



House of Commons
Environmental Audit
Committee

**Climate change
adaptation**

Tenth Report of Session 2014–15

*Report, together with formal minutes relating
to the report*

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Environmental Audit Committee

The Environmental Audit Committee is appointed by the House of Commons to consider to what extent the policies and programmes of government departments and non-departmental public bodies contribute to environmental protection and sustainable development; to audit their performance against such targets as may be set for them by Her Majesty's Ministers; and to report thereon to the House.

All publications of the Committee (including press notices) and further details can be found on the Committee's web pages at www.parliament.uk/eacom.

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Contents

Report	<i>Page</i>
Summary	3
1 Introduction	5
UK adaptation policy	5
Our inquiry	6
2 Emergency response	8
Civil Contingencies Act	8
Capabilities and resources	9
A flexible response	10
Conclusion	11
3 Flood defences	13
Investment plans	13
Somerset levels	15
Soft flood defences	16
Conclusions	18
4 Development and planning	19
Floodplain development	19
Flood Re	21
Surface water flooding and sustainable drainage	22
Local planning	23
The planning policy framework	25
Building standards	27
Conclusions	28
5 National infrastructure	30
Adapting new infrastructure	30
Adaptation of existing infrastructure	31
Interdependencies	32
Managing water demand	34
Conclusions	35
6 National Adaptation Programme	36
Top-down direction	36
A spatial NAP	39
Adaptation reporting power	40
Wider engagement	42
Conclusions	43
Conclusions	45
Recommendations	47

Formal Minutes	49
Witnesses	50
Published written evidence	52

Summary

Continued emissions are forecast to alter future patterns, frequency and severity of extreme weather. The 2013–14 winter floods highlighted the costs, damage and disruption that extreme weather can cause. With the effects of climate change likely to persist for centuries to come, the need to adapt is unavoidable.

The UK is already ahead of most countries having published the National Adaptation Programme (NAP)—required by the Climate Change Act 2008—setting out what government, businesses and others were doing on adaptation. The NAP has to be updated every 5 years, and the next NAP is due in 2018. The NAP process has created a buy-in through its bottom-up contributions from many organisations, but the Government has not identified proactive adaptation policies or driven action in a coordinated way. The NAP document has lacked a spatial focus to help develop landscape-scale or regional strategies.

In July 2015, the Adaptation Sub-Committee (ASC) of the Committee on Climate Change will publish its first statutory report, scrutinising the progress being made by the NAP process. When the next Government comes to produce the next NAP, it needs to provide a more top-down strategic direction, with a spatial focus, and create a set of measures and targets against which progress can be measured. In preparing the next NAP, the Government should assign explicit responsibility to a named body or individual—an envoy—for raising awareness of our climate change risks.

The emergency response framework for dealing with extreme weather has been repeatedly tested, and there are structures in place which allow lessons to be learnt and integrated. With cuts to local authorities' and emergency services' budgets, the Government should undertake a review of the physical resources, capacity and skills available for emergency response as well as the coordination between all of the organisations involved, at both national and local level.

Flooding is the biggest adaptation risk in the UK, and will increase even if significant resources are devoted to it. There are welcome long term investment plans for flood defences, but also some concerns about the viability of projects because of uncertainty around how 'partnership funding' for projects is determined. In the last year or so the Government has pursued a 'reactive' funding strategy, prioritising the most recent flooding events. The Government should make a clear commitment to allow the Environment Agency to allocate flood defence funds according to objective cost-benefit model considerations, without political interference.

An important issue is how funding for flooding adaptations can be matched against the value of the adaptation benefits available. The Natural Capital Committee's (NCC) work on valuing ecosystem services (e.g. 'soft' flood defences) shows that importance for climate change adaptation, but also offers the prospect of finding funding mechanisms to link natural capital 'owners' and adaptation beneficiaries. The next Government must put the

NCC on a long-term footing and encourage it to develop such funding mechanisms.

The Environment Agency's advice against building on floodplains is largely followed, but the Agency does not consider smaller developments, which in aggregate can have a significant effect on flooding risk. The Government should require the Environment Agency to provide flood risk on all sizes of development, including small developments currently exempted. Only a minority of Lead Local Flood Authorities have produced the required flood risk management plans, and without a legal duty to manage and reduce flood risks the local authority budgets for this work are liable to be reallocated to other duties. The Government must enforce the powers it already has to require Sustainable drainage systems (SuDS) in developments, particularly on floodplains, and remove the developers' right to connect homes to the public sewer.

Infrastructure and networks are increasingly vulnerable to disruption from extreme weather events, with significant economic costs. The Government should support further research into critical network 'pinch-points' and interdependencies, starting by coordinating the necessary data-gathering which is currently incomplete. The Government should also consider making adaptation reporting—preparing reports identifying what an organisation is doing to adapt to climate change—a mandatory requirement for organisations managing critical infrastructure and services. Network regulators are in a strong position to put a high value on the benefits of climate change adaptation by using their price reviews to drive the necessary infrastructure resilience investments across networks. The Government should reconsider the case for introducing universal water-metering in water-stressed areas.

1 Introduction

1. The Fifth Assessment report of the Intergovernmental Panel on Climate Change (IPCC) set out the latest science on, and the expected impacts of, climate change. It warned that “warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia”. “Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system.”¹ Some of these changes and climate impacts are already being felt:

- 2014 was the warmest year on record, according to NASA,² the UK’s Met Office³ and the World Meteorological Organization.⁴ Nine out of the ten warmest years in the instrumental record have occurred since 2000. The UK’s mean temperature for 2014 was 9.9°C, which was 1.1°C above the long-term (1981–2010) average.⁵
- The winter of 2013–14 was the wettest in England and Wales since 1766, with the rainfall in Southern England unprecedented.⁶ The provisional rainfall total for 2014 of 1,297mm was the fourth highest for the UK since 1910.⁷
- In 2014, the north east, east and west coasts of England saw the largest tidal surge for 60 years and an estimated 7,000 properties were flooded.⁸

2. In a report in November 2014, the Royal Society warned that “societies are not resilient to extreme weather” and the risks posed by climate change are increasing.⁹ The IPCC highlighted that even if emissions of CO₂ are stopped now, “most aspects of climate change will persist for many centuries”.¹⁰ This means that the need to adapt to climate change is unavoidable.

UK adaptation policy

3. In addition to the statutory requirements placed upon the Government to mitigate climate change and remain within a series of carbon budgets, the Climate Change Act 2008 also put in place a policy framework to promote adaptation action in the UK.¹¹ It placed a

1 IPCC, [Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis](#). Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. (2013) Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA

2 NASA, [Press Release: NASA, NOAA Find 2014 Warmest Year in Modern Record](#) (16 January 2015)

3 Met Office, [Press Release: 2015 confirmed as UK’s warmest year on record](#). (5 January 2015)

4 WMO, [Press Release: 14 of 15 Hottest Years Have Been in 21st Century](#). (2 February 2015)

5 Met Office, [Press Release: 2015 confirmed as UK’s warmest year on record](#). (5 January 2015)

6 *ibid*

7 *ibid*

8 Met Office, [Press Release: Wettest winter for England and Wales since 1766](#) (27 February 2014).

9 The Royal Society, [Resilience to extreme weather – Executive Summary](#) (November 2014), p2

10 IPCC, [Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis](#) (2013)

11 [Climate Change Act 2008](#)

duty on the Government to lay before Parliament an assessment of the risks for the UK of the current and predicted impact of climate change. Accordingly, the Government published a *UK Climate Change Risk Assessment* in 2012, which gave a detailed analysis of 100 potential effects of climate change.¹² That document informed the first National Adaptation Programme (NAP), published by the Government in 2013, setting out what government, businesses and society were doing to adapt better to the changing climate.¹³ The NAP fulfils the Secretary of State's duty under the Act to lay programmes before Parliament setting out: climate change adaptation objectives; proposals and policies meeting those objectives; and the time-scales for introducing the proposals and policies. The Risk Assessment and the NAP have to be updated every 5 years, with the next Risk Assessment due in January 2017 and the next NAP in 2018. The Act also places a duty on the the Adaptation Sub-Committee (ASC) of the Committee on Climate Change, to advise the Government on the preparation of each of those reports—the first statutory report being due in July 2015.

