the Slamannan plateau, which straddles my constituency. Buglife—The Invertebrate Conservation Trust—has restored more than 210 hectares at that site, installed more than 4,100 dams and removed 25 hectares of invasive conifers and scrub. More than 650 species have been recorded on the site. Given your recommendation 4, I am surprised—and I expect that surprise to be shared—that the national peat action plan does not already call for monitoring. That clearly needs to be done and you call for it to be done by 2017 so you clearly share my concerns on that lack of specific action.

Matthew Bell: That is right. You mentioned that conifers were removed in the restoration in your constituency, and that is another important illustration of the link between adaptation and mitigation. As we know, on mitigation, there is a lot of emphasis on the potential benefits of planting more trees and hitting the tree-planting targets. However, it is important that trees are planted in the right places and not planted on deep peatland, where there is a negative impact. Although there are opportunities to benefit emissions reductions, resilience and adaptation by considering soils and forestry together, we also need to ensure that we do not do things that impact negatively on one side or the other in achieving our ambitions on the two areas.

Angus MacDonald: One proposal that came up during my visit on Friday was the possibility of taxing peat use. Do you have a view on that?

Lord Krebs: We do not have a view on particular policies so the answer is no.

We say:

"Over three-quarters … of deep peat soils in Scotland are heavily modified"

because of

"drainage and afforestation",

which will be more prone to the impacts of climate change. The national peatland plan, which was established in 2015, states that restoring up to 21,000 hectares per annum is technically achievable. However, the current rate of restoration is way below that and is more like 1,400 hectares per annum.

There is a gap between what the Scottish Government has identified as a technically achievable target and what is being done but, nevertheless, as you illustrate, peatland restoration projects are happening. The figure that we quote is that there were 105 such projects in

2015. As with many things, the story is that progress is happening but there is no room to take one's foot off the accelerator. In this case, we probably need to push it further down on the accelerator.

The Convener: I presume that you would like an ambitious peatland restoration target for 2030 to be introduced.

Lord Krebs: Ambitious and monitored.

Kate Forbes (Skye, Lochaber and Badenoch) (SNP): You have touched on the matter briefly already but, when it comes to mitigation, we know that there is still more work to be done to achieve the reforestation targets. What are the opportunities for adaptation in achieving those targets? You mentioned where we plant. In the report, you also mention what we plant and diversity. What are the other opportunities?

Lord Krebs: Whether or not it is an opportunity, there is a research need to understand the potential arrival of new forest pests and diseases. We highlight one example, which is red needle blight. The number of sites that are affected by it has increased by a factor of six within the past 10 years. We know that some of the new forest pests and tree diseases arrive through international trade. Dutch elm disease, ash dieback and sudden oak death probably arose from international trade. However, it is also likely that climate change will contribute to the arrival of new diseases. Therefore, to realise the opportunities of afforestation, we need to have a good research base in tree pathology and good monitoring systems to detect the spread of tree diseases.

Alexander Burnett (Aberdeenshire West) (Con): Good morning. I am glad that you have mentioned forestry and how it is more significant in Scotland than in the rest of the UK. I should refer to my entry in the register of members' interests regarding forestry.

The Committee on Climate Change has recommended that the Scottish Government plant 16,000 hectares of trees a year. The Scottish Government's target is only 10,000 a year and I believe that, in the past two years, it has achieved only 8,000 and 6,000. Will you comment on those lower figures and on how important it is that we achieve 16,000 hectares a year? That is not just from the point of view of the climate change target because, as you said, there are two angles here, and there is also the adaptation element of flood risk.

Matthew Bell: On emissions reduction and mitigation, the job of the Committee on Climate Change is to advise the Government on what targets for overall greenhouse gas reduction are achievable and fit within the levels of ambition of the Climate Change (Scotland) Act 2009. We did that for each of the years 2028 to 2032. In order to understand what targets are achievable and fit within the ambition in the act, we look at a range of scenarios and say, "Under these different scenarios, how is it possible to reach this target at the least cost, in a way that is achievable, given all the constraints?" That is how the figure of around 16,000 hectares of forestry planting, which will help to achieve the emissions reduction targets, was seen as possible.

We are always very clear, in the scenarios that we put out there, that the Committee on Climate Change is satisfied that the overall reduction of greenhouse gases is achievable, given all the constraints. They are not intended to be prescriptions; it is clearly for the Scottish Government to decide what combination of measures—in forestry, land use, transport, domestic buildings or renewable electricity generation—to put in place. Our assessment was that one way of achieving those targets would be to increase the ambition on tree planting.

More generally, Scotland has a big natural advantage in what are called carbon sinks. Trees absorb carbon dioxide from the atmosphere, as can soils and other things. Scotland's natural advantage in those areas means that it could utilise them very cost effectively to help to meet its emissions reduction targets.

However, as you rightly say, in recent years, Scotland has not been achieving its current ambition of 10,000 hectares a year, and the figure has been gently declining in the past couple of years. Clearly, renewed attention should be paid to that. If renewed attention is paid to it, it has the potential to help on the adaptation side, too, because trees help with flood prevention and biodiversity. They also help the forestry industry, which is important for Scotland and is, arguably, threatened by the pests and diseases that Lord Krebs mentioned. We need to understand those pests and diseases and how we can ensure that the forestry industry continues to thrive and prosper, alongside providing emissions reduction and things like natural flood prevention. We need to get that nexus of three areas working together.

Alexander Burnett: I accept that the 16,000 hectares is only a recommendation and that it is the choice of the Scottish Government how it achieves the overall target. However, given that the Scottish Government is achieving only between 30 and 50 per cent of what is recommended, would it be easy to make the other 50 per cent part of another recommendation?

Matthew Bell: The point of the recommendations on adaptation and mitigation is that they should work together. We think that there is an opportunity for more tree planting to reduce emissions, as well as to improve the resilience of

Scotland. It means that there are two reasons to plant trees, in addition to the economic ones.

These are not historically unprecedented levels of ambition. In the 1970s, for example, tree planting in Scotland was at the level that we are talking about. Of course, some of that might not have been in appropriate areas—it might have been on peatland, where it has damaging effects. We are learning from that—it is important that tree planting takes place in the right areas.

10:45

The Convener: All of which points to the need for a fully functioning land use strategy, does it not?

Matthew Bell: That would be the logical conclusion.

The Convener: Mark Ruskell wants to come in with a brief supplementary on coastal habitats.

Mark Ruskell: We know that salt marshes and tidal habitats are potentially under threat because of climate change. Do you see a way to support the resilience of those habitats while managing coastal realignment? Is there a link there into mitigation? Are those habitats that sequester carbon—do they operate as carbon sinks?

Lord Krebs: Ece, do you want to pick up on that one?

Ece Ozdemiroglu: Our recommendation on coastal habitats is exactly on that point. Like many other policy points or risk assessments, we need to think about lots of different pressures together and find solutions that can address more than one pressure. In coastal habitats, flood risk and coastal erosion management are an opportunity to do that. We could create managed realignment or other, more green, options for flood risk and coastal erosion management that might also increase diversity. Such options could provide nursing grounds for fish, improve fisheries and provide recreational opportunities for the local population. The evidence for those benefits is weaker than the evidence on the other services that managed realignment provides. However, for the reasons that you outlined, we have recommended the consideration of targets to increase the use of managed realignment in flood risk and coastal erosion management.

Lord Krebs: Matthew Bell has drawn my attention to a figure on whether actions are taking place to manage coastal flood risk. To date, only one managed realignment scheme has been delivered in Scotland. There is a question about whether that programme needs to be increased at the rate at which shoreline realignment takes place.

Mark Ruskell: Why is that?

Lord Krebs: Why has more not been done?

Mark Ruskell: Yes.

Lord Krebs: I am afraid that I do not know.