4. The Climate Change Act gives the Government an 'adaptation reporting power'—to require organisations operating essential services and infrastructure to produce reports identifying climate risks and how they plan to respond. These reports feed into the Risk Assessment and NAP. In July 2013, the Government updated its strategy for the second round of reporting. In preparing for the NAP, the reporting power was mandatory for certain sectors. Under the revised strategy, authorities report on a voluntary basis.

5. Since 2010, the ASC has published several progress reports, most recently *Managing Climate Risks to well-being and the economy* in July 2014.¹⁴ This provided an update on climate change adaptation by examining the resilience of national infrastructure, business opportunities and risks, well-being and public health, and emergency planning. Previous ASC progress reports had focussed on land use planning, managing water resources and designing and renovating buildings (2011);¹⁵ flooding and water scarcity (2012);¹⁶ and key ecosystem services (2013).¹⁷

Our inquiry

6. The Government's involvement in the work of the Committee on Climate Change in respect of climate change adaptation differs from that on mitigation. Under the Climate Change Act, the Government is required to respond to the annual reports from the Committee on Climate Change examining progress against the carbon budgets (a mitigation measure), but not the ASC's progress reports on adaptation. We undertook our inquiry to examine both the progress being made on adaptation, ahead of the ASC's first

12 Defra, [UK Climate Change Risk Assessment 2012](#) (January 2012)

13 Defra, [National Adaptation Programme: Making the country resilient to a changing climate](#) (July 2013)

14 Adaptation Sub-Committee (ASC), [Managing climate risks to well-being and the economy](#) (July 2014)

15 ASC, [Adapting to climate change in the UK – Measuring progress](#) (14 July, 2011)

16 ASC, [Climate change – is the UK preparing for flooding and water scarcity?](#) (1 July, 2012)

17 ASC, [Managing the land in a changing climate](#), (10 July, 2013)

statutory report to Parliament in July 2015, and the Government's approach to the ASC's work.

7. We took oral evidence across six sessions from a range of witnesses: Lord Krebs and Daniel Johns (the chair of the ASC and the Head of Adaptation for the Committee on Climate Change respectively), Defra Minister Dan Rogerson MP and Cabinet Office Minister Oliver Letwin MP, officials from Kent County Council and Kingston upon Hull City Council, Climate UK, the Local Adaptation Advisory Panel, the Home Builders' Federation, Public Health England, the Town and Country Planning Association, Local Authority Building Control, Natural England, Water UK, the Environment Agency, the Energy Networks Association, Professor Jim Hall, the Federation of Small Businesses, the Infrastructure Operators Adaptation Forum, and Brian Smith (a member on the DfT Review of the *Resilience of the Transport Network to Extreme Weather Events*).

8. The focus of our inquiry was the ASC's most recent progress report and the actions that Government now need to take to be able to produce an effective revised NAP in response to the ASC's advice later this year. We examine below the state of progress on emergency response (Part 2), flooding (Part 3), the role of the development planning system (Part 4) and national infrastructure (Part 5). In Part 6 we consider how the lessons in these areas should be taken on board in revising the NAP.

2 Emergency response

9. Adaptation involves measures to prevent damage and disruption from extreme weather events. Because it is not practicable, even if it were affordable, to defend against all threats in all locations, adaptation also encompasses the response to such events, to minimise the disruption that inevitably will occur. As the ASC put it, emergency response is a different type of adaptation as it “extends into the ‘respond and recover’ rather than just the ‘prepare’ aspects of climate change adaptation”.¹⁸ The ASC highlighted that exposure and vulnerability to extreme weather impacts is increasing and climate change is likely to lead to increased river, coastal and surface water flooding in England. The 2013–14 winter flooding was a stark reminder of our vulnerability to such weather extremes; the response to which was assessed by the Fire Brigades Union as “the largest deployment by the fire and rescue services since [the] Second World War”.¹⁹

10. The ASC report noted that “emergency response and recovery are needed when preventative measures alone do not provide complete protection against an extreme weather event”,²⁰ and that “organisations involved in emergency response will need to be able to cope with the increasing frequency and intensity of severe weather expected with climate change”.²¹ Lord Krebs told us that “we have to have an effective system to respond” to extreme weather events.²²

Civil Contingencies Act

11. Emergency response, whether to extreme weather or other events, is shaped at the highest level by the Civil Contingencies Act 2004. This created the first single statutory and regulatory framework for civil protection in the UK.²³ Daniel Johns told us that the Act has created a “very strong legal framework for emergency planning”.²⁴ The National Security Strategy identifies high priority risks and the Civil Contingencies Secretariat in the Cabinet Office produces the National Risk Assessment, to guide planning for those major risks over the following five years. The Assessment addresses major coastal or river flooding, droughts, heatwaves, cold spells, wildfire, and animal or human disease outbreaks. It also covers terrorist attack and major industrial accidents. A separate National Security Risk Assessment looks 5 to 20 years ahead.²⁵

12. The Cabinet Office Civil Contingencies Secretariat coordinates local resilience alongside DCLG. Individual departments and agencies have responsibility for advising and

18 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p164

19 Fire Brigades Union, [Inundated: The lessons of recent flooding for the fire and rescue service](#) (February, 2015)

20 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p163

21 *ibid*, p163

22 Q282

23 [Civil Contingencies Act 2004](#).

24 Q283

25 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p166

preparing for events that fall within their remit, including Defra which leads on flooding and drought. At the local level, emergency response is led by ‘category 1’ and ‘category 2’ responders. In each part of the country they work together in one of 38 Local Resilience Forums. Paul Crick from Kent County Council explained to us how the Kent Resilience Forum emergency response system brings together many organisations:

[Kent Resilience Forum] is chaired by Kent police but the partners around the table range from district councils, police, Kent fire and rescue, other partners such as ambulance and coastguard—the usual category 1 and category 2 responders ... Because partners have seen the benefit of that emergency agency working, the Environment Agency now sit within that team two to three days a week, as do public health now with the public health potential issues that could be on the horizon. Partners are beginning to join up in creating that one big team. It is very much a multi-agency approach.²⁶

DCLG and the Cabinet Office are involved when an event spans more than one Local Resilience Forum boundary, or where the severity of the event causes central Government to lead the response through the ‘COBRA’ ministerial emergency committee.

Capabilities and resources

13. The effectiveness of plans and responses to emergencies is reviewed through the National Resilience Capabilities Programme, test exercises, and both internal and independent external reviews. Oliver Letwin, Minister for Government Policy, told us that “what we have started to learn to do is to build up capacities that enable us at the centre to reinforce local effort in advance”.²⁷ He explained that the Cabinet Office is planning to consider how the risks from climate change might alter the way the National Risk Assessment (a 5-year forward look) and the National Security Risk Assessment (a 20 year forward look) are developed. He explained that part of the review of capabilities would involve:

a reassessment of what it means to have a one in 100 or one in 200, or one in 1,000 or one in 10,000 risk of something occurring. If that was true for a particular thing in 1999, it is not going to necessarily be true in 2020. You have to ask yourself what changes have occurred that would change that risk assessment, and that is what we are in the process of doing.

[A] combination of a more sophisticated, more real-time approach to forecasting likelihood, with more fine-grained understanding of which risks really matter most, should produce a graph that more accurately enables us to focus on the right things as our priorities.²⁸

26 Q9

27 Q326

28 Q324

14. However, the National Flood Forum believed that further clarity on roles and responsibilities in emergencies was required.²⁹ And Daniel Johns told us that when the ASC had looked at emergency planning it found that:

There were concerns about the level of capability to manage certain types of emergency, so while the Cabinet Office runs a national capability survey every other year, primarily it talks about processes: do you have a plan for this; do you know what to do in the event of that? It does not ask questions such as, “What assets and what capability do you have to respond to certain types of emergency?”³⁰

He concluded that “there are still some shortcomings around resources, information and certain aspects of capability”.³¹ The ASC wanted the Government to review resourcing levels “to ensure there are sufficient trained personnel, and assets, available to respond in an emergency”.³² The Fire Brigades Union found that:

With 6,500 fewer firefighters now than at the time of 2007 floods, the UK today is less flood-resilient than it was just a few years ago, with an over-reliance on volunteers who for understandable reasons may not always be available.³³

Concerns were expressed that budget cuts at a local level might undermine the emergency response systems. Kristen Guida from Climate UK told us that “we have devolved a lot of responsibility down to local areas, which are haemorrhaging in terms of resource, and we are going to have to monitor this adaptation programme at some point”.³⁴

A flexible response

15. Alex Nickson from the Local Adaptation Advisory Panel told us that “resilience is about how we can avoid or limit the damage, respond to it effectively and then return to a more resilient place afterwards so that we are more resilient again to the next event”, but also that local resilience groups were “too response-focused” because their raison d’être comes from the Cabinet Office.³⁵ Oliver Letwin believed, however, that overall “we have a pretty well-developed system for dealing with emergencies” which has been “tested over and over and ... mostly it has worked”.³⁶ He explained that:

You have to have a well-orchestrated system for finding out what is happening, get the right collection of people in the right place to work out

29 National Flood Forum ([CCA0009](#)), para 7

30 Q283

31 Q283

32 ASC, *Managing climate risks to well-being and the economy*, (July 2014), p185

33 Fire Brigades Union, *Inundated: The lessons of recent flooding for the fire and rescue service*, (February, 2015), p5

34 Q11

35 Q18

36 Q325

how to deal with what is happening, have the right co-ordination between those people and other people in other parts of the country to make sure that the thing is carried out efficiently, with back-up at the centre for those who find that they do not have sufficient resources locally. That is what the system of COBRA and the local resilience forums achieves.³⁷

16. He told us that the Civil Contingencies Secretariat does a “really terrific job” to keep under review previous responses which it then uses “to improve on the process for the next one”.³⁸ Similarly, Lord Krebs thought that “the emergency planning system is pretty good”,³⁹ and the ASC praised the way lessons were learned following previous emergencies, such as the 2007 floods.⁴⁰ The ASC’s progress report noted that:

Emergency services provide a multi-purpose capacity to respond to unexpected crises. Given the uncertainties around future climate change, in particular around extreme events, a flexible response capability is a good way of building societal resilience.⁴¹

17. The Government’s National Security Strategy addresses not just flooding and severe weather but also includes extremism, counter-terrorism and cyber security. Oliver Letwin emphasised the need for a flexible system with people “knowing what to do if”.⁴² There was little to be gained in terms of response from seeking to identify whether the emergency in question was a terrorism related or a natural event. He told us that “we have avoided the mistake of fashioning the response according to the cause, and instead fashioned a response according to the problem”.⁴³ A ‘Horizon Scanning Group’ is looking into the future “to imagine what might happen, and might be a concern or an opportunity, and then to see how far we can prepare ourselves to deal with [it] should it materialise”.⁴⁴ He told us that this work was still in its early years and that “You cannot have a perfectly developed plan for what might happen 50 years from now, but if you have not thought about it you will certainly be surprised by something you had not thought about.”⁴⁵

Conclusion

18. The emergency response framework for dealing with extreme weather (and other events) has been repeatedly tested and there are established structures through which the relevant central and local authorities learn lessons and integrate these into improving systems. Cuts to local authorities’ and emergency services’ budgets may be

37 Q325

38 Q326

39 Q282

40 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p176

41 Ibid, p165

42 Q325

43 Q328

44 Q327

45 Q325

reducing the capacity of local emergency responders to deal with extreme weather events when required. *Without waiting for the ASC's statutory report on the NAP in July 2015 or the results of the Government's 'horizon scanning' of future risks and threats, the Government should commission a review of the physical resources, capacity and skills available for emergency response as well as the coordination between all of the organisations involved, at both national and local level.*

3 Flood defences

19. Increasing flood risk is the greatest threat from climate change in the UK.⁴⁶ The chance of a catastrophic flood in England within the next 20 years (one causing over £10 billion of damage) was assessed by the ASC as around 10%.⁴⁷ The ASC calculated that:

In 2014–15 almost three-quarters of the flood defence systems in England will not be maintained according to their identified needs. This is despite additional maintenance funding being provided by the Government after the 2013–14 winter storms.⁴⁸

The National Audit Office concluded that as of December 2013 five million homes were at risk of flooding in England.⁴⁹

Investment plans

20. The Government has committed £2.3 billion of capital funding for flood defences up to 2021.⁵⁰ Subsequently, Defra published its *Six-year investment plan* in 2014,⁵¹ detailing where this money will be invested, and the Environment Agency published a renewed *Long-Term Investment Strategy* in 2014.⁵² The Defra Secretary of State has announced that this funding will protect over 300,000 properties, reduce flood risk by 5% and save the economy £2.7 billion by 2021.⁵³ Our ASC witnesses welcomed the announcement of these flood investment programmes. Daniel Johns told us that:

The long-term investment scenario is exactly what we would like other sectors to be doing: looking that far ahead, looking at a range of different climate scenarios, and then making sensible investment choices in the context of that evidence.⁵⁴

21. Lord Krebs cautioned, however, that even with the new flood defences, flood risk will still increase in the future. He told us that “we are investing ... quite a lot of money in flood defences, but not enough to protect homes at the same or equivalent level of risk that they are protected at today”.⁵⁵ The ASC found that:

46 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p33

47 *ibid*, p33

48 *ibid*, p27

49 NAO, [Strategic flood risk management](#), (November 2014), p4

50 Defra, [Reducing the threats of flooding and coastal change](#)

51 Defra [six-year investment plan](#) (December 2014)

52 Environment Agency [Long-Term Investment Strategy](#) (December 2014)

53 Defra, [“Government press release: £2.3 billion to be spent on new flood defences”](#) (2 Dec 2014)

54 Q272

55 Q272

Despite the [flood] defences in place ... Kingston-Upon-Hull can expect the most river and coastal flooding over time. As well as some households in the high and very high flood risk categories, Hull has 100,000 households in the medium and low flood risk categories. This risk profile means there might be little flooding year to year, interspersed by occasional very significant flood damage.⁵⁶

22. Paul Crick from Kent County Council told us that “the Environment Agency very rarely now 100% funds schemes”.⁵⁷ The Environment, Food and Rural Affairs Committee calculated that “in order to deliver on their flood investment programme, Defra will need to make efficiency savings of at least 10% and attract external contributions (e.g. through partnership funding) of £600 million or more”.⁵⁸ Dan Rogerson outlined some of the details of that ‘partnership funding’ process:

This is a six-year programme and many of these schemes have been discussed in local areas for a long time. There is a huge head of steam behind the delivery of those, for communities, and all the departments coming together ... Some of these are very big schemes but even right down to some quite small schemes there are ways in which local authorities, businesses and others, can pull things together.⁵⁹

He felt it was important to bring in money from outside Government to ensure as many schemes as possible could go forward, but also so that those contributing could see the value of what was delivered.⁶⁰

23. Paul Leinster, Chief Executive of the Environment Agency, told us that the partnership funding approach had set in place

a consistent set of criteria that all risk management authorities have to abide by. That sets a tariff and you get money for the number of houses protected, for the amount of farmland protected, for habitat created, but it is a transparent system that everybody sees and it is a level playing field for all authorities.⁶¹

As a result, for some schemes the Government will provide 100% of the funding, but for others the local authority will need to get funding from private partners.⁶² We heard that

56 ASC, *Managing climate risks to well-being and the economy* (July 2014), p35

57 Q21

58 Environment, Food and Rural Affairs Committee, Eighth Report of Session 2014–15, *Defra performance in 2013-14* HC802, para 31

59 Q317

60 Q318

61 Q81

62 Q81

some local authorities were having difficulty in finding private partners. In 2014–15, only £40m of the £148m coming from outside central government was from private sources.⁶³

24. We heard that one of the key obstacles to funding flood schemes was the way in which premises were valued. Paul Crick told us that schemes to protect residential properties received a higher benefit-cost ratio in the Environment Agency scoring than schemes to protect business premises, which therefore require a greater contribution from partnership funding.⁶⁴