Matthew Bell: Managed realignment is not the most straightforward thing. You have to trade off a range of uses for the areas in between the sea side and where urban settlements start pitching up. What we have seen, partly in and around Glasgow, is that there are ways of combining urban settlements and managing the shoreline. Salt marshes and other mechanisms then provide a range of benefits. They can have positive impacts on health and wellbeing—I am sure that we will come on to that issue—as well as on flood defence and biodiversity. However, there are often short-term costs, whether financial or in terms of changes that have to take place. There is a trade-off between the short-term impacts and the longer-term benefits. That can be decided only at the individual local level. The circumstances will be different in different localities, so it is hard to generalise. There is clearly a tension in every local area between the short-term changes that would be necessary and the long-term benefits that managed realignment might bring.

Lord Krebs: We say in the report:

"There is currently no national long-term vision or plan proposing the area of intertidal habitat to be created through managed realignment in Scotland."

One reason that more is not happening is that there is no national vision for what should be happening.

On the extent of shoreline management plans in individual areas, the existing ones for Fife, Angus, East Lothian and Dumfries and Galloway cover about 4 per cent of the Scottish coastline. We are at the beginning of a process but there is no long-term vision and not much progress has been made on implementing the development of shoreline management plans. That is a sort of answer to your question.

The Convener: Okay—thank you.

We move on to the built environment, with a question from Finlay Carson on flooding.

Finlay Carson: In your report, you state:

"There has been no long-term assessment of flood risk management investment needs."

Are you satisfied that we are assessing flood risk properly? We have areas that are designated as potentially vulnerable zones, but other communities are still flooding. In one community in my constituency, 26 out of 32 properties were flooded, but the area is not included in a PVZ.

There may not be enough assessments being carried out, but are you satisfied that those that are carried out are fit for purpose?

Lord Krebs: One of the problems with flood risk assessments is that there is a moving target, most likely because of the imprint of climate change. We are seeing changes in weather patterns, and there have been some historically high-intensity rainfall events—for example, in England last December and January. In Cumbria, the rainfall intensity was at a historic high. We cannot say that that individual event was due to climate change, but we can say that warm atmosphere holds more moisture and that, when the moisture drops, it will do so in more intense rainfall events.

The question of whether the current flood risk assessments are fit for purpose—I am not saying that they are not—relates partly to the fact that we are looking at a moving target over time. There is also the question of what constitutes an acceptable level of risk. In a risk assessment, one may say that properties are 100 per cent protected, or that there is a certain level of risk. There is an interesting question with regard to how we communicate the level of risk. Normally, it is communicated as a one-in-200-years or one-in-100-years risk, which is easily open to misinterpretation. For example, if there are 100 sites, each with a one-in-100-years risk, the likelihood is that one of those sites will flood every year. The other way in which that may be misleading is that people may think that, if they had a flood last year and there is a one-in-100-years risk, they have 99 years to go until the next time that they are flooded, but of course the statistical probability is the same each year.

We need to consider carefully how we communicate risk, recognise that risk is not ever zero and acknowledge that the conditions under which we assess risk will change over time. That is my answer to the question of whether the flood risk assessments are fit for purpose. It is not a simple story.

David Stewart (Highlands and Islands) (Lab): Lord Krebs, you made the interesting point earlier that climate change is with us now—it is not just some science-fiction event in the future.

I am very concerned about flooding in the UK and in Scotland in particular. Your report clearly identifies the reason why there is a problem in Scotland, which is an increasing pressure to build on flood plains. That is a real problem, given that 90 per cent of properties that are at risk of flooding do not have flood prevention measures. That is extremely worrying. What changes would you like to see? I note with interest that you have highlighted that issue as red in the traffic-light system in your report. It really requires more work urgently.

Lord Krebs: The situation in Scotland that we have highlighted in the report—which is very similar to the situation in England—is that not all local authorities have undertaken a strategic flood risk assessment to inform their local development plans. It is clearly an important duty on the planning authorities to ensure that they have looked properly at future flood risk.

There is evidence that site-specific flood risk assessments are not always conducted when they should be. For example, individual developers who put in planning applications should carry out flood risk assessments, and the Scottish Environment Protection Agency should be consulted on those and its advice taken into account. The problems relate partly to the way in which the planning system is implemented. I am not saying that we should not build on flood risk areas, because there could be very good reasons for doing so, but we need transparency and a proper process of risk assessment that feeds into that.