25. Allen Creedy from the Federation of Small Businesses (FSB) explained that in a recent survey of FSB members many were “relatively positive about working in partnership with the Environment Agency and ... there was a willingness even to make financial contributions and to assist in design.” But he cautioned that in order to invest, small businesses “were looking for something back” such as reductions in premiums or rates.⁶⁵ Paul Leinster of the Environment Agency was concerned about the overall feasibility of the flooding targets:

Going forward, the conditions that have been applied to that additional money is 300,000 more households being protected, a further 10% efficiency and to bring at least 15% of the funding in from partnership funding. We believe that we will have to do more than that to meet that 300,000 household target.⁶⁶

Somerset levels

26. The challenge of flood defence planning is made more difficult by having to adjust plans in response to specific events. The ASC noted that after the 2013–14 winter flooding, the Government committed an additional £20.5 million towards the Somerset Levels and Moors action plan, without a cost-benefit assessment. The post-flooding dredging work cost £5.7 million, which the ASC calculated delivered flood risk benefits of only £1.90 per £1 spent.⁶⁷ Daniel Johns told us he was concerned that, with funding scarce, the additional money made available for the Somerset Levels might have been at the expense of more cost-effective investment elsewhere,⁶⁸ and indicative of a reactive approach to flood investment:

The question is whether you should have a flood-risk management strategy that is reactive and try to build defences where it flooded last, or if you should try to build defences where it is most likely to flood next and can deliver the most benefit. Obviously, the strategy should be the latter, and we

63 Defra, [Reducing the threats of flooding and coastal change](#)

64 Q21

65 Q204

66 Q85

67 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p45

68 Q275

recognise that given severe events—the Somerset Levels have obviously experienced widespread flooding for a period of time and lots of damage was caused—at the same time when there is limited funding, you have to be aware of those kinds of trade-offs. If you are spending money in some parts of the country, you are not spending that money elsewhere.⁶⁹

27. Dan Rogerson acknowledged that there was some criticism of the money provided for the Somerset Levels, “where the number of properties inundated was much lower than in other areas”. He considered that the money was required because the duration of the floods meant that “there were much wider impacts that we needed to deal with”.⁷⁰

Soft flood defences

28. Alex Nickson of the Local Adaptation Advisory Panel told us that:

Increasingly what we are looking at is not just delivering flood defences as a comforting concrete wall between you and something wet, it is about using green infrastructure that enhances businesses, enhances quality of life, attracts and retains inward investment. Some of that is just not captured and valued because the partnership funding score’s ancestry is in coastal flooding and it is designed to reduce the total number of homes, so it is about quantity rather than perhaps the quality of flood risk reduction.⁷¹

The Woodland Trust told us that there was evidence that sustainable land management, including tree-planting could offer significant adaptation benefits, including flood alleviation. For instance, they told us about

a farmer led approach to sustainable land management in the uplands which found that tree planting had major benefits in reducing water run-off and improving water quality from improved grassland. The project demonstrated that planting tree belts across the slopes led to increased infiltration of water into the soil—more than 60 times that of neighbouring sheep grazed pasture without tree belts. When this effect was modelled across the catchment the result was a potential reduction in peak stream flows of as much as 40%.⁷²

The Woodland Trust saw this as “clear evidence that integrating trees into upland farms could play a part in reducing flood risk downstream”.⁷³

29. Sarah Mukherjee from Water UK explained, however, that research into such ‘soft’ flood defences was still an early stage, and that Ofwat:

69 Q275

70 Q319

71 Q16

72 Woodland Trust ([CCA0037](#)), para 7

73 Woodland Trust ([CCA0037](#)), para 7

have been quite challenging, and rightly so, about it because they want to make sure that the money we are spending on this has a direct customer benefit and is not just a whole load of good things for the environment without being able to show that we can reduce customers' bills or keep them flat as a result.⁷⁴

Certain farming practices are adding to flood risk. In the wake of the dramatic flooding of last winter, the ASC wrote to the Environment Secretary to highlight the “wider drivers of flood risk ... such as some agricultural practices”.⁷⁵ Likewise, Daniel Johns felt “it would be unfair to expect the taxpayer to fund [land management schemes] when it might just exacerbate the problem [and] in some cases is due to inappropriate farming practices”.⁷⁶ Dr Ceris Jones from the NFU wanted to see a conversation started “with the farmer about those areas of the farm that are least productive that might be suitable for flood risk management and how farmers are recognised for that contribution”.⁷⁷ Green Alliance said that “climate adaptation measures on farms should be rewarded through farm payments”.⁷⁸ Dan Rogerson, though positive about the potential for soft flood defences to deliver wider benefits, cautioned that “it is quite often easier to be definite about what the effect will be if you have a hard defence”.⁷⁹

30. The Natural Capital Committee has been examining how the valuation of natural capital benefits, such as those from soft flood defences, might be used in policy-making. The NCC's first report in 2013 set out a “framework that will help natural capital to be hard wired into economic decision-making in this country ... so that we can better understand which of our natural assets are critical to our well-being”.⁸⁰ In their second report, it presented a preliminary analysis of the state of natural capital in particular areas and identified those at high risk, including “protection from natural hazards” such as flooding.⁸¹ The NCC's third report, published earlier this year, repeated its earlier call for Government to work with business and NGOs in developing a strategy and supporting 25-year plan to protect and improve natural capital.⁸² That strategy needed to be underpinned by three components: a robust and consistent ‘measurement’, ‘accounting’ and ‘valuation’ of natural capital. Investments in natural capital could “deliver significant value for money and generate large economic returns”.⁸³ The NCC singled out the potential in eight specific areas, most of which could help to reduce the likelihood or impact of flooding—woodland

74 Q101

75 ASC, [Managing climate risks to well-being and the economy](#) (July 2014), p23

76 Q277

77 Q105

78 Green Alliance ([CCA0021](#))

79 Q315

80 Natural Capital Committee, [The State of Natural Capital: Towards a framework for measurement and valuation](#) (April 2013)

81 Natural Capital Committee, [The State of Natural Capital: Restoring our Natural Assets](#) (March 2014)

82 Natural Capital Committee, [The State of Natural Capital: Protecting and Improving Natural Capital for Prosperity and Wellbeing](#) (January 2015)

83 *ibid*, p7

planting, peatland restoration, wetland creation, intertidal habitat creation, urban greenspaces and improving the environmental performance of farming. The private sector and civil society have a significant part to play, the NCC said, because they own or are responsible for the majority of natural assets. Its report sets out a range of different funding options these include: capital maintenance payments from natural capital asset owners:

Some form of transfer is required from the social benefactors [of ecosystem services] to the private owners [of natural capital assets] to ensure that organisations are fully compensated for the benefits that they provide to others through maintenance of their natural assets. This could take the form of a subsidy or of a private payment though some form of Payment for Ecosystem Services. Our accounting framework provides a robust method for calculating the appropriate level of transfer and monitoring its ongoing delivery should Government, the private sector or a charity wish to fund the provision of public goods on privately owned land.

Conclusions

31. Flooding is the biggest adaptation risk, and will increase even if significant resources are devoted to it. The Government has sometimes followed what the ASC has called a ‘reactive’ funding strategy, prioritising the most recent flooding events rather than long term objective needs.

32. Funding for flooding adaptations must be sourced and matched against the value of the benefits available. The challenge is to balance the revenue to natural asset owner against the needs of potential beneficiaries, who currently do not fully pay for those reduced-flooding benefits. The Natural Capital Committee’s work is at the heart of this question and it has been doing invaluable research in this area.

33. The Government should make a clear commitment to allow the Environment Agency to allocate flood defence funds according to its objective cost-benefit models without political interference.

34. The Government has indicated that it will leave it to the next Government to decide the NCC’s long-term future. The NCC’s work on valuing ecosystem services, including those providing ‘soft’ flooding defences, show its importance for climate change adaptation, but also offers the prospect of finding funding mechanisms to link natural capital ‘owners’ and adaptation beneficiaries. The next Government must act as quickly as possible to put the NCC on a long-term footing, and encourage it to develop those funding mechanisms.