On the risk management side, as you mentioned, 90 per cent of at-risk properties are not protected by flood defences, which is a pretty remarkable statistic. In addition, there are issues with the way in which we manage surface water. Certainly in England—and in Scotland, I imagine—surface water flooding is probably a bigger cause of damage than coastal or riverine flooding.

In Scotland, as in England, there has been an increase in the paving over of permeable surfaces with impermeable surfaces, whether that means front gardens being paved over for parking space or concrete surfaces for car parks where there were previously soft surfaces. We have suggested that, in England and in Scotland, we should be very cautious about creating more problems by paving over areas with impermeable surfaces. We have also advocated, again in both England and Scotland, the uptake of sustainable urban drainage systems. We point out that the data on the actual uptake of SUDS in new developments are not being collected in Scotland, so again there is an information gap.

A variety of actions are required in risk assessment and in flood risk management when new developments are in place.

David Stewart: Thank you—that was a clear summary of where we are. It seems that flooding is one of the most worrying aspects of climate change in Scotland. You are right to highlight issues around how we use sustainable urban drainage systems.

In my experience in the Highlands and Islands, where we have had severe flooding in Moray and parts of Inverness, there were very mundane and simplistic issues such as the failure to maintain culverts correctly. Lack of such maintenance

causes more widespread problems in the longer term.

Lord Krebs: That is not to say that there are not some good examples. We refer in the report to an example in Glasgow, where systems are put in place at a community level to manage surface water flooding at the same time as providing amenity for the local community and space for wildlife and biodiversity. There are multiple-win solutions if the motivation and the resources are there to implement them.

David Stewart: In the longer term, we know what the problem is in relation to the extent of flooding in Scotland and in the UK. Apart from being very careful about building on flood plains, and ensuring that people take advice from SEPA—because sometimes its advice is not taken on board—is there a wider issue in terms of how we look at housing design? Do we need to look in a much more preventative way at how we design housing?

Lord Krebs: Absolutely. We quote a figure on property-level resilience measures, because there are things that individual householders can do to protect their existing properties, even if those properties are not new build. Based on 2014 figures, only nine out of 32 local authorities have implemented schemes to promote the uptake of property-level flood protection measures. There is no data on which we could assess the actual level of uptake, but we think that individual householders can take important additional measures.

As an aside, as you know, houses that were built before 2010 will now be covered by the new flood insurance scheme, called Flood Re, which enables householders in flood risk areas to get affordable insurance. We made the point to the chief executive of Flood Re that, over the 25-year lifespan of the scheme, one important measure is that houses that are affected by flooding should be restored under Flood Re in a more resilient way so that the problems if they are flooded in the future will be manageable and insurable. The transition plan for Flood Re must build in something about property-level protection and resilience.

David Stewart: I will finish with a practical point. I am not looking for an answer, because it is a fairly technical point. In the previous session of Parliament, we took evidence from the Met Office. It explained that, in England, there is complete coverage with high-density radar that predicts incoming weather. Unfortunately, Scotland does not have that complete coverage—Moray, in my patch, which has had severe problems in the past, does not have high-density coverage—so local authorities and others are more restricted in their ability to predict weather. Has your committee looked at that issue? If not, would you be interested in raising it with the Government?

Lord Krebs: We have not looked at that particular matter, although we regularly talk to the Met Office about its forecasting services. We have talked more about the structural issues of planning, hard surfaces and sustainable urban drainage, rather than the quality of day-to-day forecasting. You are talking about the emergency services having sufficient advance warning in place to be prepared, and I am not sure that we have looked at that.

11:00

Matthew Bell: No, we have not looked at that particular scheme.

Returning to the theme, there is a very ambitious commitment in the strategy to have no net increase in flood risk for Scotland. However, in the follow-through for that a series of measures is lacking, such as the building of flood plains, improved radar coverage, improved soft defences and improved household-level defences. Those measures that could be put in place would allow the Government to know whether it is achieving the ambition of no net increase in flood risk. There is a disconnect—it is very difficult to understand whether the series of measures that are being put in place are working towards that ambition.