4 Development and planning

35. The planning system also has a flood defence role to play by minimising development on floodplains and maximising the use of ‘sustainable drainage’ techniques.

Floodplain development

36. Dan Rogerson told us that the Government “have been very clear that we do not want to see building on floodplains”.⁸⁴ The National Planning Policy Framework (NPPF) states that

Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.⁸⁵

The Defra Minister went on to say that the Government will put in place measures to protect existing communities on floodplains, such as London, but “what we do not want is new development on floodplains and unprotected areas”.⁸⁶ However, Lord Krebs explained to us that “the rate of new build in flood plains is higher than the rate of new build elsewhere” and while there may be good reasons for this it meant that “we are potentially storing up problems for the future”⁸⁷:

Many of those homes are protected by community-level defences built by the Environment Agency. But there is a question as to whether this build-and-protect policy is short-sighted, and whether in the end you will have to invest more and more in flood defences to keep those homes protected.⁸⁸

37. The Environment Agency is a statutory consultee on all new developments of over one hectare that are within the floodplain, but does not comment on small developments of fewer than 10 homes.⁸⁹ It “takes a ‘risk-based’ approach, using its expert judgement to determine whether to respond directly to an application, or rely on the developer using the Agency’s Flood Risk Standing Advice”.⁹⁰ Paul Leinster stressed that the Environment Agency is “an adviser to the planners; we are not the determinants of planning applications”.⁹¹ Dan Rogerson also told us that

84 Q329

85 DCLG, [National Planning Policy Framework](#), para 99

86 Q329

87 Q254

88 Q252

89 ASC, [Managing climate risks to well-being and the economy](#), (July, 2014), p45

90 *ibid*, p45

91 Q93

if there is any doubt within a local authority's mind about something, an application, they can seek the Environment Agency's advice proactively as well. It is not just the local authority sitting there with their arms folded waiting for the Environment Agency to bang on the door.⁹²

38. We heard that Environment Agency advice on development applications in flood risk areas (when provided) is largely followed by local planning authorities, helping to ensure that "developments should be safe, resilient and not increasing flood risk elsewhere".⁹³ The Environment Agency told us that, in 2013–14, in 97% of cases in which the Agency "sustained an objection to a planning application on flooding grounds ... those have been accepted by local planning authorities in their decisions".⁹⁴ Kent County Council⁹⁵ and Kingston Upon Hull County Council⁹⁶ confirmed that, when offered, the Environment Agency's advice is generally followed.

39. Steve Quartermain, the DCLG Chief planner, told us that:

On planning applications where [the Environment Agency] are consulted, they will give advice and they do take into account not only the site-specific issues but then they will look at the cumulative effect and whether it has an effect downstream or whether it is upstream that is affected, and they do take this more holistic approach. This advice is given to planning authorities and they can take that into account when they take their decisions.⁹⁷

Lord Krebs raised concerns, however, about increasing flood risk as a result of the cumulative impacts of small scale floodplain development, on which the Environment Agency is not required to provide advice. He told us that "about 12,000 new homes a year [are] being built without Environment Agency advice on flood risk".⁹⁸ Paul Crick of Kent County Council told us that

The cumulative impact is not necessarily where the development is. Often it is downstream in communities that have not perhaps had any development for years and years and yet the impact of the additional development upstream ... impacts on those communities downstream.⁹⁹

40. The Environment Agency explained that "nobody has a comprehensive overview of the total development across England".¹⁰⁰ The Agency could add the most value on the more complicated and larger developments, where they "look at the impacts both of the

92 Q337

93 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p27

94 Q87

95 Q44

96 Q42

97 Q338

98 Q254

99 Q46

100 Q92

development itself and within its catchment situation”.¹⁰¹ Meanwhile Paul Leinster told us that:

It should not be a surprise now to any local authority that they need to consider flood risk when they are considering planning applications and I do not think they should have to rely on us to do that very necessary first level of scrutiny.¹⁰²

Dan Rogerson raised a lack of feedback from local authorities to the Environment Agency on whether the Agency’s guidance has been followed as an issue. As a result, he told us, Defra had put in place a number of measures “to remind local authorities to get the feedback to the Environment Agency on exactly how they have taken account of that advice, from the local authority side”.¹⁰³

Flood Re

41. Our ASC witnesses highlighted the safeguard against inappropriate development, provided by the Flood Re flood reinsurance scheme.¹⁰⁴ Oliver Letwin was confident that Flood Re would, through market forces, prevent inappropriate development in the flood plain. He told us that “the most powerful incentive you could possibly have in the housing market is the housing market. If it is impossible to sell houses, builders will not build them”.¹⁰⁵ Moreover, Pete Fox of the Environment Agency emphasised that:

The fact that the Government has proposed a flood reinsurance system—and houses built after 2009 are proposed to be excluded from the scheme—will also add to developers’ difficulty in justifying and selling their properties once they have built them at flood risk.¹⁰⁶

42. The National Flood Forum believed that on its own, Flood Re “does nothing to reduce flood risk, and could in fact encourage inaction. Flood Re, in effect, buys time for us to collectively reduce our flood risk, so that a market can deliver affordable insurance effectively”.¹⁰⁷ Oliver Letwin told us that the insurance scheme was intended to have a finite life:

It has been the intention right from the beginning ... through to the near end of the Flood Re discussions that you should get to the point where—a period of decades rather than years—Flood Re disappears because the need for it disappears, because we have protected what needs protecting of the old, we have built the new in a way that does not require that protection and

101 Q92

102 Q93

103 Q329

104 Q253

105 Q334

106 Q87

107 National Flood Forum ([CCA0009](#)), para 11

therefore there is not a reinsurance problem anymore. That means that we need to have proper incentives from the insurance companies also for those houses that are subject to risk to invest in sensible groundwater flood risk prevention, for example. That is all part of the package. This is not saying that Flood Re is a permanent feature of the scene that there is to solve all the problems. It is a transitional device to try to get us to the point where it is unnecessary.¹⁰⁸

Similarly, Lord Krebs told us that a well-structured Flood Re scheme provides an opportunity to incentivise property level resilience measures, so that “when people suffer flood damage and are paid by the insurance company to repair their home, they repair it in a more resilient way”.¹⁰⁹ In February 2015, he wrote to the Chief Executive of Flood Re, outlining his advice for designing an effective Flood Re that would “promote flood alleviation, reduce its costs, and improve value for money”.¹¹⁰ In this letter, he explained that “Flood Re should form the centrepiece of a comprehensive, 25-year strategy that seeks to counter the increasing risk of flooding and reduce the number of households at high risk”.¹¹¹

Surface water flooding and sustainable drainage

43. Sustainable drainage systems (SuDS) slow the rate of surface water run-off and improve infiltration, in both rural and urban areas, by mimicking natural drainage. This reduces the risk of flash-flooding which occurs when rainwater rapidly flows into the public sewerage and drainage systems. The ASC found however that their uptake in new development has been low. Brian Smith, a member of the DfT Transport Resilience Review, noted that run-off and high groundwater levels were a particular problem for the transport sector in last year’s winter flooding. This could, he argued, be ameliorated by

getting sustainable drainage systems in place. What we are doing is allowing the problem to get worse for the future, so it does seem to me rather bizarre that we are ... not addressing something that we know is contributing to the problem. I think to get a move on the sustainable drainage systems regulation is really important.¹¹²

44. Defra and DCLG undertook a *consultation on delivering Sustainable Drainage Systems*¹¹³ in 2014, which proposed strengthening planning policy to make clear that the “expectation is that sustainable drainage systems will be provided in new developments”.¹¹⁴ Minor developments—9 houses or fewer—would not be covered. Lord Krebs wrote to the

108 Q349

109 Q258

110 Letter: Lord Krebs to Brendan McCafferty: [“Designing Flood Re to encourage flood risk reduction”](#) (2 February 2015)