When we do point surveys, we observe that individual planning applications in flood-risk areas are largely not supported by flood-specific assessments. Lord Krebs mentioned flood plain development and the fact that a small proportion of local authorities promote property-level protection measures but those are not taken up. There is no national database on building on flood plains, so we do not know how much building is happening on flood plains nationally. The Government needs to decide which of the measures that could be put in place—radar is one of those—would be consistent with meeting the ambition and could be monitored in a way that allows us and the public to check whether the ambition is being met. That is the disconnect that exists right now.

Lord Krebs: I have found the part of the report that talks about emergency response, so I will return to your point on the ability of the emergency response system to deal with extreme weather events. Part of that is having an appropriate radar weather forecasting scheme to enable the emergency services to be prepared. It is highlighted as something for the next SCCAP in 2019 to pick up, rather than for the current one.

The Convener: Before we move to Jenny Gilruth's question, I would like you to clarify something. From reading the report and listening

to what you are saying today, it strikes me that you are almost as critical of local government as you are of national Government. Perhaps more accurately, the to-do list for improvement that you are preparing applies just as much to local government as it does to national Government. Is that a fair observation?

Lord Krebs: In some areas, it is absolutely fair. One of the things about building a resilient Scotland is that it is not the responsibility of one entity. It is not just the responsibility of central Government; local government has a role to play, too. However, as we discussed in relation to property-level protection, individual householders also have a role to play and businesses do, too—we talked about the farming community, for example.

An important part of the way in which Scotland will become more resilient is through engaging everybody to recognise that it is a problem for the future and, if we do nothing about it, it will only get worse. Programmes such as adaptation Scotland, which tries to bring together different players and stakeholders, are important in generating wider public action. Although I agree with you that we point the finger at local government in a number of areas, I would not want you to feel that it is solely the responsibility of officialdom. There is a wider responsibility that lies with business, local communities and individual households.

The Convener: It is useful to get that on the record.

Jenny Gilruth: To drill down further into the local authority issue, the report highlights that, in 2014, only nine of the 32 local authorities in Scotland had implemented schemes to promote the uptake of property-level flood protection, and I understand that there is no data on the uptake. Had those nine local authority areas already experienced flooding and should the Scottish Government compel the other 23 local authorities to act?

Lord Krebs: Do we know whether those nine local authorities have had flooding?

Matthew Bell: Some of them certainly have had flooding and we can get you the details of which have and which have not. In some ways, the second part of the question is the most interesting: should local authorities be compelled to put measures in place? We have to be careful about compelling them to act if it is not appropriate for the local area, as there might be some for which, due to their location, flood risk is very low. That is where transparency and communication become very important.

Where there is a risk, local authorities have to be able to assess that risk through a combination of Met Office and national information, so we must ensure that we collect data. One of the reasons why we point out that there is no national database on development on flood plains is that that could be done nationally but local authorities could draw on that data to understand whether there are particular risks in their local areas.

It is important to have checks and balances in place so that local authorities in which there is a significant risk take that risk seriously. One of the things that we know about flooding to date is that, although some of it is down to sea level rises, a lot of it is down to rainfall and to the combination of risks from climate change and from urbanisation and hard surfaces, as Lord Krebs said. Local authorities that are not by the coast, for example, might think that they do not have a problem, but even they are likely to have some flooding risk, so doing that assessment is important. For some local authorities it is appropriate to promote property-level protection measures, but for others that might not be a wise use of our scarce financial resources.

Ece Ozdemiroglu: One recommendation that we made on closing the evidence gap was to work with the infrastructure providers, as they might have better data on their assets and the risks that those assets pose. To repeat Lord Krebs's message, perhaps the onus is not on one party but on several parties working together to generate evidence and to make decisions.

The Convener: To expand on that point, we have seen the graphic impact of severe flooding and I want to explore how we should respond to that. If we take the example of Ballater in north-east Scotland, which suffered devastating flooding in the last while, how should we have restored the infrastructure that was taken away there? I know that the Cairngorms national park has very carefully considered whether to restore the path network in its previous location, given the risk of an event like that happening again. However, we restored the road network in exactly the same place and we saw the broadband cables hanging in mid-air because they are located alongside the road. What do we need to do better in the future? I recognise the challenges for relocating the roads and broadband infrastructure, but surely the same logic applies to that as to the path network.

Matthew Bell: The approach has to start with understanding the risks. We point out, for example, that the 2015 infrastructure investment plan does not consider future climate change risk and the resilience of infrastructure into the future. Similarly, we point out that "Scotland's Digital Future: Supporting the transition to a world-leading digital economy", which was published in 2013, did not consider the risks to digital infrastructure from future events, which will potentially be exacerbated by climate change. The approach has

to start with acknowledging and understanding those risks in more detail and feeding that through to the plans. As we have been saying, that also has to filter down because a lot of decisions are taken locally—where to site a road or where to give permission for electricity lines or digital communication fibre optics to go. The national-level information has to filter down so that sensible decisions about keeping infrastructure resilient to those changing risks can be made locally.

Mark Ruskell: I want to return to the issue of local government. Do you have evidence to suggest that capacity and funding are serious issues for how local government adapts? Look at some of the issues that we have talked about this morning: maintaining culverts, development planning control, individual property-level protection subsidy schemes and major capital projects. That is a lot of work to manage. Local government teams in relevant parts of the councils are becoming smaller, not larger. Have you encountered that?

Lord Krebs: We have not looked specifically at the resource constraints but, from my experience, local authorities vary in how well they deal with climate adaptation and how high it is on their agenda. I suspect that at least part of the problem is the priority that local authorities give to these matters. That may be driven by the elected members or by the executive. I would not want to jump automatically to saying that this is a resource constraint problem. It may be a prioritisation problem. Life is very hard there because there are so many competing priorities. Climate adaptation and resilience could always be seen as a slightly longer-term thing that we could put off until next year or the year after. I do not think that we have any evidence on which to say that the failure of local authorities to meet certain objectives on resilience is entirely the result of lack of resource.

Matthew Bell: That point is the main one. In a different publication—the climate change risk assessment, the Scottish version of which we are putting out today—we look a little bit at local authority resourcing across Scotland and the rest of the UK. There used to be a combination of staff whose main responsibility was local adaptation measures. Lots of those positions no longer exist or have been combined with other positions, and that affects whether things are prioritised. If it is not somebody's main job to look at something, it is easy for it not to get prioritised alongside a range of other very real pressures. I am sure that we will come to social services and other pressures.

It is a difficult balance. Local authorities are clearly under an awful lot of pressure. You are right to observe that, particularly when it comes to adaptation, lots of the measures must be thought about at a local level in order to get the right solutions in place.

The Convener: Thank you. Let us move on to the resilience of society to the impacts of climate change.

Jenny Gilruth: I want to ask about the public understanding of climate-related risks. On page 152 at the tail end of the report, it says:

> "Raising awareness about the effects of climate change is likely to be most effective when people are already dealing with the effects of extreme weather."

It strikes me that the horse has already bolted, and we are retrospectively dealing with the impact. The report also cites evidence from the ready for emergencies website, which is an online resource that has been developed by Education Scotland. Do you accept that there needs to be a level of education to build on behaviours in the next generation in order to combat climate change and to further build the resilience of the next generation in dealing with the effects of climate change?

Lord Krebs: The short answer is yes. We need to do more to engage people. As I said in answer to an earlier question, we cannot say that building resilience is the responsibility of "them out there". There is a responsibility for "them out there"—public authorities and so on—but building resilience is also an issue with which every citizen of Scotland should be engaged. That is easy to say but not necessarily so easy to do.

Understanding how best to get across messages that may seem a bit abstract and theoretical in a way that says, "These are practical issues that affect you here and now," is an interesting communication challenge. That is why I started off by saying that we should not talk about climate change as something that will happen out there at the end of the century. We should talk about it as something that is affecting us now. Things that are happening to citizens on a daily or yearly basis are, in part, a result of climate change. We need to think about how to manage that. I agree that we need better communication, but I do not have a magic bullet as to how to achieve that.