111 *ibid*

112 Q217

113 Defra, [consultation on delivering Sustainable Drainage Systems](#)

114 *Ibid*, p6

Defra Secretary of State outlining the ASC's concerns: that the proposed revision to the planning system excludes minor development, and that it does not address the 2008 Pitt Review recommendation to remove the automatic right to connect new developments to public sewers.¹¹⁵ In December 2014, the DCLG Secretary of State told the House that the Government response would “make it clear that the Government’s expectation is that sustainable drainage will be provided in new developments wherever this is appropriate”.¹¹⁶ Dan Rogerson told us that it was the Government’s approach “to promote SuDS as a first point of call. People should assume that SuDS is the answer unless it cannot be delivered on site, and then they have to demonstrate it cannot work”.¹¹⁷

45. The ASC told us that they were still worried that the changes would not encourage the uptake of SuDS in new development, not least because:

developers have an automatic right to connect new homes to existing public services, and that right remains to this day. While that remains, I think there is an argument to say that while developers can always connect to the sewers, they are always likely to want to, so it is an uphill battle to get them to adopt some of these approaches that they could see as much more difficult, tricky, and novel ways of managing sensible drainage.¹¹⁸

East Sussex County Council, like the ASC, were concerned about the delays in ending the right-to-connect provisions of the Flood and Water Management Act, believing that this was preventing the widespread use of SuDS in new developments.¹¹⁹ Oliver Letwin told us that “the Act is being implemented gradually” and the Government do not intend to implement the regulation before the Election.¹²⁰

Local planning

46. Lead Local Flood Authorities (LLFAs) were created under the 2010 Flood and Water Management Act. They are responsible for “managing the risk of flooding from surface water, groundwater and ordinary watercourses” and for “developing, maintaining and applying a strategy for local flood risk management in their areas and for maintaining a register of flood risk assets”.¹²¹ The ASC worried that:

115 Letter: Lord Krebs to Rt. Hon. Elizabeth Truss: [“Consultation on delivering Sustainable Drainage Systems”](#) (24 October 2014)

116 [WMS Statement 18 December 2014](#)

117 Q338

118 Q264

119 East Sussex County Council ([CCA0014](#)), para 4.7

120 Q348

121 Defra, [Flood risk management: information for flood risk management authorities, asset owners and local authorities](#) (updated 3 June 2014).

Whilst some of the new roles are statutory, the core task of managing and reducing flood risk is not. Even where statutory roles are specified, there is scope for LLFAs to determine the level of activity required to meet them.¹²²

Lord Krebs noted that an Environment Agency assessment in 2013 found that only five out of 152 Lead Local Flood Authorities had a flood risk management plan in place.¹²³ The NAO found in March 2014 that only 16% of LLFAs had done so.¹²⁴ Dan Rogerson told us that:

This is an issue that has certainly vexed me in my 15 months that I have been Minister. They have responsibilities and as Defra we have provided money to local authorities through DCLG to do that work. Under the Act they have the responsibility to take it forward. In many more authorities that work is well underway, but it has been a source of concern to me, particularly given the first winter I experienced in the job, that these plans should all be in place.¹²⁵

He told us that he had written to councillors and local authorities on several occasions to stress the importance of this issue.¹²⁶

47. The lack of a legal duty for managing and reducing flood risks appears to have affected the resources allocated to this area within local authorities. East Sussex County Council believed that “within the current economic climate of budget constraints across the local government sector, it is a significant challenge to prioritise work on longer term adaptation work programmes”.¹²⁷ The ASC reported that:

Local authority spending is under pressure and at least some of the funding provided for managing local flood risk is being diverted to other council services. This is leaving flood risk management teams with less than they feel they need, including to fulfil their statutory duties. Taking steps to reduce local flood risk is not a statutory duty for local authorities.¹²⁸

Climate UK told us that “budget cuts and diminishing capacity within the public sector are a barrier to local action, undermining the ability to deliver on the recommendations of the ASC report”.¹²⁹ The City of London Corporation believed that “since the abolition of the National Indicator set, in particular NI-188,¹³⁰ and the ongoing reductions in local authority funding, by necessity local authorities have focussed on the provision of core services”.¹³¹ The National Flood Forum highlighted that “many local authorities have lost

122 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p42

123 Q251

124 NAO, [Strategic flood risk management](#) (November, 2014), p9

125 Q339

126 Q339

127 East Sussex County Council ([CCA0014](#)), para 4.3

128 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p42

129 Climate UK ([CCA0010](#)), para 2.1

130 National Indicator 188 measured Local Authorities progress in assessing and managing climate risks and opportunities, and incorporating appropriate action into local authority and partners’ strategic planning.

131 City of London Corporation ([CCA0027](#)), para 3

their skilled staff [and] it is not clear for many authorities whether they have the skilled resource to be able to deliver their responsibilities”.¹³² They wanted the Government to “ensure that local authorities have flood risk management teams with the right skills and resources to deliver the functions required”.¹³³

48. Staff cuts in the Environment Agency might also affect flooding work. The ASC calculated that

Numbers of flood risk management staff within the Environment Agency fell by 800 (20%) after the 2010 Spending Review, with a decrease of over 400 in the asset management teams responsible for the maintenance of defences and the response to flood incidents.¹³⁴

This was a concern of several witnesses. Paul Crick of Kent County Council told us that “capacity at a local level is key”¹³⁵ and Alex Nickson of the Local Adaptation Advisory Panel (and Greater London Authority) told us that “core local competency to be able to develop and deliver [flood risk management] projects” needed to be retained.¹³⁶

49. Martin Budd of Kingston upon Hull City Council told us that it was not yet clear what effect Environment Agency staff cuts might have:

We have always been very successful in terms of flooding, in terms of being able to work very closely with the Environment Agency to develop the schemes that are required for the city, but there is certainly a concern that, as the changes start to take place, capacity will start to disappear. More of that will fall back on to the local authority to try to find the resources to do that.¹³⁷

When we asked the Environment Agency about these staff reductions, they explained that the 40% staff cut was not as stark as the ASC had suggested¹³⁸ because of the Agency’s restructuring.¹³⁹ The ASC nevertheless raised a concern that continuing development on floodplains was increasing the reliance on flood defences and an under-investment in these defences was storing up costs and risks for the future.¹⁴⁰

The planning policy framework

50. Some of our witnesses raised a concern about the wider planning system. The NPPF, which provides guidance to local planning authorities, devotes a chapter to “meeting the

132 National Flood Forum ([CCA0009](#)), para 9

133 National Flood Forum ([CCA0009](#)), para 9

134 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p27

135 Q19

136 Q19

137 Q19

138 Q92

139 Q82, Q83

140 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p8

challenge of climate change, flooding and coastal change”. It encourages consideration of long term effects.¹⁴¹ Steve Quartermain, Chief Planner at DCLG, told us that local planning authorities understand what the NPPF asks of them and what the Government guidance says.¹⁴² Nevertheless, Dan Rogerson told us that the Government was providing local authorities with the relevant information to take account of the wider national picture of flood risk management:

We have improved massively the flood mapping that is available to them, to make their job easier. If you have smaller district councils it is invaluable to them—I would hope—to have the information that is there, and the work that has gone on since 2007, when surface water flooding was a huge part of the problem we experienced. We are talking about floodplains where people quite often are thinking about river flooding or estuaries. There is more information about surface water flooding there as well, and local authorities will place conditions, ... to make sure that any development, however small, takes account of that.¹⁴³

51. Dr Hugh Ellis of the Town and Country Planning Association (TCPA), was critical, however, of the planning timescales. The TCPA highlighted that:

‘Local Plans’ are the only statutory planning instrument we have in England and such plans have a very short time horizon of between 10 and 15 years. The nature of climate impacts and the long lasting character of the built environment means that much longer time scales are vital.¹⁴⁴

There was, Dr Ellis believed, no sense of what England would look like in 2050, in relation to economic development, infrastructure, climate change and housing,¹⁴⁵ and that “any adaptation strategy that plans for less than 50 years is pointless; ideally it is 50 to 100 [years]”.¹⁴⁶ The TCPA also wanted climate change adaptation and mitigation to be integrated in a holistic planning approach “to avoid maladaptation such as carbon emissions-intensive adaptation”.¹⁴⁷

52. Summing up their criticisms of the current planning regime, the TCPA told us that

We are faced with a major national choice between building a secure and resilient future, through clear planning and investment, or falling victim to the current policy and political muddle which leads to an ineffective form of crisis management. The benefits of the first approach will be stronger outcomes for our economy and for the natural environment but they will