Jenny Gilruth: What about the level of education? We are trying to encourage behaviours in the next generation that will guard against climate change. Do you recognise the importance of education in doing that? We have been looking at the ready for emergencies website. I am not sure to what extent a website is a valuable resource in developing those behaviours. Do we need a more critical approach in the way in which we deliver that education in schools via the curriculum?

11:15

Matthew Bell: We have not done an assessment to understand whether the subject is given sufficient or insufficient weight in the curriculum. It is clear that the response and the communication need to combine the emergency response and the longer-term adaptation.

Earlier, we looked at figures on the uptake of property-level protection measures, which show partly a lack of education and understanding. We need people to understand the risks and to be able to react to them in a preventive way in advance of emergencies happening, and we need to have emergency plans in place for when things do take place.

On the page that you quoted, we are pointing out that although, ideally, we would avoid emergencies taking place, when they do take place, we should take advantage of them to ensure that they do not take place repeatedly. In a range of evidence that we have looked at—Lord Krebs quoted some of this earlier—it seems that people think that if they have been flooded this year, it is unlikely to happen again for another 99 years. Actually, if a place has been flooded this year, we should put in place measures to ensure that the physical damage and the psychological damage, for which there is a lot of evidence—flooding impacts on employment and a range of other things—do not get repeated time and again.

The Convener: On the subject of emergency planning, a number of committee members visited the national centre for resilience in Dumfries recently. We were all impressed by the arrangements in place with Dumfries and Galloway Council for knowing where vulnerable individuals are located so that when an emergency arises—as that area has experienced—the evacuation of those people can be prioritised. Are you aware of that example and has that been picked up as an example of best practice by other places?

Matthew Bell: We pick up on that example in the report. The national centre for resilience is an important part of co-ordinating an emergency response. Alongside that, we mention putting in place monitoring and evaluation measures to assess impact. Off the back of that, we can understand where such a scheme should be rolled out and where more should be done.

David Stewart: Your recommendation 18 on health is extremely interesting. It is about assessing the risk, about which you are particularly concerned, of vector-borne diseases carried by mosquitoes and ticks—I think arthropods is the technical term—which are cold-blooded and so are more sensitive to climate change.

In other parts of the world—not in the UK—malaria is a huge problem caused by mosquitoes and, of course, we have seen west Nile fever a bit nearer to home in Europe. What are your concerns about the monitoring for and protection of our health from exotic diseases that we do not currently suffer from but that we are likely to because of climate change?

Lord Krebs: You have highlighted a few possible diseases. Knowing the likely impacts of climate change on vector-borne diseases really is a matter of research. Research is already going on and we need to ensure that it continues.

Surveillance is important so that, when new diseases arise, we have a good handle on plotting their progress. They will not just jump into Scotland out of the Mediterranean. They will creep up northwards, so there will be plenty of opportunity to monitor their arrival and to ensure that, when new diseases arise, resources are prioritised in an appropriate way to tackle them.

For the next SCCAP, the onus should be on Health Protection Scotland to ensure that it has a proper research base and a risk assessment and monitoring base.

David Stewart: On a related point, air pollution is clearly a growing problem with climate change. We already see it in Scotland—some of our urban streets in Edinburgh, Dundee and Glasgow have very high levels of pollution. A policy area that the Scottish Government is looking at, which I certainly support, is the introduction of low-emission zones. I think that London has such zones. They are a good way of reducing pollution and reinvesting funds into public transport. What is your view on the concerns about air pollution?

Lord Krebs: In Westminster, the Committee on the Medical Effects of Air Pollutants has substantially increased its assessment of the number of premature deaths caused each year by air pollution. I cannot remember the exact number, but it is in the many tens of thousands. It is a significant public health issue in the UK as a whole and not just in Scotland.

As you highlight, the changes that would be important in contributing to reducing air pollution have multiple benefits. Encouraging the use of more efficient, low-emission vehicles would have the advantage of reducing our carbon emissions, and encouraging people to use public transport or bicycles or to walk would have health gains. All those actions also have adaptation gains by reducing air pollution and mitigation gains by reducing carbon emissions. There are multiple benefits to be had from trying to encourage people to use different forms of transport and, when they drive, encouraging them to drive low-emission vehicles and ultimately ultra-low-emission

vehicles, such as electric cars. That approach is strongly emphasised on the mitigation side as transport is a major source of emissions.