141 DCLG, [National Planning Policy Framework](#) (March 2012), pp21-25

142 Q329

143 Q332

144 Town and Country Planning Association ([CCA0028](#)), para 2.6

145 Q141

146 Q159

147 Town and Country Planning Association ([CCA0028](#)), para 2.6

also be fairer outcomes for our most vulnerable communities. Given how long it takes to reshape the built environment we can be clear that action must be taken now to reshape the nation. Further delay will be costly for taxpayers and potentially disastrous for many vulnerable communities.¹⁴⁸

The National Flood Forum echoed these concerns:

A review is needed on how effectively planning policy is being delivered through the whole development process at delivering government policy on flood risk management, particularly as reflected in the National Planning Policy Framework, the Flood and Water Management Act 2010, the National Flood Management Strategy, and their equivalents in the devolved administrations.¹⁴⁹

Building standards

53. Paul Leinster from the Environment Agency identified scope for adaptation at the individual property level. He told us that we need to think about how “we make sure that properties become more resilient” as well communities.¹⁵⁰ Climate change is likely to alter the risks to public health and well-being. Cold-related mortality is likely to decline slightly with rising average temperatures, but remain the largest weather-related risk to health in the future. Due to an ageing population, approximately 40,000 excess deaths a year are expected in the 2050s as a result of cold weather, compared to 41,000 today. Furthermore, without adaptation the number of additional deaths and illness associated with heat stress is likely to increase. Current estimates, based only on increasing average temperatures rather than the more frequent heatwaves, suggest approximately 7,000 excess deaths a year in the 2050s; a tripling of the current figures. Professor Paul Cosford from Public Health England told us

There is certainly no shortage of evidence on the health impacts of climate change and the likely effects there. I think that the challenge for us is ensuring an adequate focus on the risks that are there from the health impacts in terms of extreme events—flooding, heat waves and so on—while at the same time not forgetting that cold weather kills far more people than heat waves do at the moment, and still will for some years to come.¹⁵¹

54. Understanding of these risks has improved since the first Climate Change Risk Assessment was published in 2012¹⁵², but building standards do not appear to have reflected that evolving understanding. In our November 2013 report on the Housing Standards Review we criticised the Government’s decision to discontinue the Code for

148 Town and Country Planning Association ([CCA0028](#)), para 4.1

149 National Flood Forum ([CCA0026](#)), para 12

150 Q91

151 Q146

152 ASC, *Managing climate risks to well-being and the economy* (July, 2014), p127

Sustainable Homes and to “significantly dilute” the ‘Zero carbon Homes’ standard in 2016, which will have consequences for our emissions performance.¹⁵³ We concluded that abandoning the Code would reduce opportunities for local authorities to push ahead with more challenging standards on energy and water efficiency. The emphasis has not, however, been on the need to reduce the impacts of heat stress on householders or the users of other buildings. Local Authority Building Control told us that

As temperatures rise due to climate change there is an increased risk of overheating in buildings.

As our homes and other buildings become tighter, there is growing concern that indoor air quality is suffering as a result, and it becomes even more important that the ventilation provisions in the [Building] Regulations are adequate to counter this. A body called the Zero Carbon Hub is currently studying this.¹⁵⁴

55. Dr Ellis of TCPA believed that “the Building Standards Review ... and measures through planning and the NPPF do not emphasise anything like enough the importance of green infrastructure and potential temperature change”.¹⁵⁵ The National Housing Association told us that housing should be considered as “nationally significant infrastructure with equivalent import for national economic, social, and health resilience.”¹⁵⁶ The ASC concluded that

A new standard or other requirement is needed to ensure that passive cooling measures are built in to new homes at the design stage. Voluntary measures are unlikely to be taken up by house builders because the benefits will accrue to the householder rather than the developer.¹⁵⁷

Conclusions

56. Despite the clear flooding risks of building on floodplains, this continues. The Environment Agency’s advice against doing so is largely followed by planning authorities, but the Agency does not consider smaller developments which can still in aggregate have a significant effect on flooding risk, and the potential knock-on effects for communities downstream from a proposed development can be missed. *The Government should require the Environment Agency to provide flood risk advice on all sizes of development, including small developments currently exempted. The Government should reassess the Environment Agency’s future resources, skills and financial needs, to*

153 Environmental Audit Committee, Eighth Report of Session 2013–14, [Code for Sustainable Homes and the Housing Standards Review](#), HC192

154 Local Authority Building Control ([CCA0036](#)), para 6-7

155 Q142

156 National Housing Association ([CCA0019](#)), para 4.1

157 ASC, [Managing climate risks to well-being and the economy](#), (July, 2014), p157

ensure that these reflect the increasing risks from flooding in the years ahead, and the volume of work needed to deal with these.

57. The Flood Re insurance scheme will not in itself reduce flood risk for individual properties, but it does offer a means for encouraging greater property level flood resilience measures to be delivered .

58. The Government has said that it supports the deployment of Sustainable drainage systems (SuDS) as the default approach to development, but has stopped short of enforcing its use through the existing provisions of the Flood and Water Management Act. It has also stopped short of removing developers' automatic right to connect new homes to the public sewer system, which would provide an incentive for them to include SuDS. *The Government must enforce the powers it already has under the Flood and Water Management Act to require SuDS in developments, particularly on floodplains, and remove the developers' right to connect homes to the public sewer.*

59. Only a minority of Lead Local Flood Authorities have produced the required flood risk management plans, and without a legal duty to manage and reduce flood risks the local authority budgets for this work are liable to be reallocated to other duties. Where flood risk plans are produced, they are unlikely to cover the multi-decade planning horizon commensurate with the infrastructure lives involved. *The Government should review the rigour of local authorities' flood risk management plans, and put authorities' responsibilities to take action to reduce flood risk on a statutory footing to prevent resources being directed elsewhere.*

60. Building standards have so far given less weight to the health risks of over-heating than to energy efficiency. Continuing climate change will require an increasing emphasis on heat as well as cold. *The Government must ensure that its research in the Zero Carbon Hub addresses these issues, and consider heat-stress issues—including the use of more appropriate building materials—in the next review of building regulations.*

5 National infrastructure

Adapting new infrastructure

61. There are plans for more than £375 billion to be invested in infrastructure over the next decade. The Government has pledged to increase capital spending on infrastructure by £3 billion a year by 2015–16 and £18 billion in total over the five years of the next Parliament. According to the ASC:

The development of new infrastructure provides an opportunity for infrastructure providers to ensure that climate adaptation measures are fully incorporated into decisions on design and location. This will often be more straight-forward and more cost-effective than having to retrofit measures when upgrading and renewing existing networks.¹⁵⁸

Similarly, Professor Jim Hall, from the Environmental Change Institute at Oxford University, told us that “infrastructure decisions are long-lived and hard to reverse in the context of the changing climate”.¹⁵⁹

62. For national infrastructure planning, a National Policy Statement (NPS) for each sector is produced by the relevant lead Government department. This provides the framework within which Examining Inspectors consider an individual planning proposal. The Government’s NPSs require planning applications for new infrastructure to consider a wide range of climate hazards and to account for how these may change in the future.