Finlay Carson: I am pleased to say that many of the answers that I was looking for have already been provided. I declare an interest: I am an elected member of Dumfries and Galloway Council. I am very proud of the way that the council has responded to climate change, particularly with regard to resilience in our small rural communities. The council has facilitated those communities putting together their resilience plans.

One of your recommendations is that the Scottish Government should work more closely with local authorities to assess the impacts of climate change. Health and social care, emergency planning and recovering from extreme weather conditions all need local solutions. How can we provide more capacity and funding for small communities to have a grassroots-led approach to climate change resilience rather than a top-down approach?

Lord Krebs: A grassroots approach is very positive. That goes back to the questions that we were discussing about public engagement, and if a community is generating its own resilience plans that definitely involves local engagement.

On the resource question, I do not know that I am in a position to say where the money will come from. I know that some of the community-led projects in Glasgow have attracted money from the Heritage Lottery Fund. That fund might be one source that people could apply to. I do not know whether the Scottish Government centrally allocates resources for such community plans.

Matthew Bell: More widely, we are making the point about the risk of viewing many of the issues in silos, with the air pollution problem and the risk of premature death from that pollution in one silo, adaptation in another silo and flood risk in another. However, if you bring together some of the issues, whether that be urban green spaces or some of the coastal defences that we were talking about, you bring together the health, adaptation, resilience and mitigation impacts. In that context, you can make sure that local bodies, which are very short of financial resources, make the most efficient use of the resources that they have by looking across the piece and seeing where they can get multiple gains from a single action. That is even more important with the constraints that exist today.

The Convener: Let us wrap up this discussion by looking at what happens next. You have produced an excellent report. What discussions do you anticipate having with the Scottish Government over its content? Do you anticipate that the Government will produce an action plan based on what you have said? Where do we go from here?

Lord Krebs: We are meeting the cabinet secretary later this morning and we will discuss the report with her. I do not think that the Scottish Government has said that it will produce a formal response, but we anticipate—indeed, this is what I have seen in the press coverage—that it will welcome the report. It was a very good thing that the Government asked us to carry out an independent assessment. We look forward to being asked again at some point to carry out another independent assessment. I hope that the Government will do that, but whether it would ask us to do that on this adaptation programme or on the new one in 2019 is a question for discussion. Clearly, by 2018, which will be this programme's final year, it is quite likely that not much will have changed—a bit may have changed, but not a lot—so it may be more sensible for us to look at the next adaptation programme.

In England, we are obliged by the Climate Change Act 2008 to report every two years to the UK Parliament on the adaptation programme. Whether that model is appropriate for Scotland is a matter for discussion with the Scottish Government.

Matthew Bell: It is worth noting that the Scottish Government has to produce a progress report on the adaptation programme. That report is due in May 2017 and we would certainly expect it to reflect the evidence and analysis that we have put forward. Given the independent assessment that the adaptation sub-committee has made on the adaptation programme that evidence and analysis should be reflected in the progress report that the Government has to produce anyway.

The Convener: As no one else has another question, I will ask a final one about a specific matter. You identify in the report a need for a senior owner for each objective to be held accountable for delivery. What parts of Government ought to take responsibility for specific objectives?

Lord Krebs: The senior owners will not naturally be in Government. They may be in executive agencies, such as SEPA, or they may be in other organisations, such as business representative organisations and so on. We have not done a breakdown across Government departments of where we think responsibility should lie, but that would flow automatically from the area being considered.

The Convener: Thank you for that clarity. I thank all the witnesses for coming along. It has been a very useful exercise for the committee to

hear from you. Once again, thank you for an excellent report. It has given us a lot to consider.

At its next meeting, on 4 October, the committee will take evidence on climate change adaptation from stakeholders. As agreed earlier, we will now move into private session. I ask that the public gallery be cleared as the public part of the meeting is closed. Thank you.

11:27

Meeting continued in private until 12:03.

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