63. Daniel Johns told us that “within the National Policy Statements ... the wording of the policy is quite clear in that cumulative impacts should be considered in decisions about whether to build infrastructure in particular places”.¹⁶⁰ However, Professor Hall told us that whilst all the NPSs do incorporate attention to climate change “an important question is the extent to which the cumulative effect of infrastructure investment is being taken into account” and whether this may be “building up vulnerability to climate change in the future”.¹⁶¹ Daniel Johns believed that we were creating systemic risk by considering infrastructure applications in isolation.¹⁶² To avoid that, the ASC recommended that DCLG “should consider introducing effective mechanisms for the assessment of cumulative risks arising from new infrastructure development at sub-national and national scales”.¹⁶³

158 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p90

159 Q189

160 Q256

161 Q190

162 Q256

163 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p90

Adaptation of existing infrastructure

64. John Dora of the Infrastructure Operators Adaptation Forum, told us that “we are very good at looking at building new infrastructure, but the new infrastructure that gets built in the UK is a very small percentage of what is there”.¹⁶⁴ Brian Smith a member on the DfT Review of the Resilience of the Transport Network to Extreme Weather, similarly told us that

The reality is that the bulk of the infrastructure we have now is the infrastructure we are going to have in 30 or 40 years’ time. That is where we need to be thinking because that is what is going to fall down.¹⁶⁵

65. Failure of critical national infrastructure can result in major disruption to society and the economy. The Environment Agency, for example, estimates that the 2007 floods cost £325 million in disruption to the provision of goods and services in England and Wales. During the storms and flooding in winter 2013–14, the ASC reported:

- over 2 million customers suffered power cuts, of which 16,000 were without power for more than 48 hours;
- an 80 metre section of sea wall collapsed at Dawlish, Devon. This severed the main rail connection between the south-west of England and the rest of the country for around two months;
- flooding of an electricity substation at Gatwick airport caused power loss in the North terminal and severe disruption over the busy Christmas period; and
- the tidal-surge in December 2013 resulted in the flooding of substations that severely affected three major ports, disrupting trade for several days.¹⁶⁶

Allen Creedy told us that 66% of Federation of Small Businesses members had been negatively affected by severe weather with the most common problems relating to indirect effects to their business.¹⁶⁷

66. The ASC highlighted the important role that regulators can play in encouraging adaptation, through incentives and penalties, setting standards and regular price controls.¹⁶⁸ Tony Glover of the Energy Networks Association, explained that decisions over the adaptation of gas and electricity networks are largely led by regulator-scrutinised business plans:

Each gas and electricity network operator will provide a well-justified business plan that Ofgem will either approve or will not, and it will ask for

164 Q195

165 Q198

166 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p62

167 Q189

168 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p87

changes to it. It is up to the companies themselves to come up with proposals to address whatever challenges there are. That has certainly been the case with the flooding issue and could be in other areas.

It is for the regulator to approve and for the energy network companies to come up with the proposals, but I also think in order to arm the energy network companies with the information they need to be able to make those investment proposals, which hopefully will be approved by Ofgem, there is a need to understand what those risks are.¹⁶⁹

67. Tony Glover also told us that in an economically regulated sector there were constraints on what could be done on adaptation, in terms of the costs that could be passed onto customers. He told us that “because we are economically regulated and because ... there is a big focus on energy bills, we have to justify our expenditure, and we have to justify it against the costs that will be faced if we do not.”¹⁷⁰ (Sarah Mukherjee explained that similar considerations applied to flood defence spending—paragraph 29).

68. That means that regulators have an important role in influencing investment infrastructure. Brian Smith highlighted that it was absolutely vital that the regulators sent out the right signals with regards to climate change adaptation. He told us that

What the extreme weather has thrown up sometimes is the fact that the incentive system is not quite right. The nature of regulation is that it does not just change overnight but I think what we are seeing is it changing within the regulatory period. It then comes right back to [...] the regulatory role whether it is Network Rail, or in future it is going to be the regulation of the Highways Agency or indeed of the energy industry. Absolutely vital are the signals it sends out and then the behaviours and the decision making that follow from there.¹⁷¹

Tony Glover told us that Ofgem understood and would accept the need for adaptation actions in the price reviews even though “there is no specific climate change adaptation incentive”.¹⁷²

Interdependencies

69. Climate risks to national infrastructure, and the associated economic costs, are not yet fully understood. Professor Hall told us that, whilst “bottom-up calculations of impacts are quite well understood”, understanding the cumulative and knock-on effects was still a work-in-progress.¹⁷³ This is due in part to the interdependency of infrastructure systems: many are connected physically or depend on one another to function effectively.

169 Q209

170 Q201

171 Q230

172 Q230

173 Q202

Disruptions to individual infrastructure assets can have systemic consequences for other infrastructure sectors and the wider economy. Accordingly, Professor Hall did not think it made sense to consider prioritising adaptation in one sector ahead of another; instead we should be looking at “pinch-points within each network”.¹⁷⁴ Brian Smith echoed these comments and told us that “we need to start thinking about things like the intensity of use of our infrastructure and link the economic impact to that [and about] what are the critical connections”.¹⁷⁵

70. Reflecting on his involvement in the DfT Transport Resilience Review, Brian Smith explained that there were some key links between different operators, and that “You could not just look at an airport or a port in isolation. You had to think about the link and that led to a critical issue of what we would call a critical network as well”.¹⁷⁶ Professor Hall highlighted the need to coordinate good practice across different sectors:

Not only is each infrastructure vulnerable to different hazards, but it also fails in different ways. We would say it has different failure modes, but the principles by which you calculate the likelihood of those hazard—the likelihood of failure given the hazard—and estimate the consequences are all completely cross-cutting. We would be looking for good practice in taking that approach right the way across different infrastructure sectors to come up with risk estimates that are consistent across sectors in order to be able to prioritise and target resources across different sectors.¹⁷⁷

71. In light of these concerns, John Dora told us he wanted to see more work examining interdependent systems such as energy, ICT and transport:

One of the things we ought to do is map out where things are co-located and might have similar sort of risks attributed to them, such as flooding or wind ... We need to assess the vulnerability of a lot existing infrastructure.¹⁷⁸

Professor Hall told us about his research in the UK Infrastructure Transitions Research Consortium looking at national infrastructure systems and their interdependent risks. He had identified some ‘critical infrastructure hot-spots’—areas with “a geographical concentration of infrastructure with large numbers of customers either directly or indirectly dependent on those assets”.¹⁷⁹ Professor Hall explained that this work was still at an early stage and that it would “benefit from a more concerted effort to assemble national infrastructure data.”¹⁸⁰

174 Q196

175 Q197

176 Q195

177 Q206

178 Q205

179 Q206

180 Q210

72. Climate UK told us that “understanding and addressing infrastructure interdependencies is a major challenge, which is exacerbated by a number of factors, including sharing and access to data”.¹⁸¹ Alex Nickson of the Local Adaptation Advisory Panel had found that the communication local authorities had with infrastructure network providers on their adaptation plans was mixed, some operators were very open but others he said, “hide behind national security as soon as you start to probe the problem”.¹⁸² Professor Hall told us that some of the data “is subject to security concerns or commercial concerns” but that there were ‘honest brokers’, such as Ordnance Survey, who were trusted by the utility companies and could “bring together infrastructure data to help us build up this big picture”.¹⁸³

73. Lord Krebs told us that “some areas of infrastructure are thinking long-term about resilience and doing quite well, while others are doing less well”.¹⁸⁴ Prof Jim Hall believed that there was a question of whether operators were accurately reporting on the risks that they would be exposed to in the future. “That is why reporting is so important”, he told us, because “it incentivises people to demonstrate that they are getting it right in the long term.”¹⁸⁵

Managing water demand

74. Climate change will also put pressure on water supplies. Adaptation in this case includes reducing water demand. Lord Krebs told us that

There are certain parts of this country that are already water stressed—the south-east—and will become more so in the decades ahead if we have hotter summers and more uneven patterns of rainfall. So, again, that is another long-term planning issue: how do you manage both supply and demand of water in relation to future planning decisions and development.¹⁸⁶

The ASC’s report concluded that adaptation in the water sector was less evident than in some other infrastructure sectors.¹⁸⁷ Climate UK disputed this, telling us that “local experience around the country suggests that water companies are both active and engaged, demonstrating higher capacity in long-term thinking and decision-making than acknowledged in the report”.¹⁸⁸

181 Climate UK ([CCA0010](#)), para 5.3

182 Q37

183 Q210

184 Q255

185 Q229

186 Q255

187 ASC, [Managing climate risks to well-being and the economy](#), (July, 2014), p59

188 Climate UK ([CCA0010](#)), para 3.2.6

75. Yorkshire Water told us that they felt the conclusions in the ASC’s report “were not a true reflection of the resilience of the water sector”.¹⁸⁹ Alex Nickson of Local adaptation Advisory Panel explained that

For most of the companies in the south-east who are facing serious water stress, they recognise that demand reduction is an important measure to balancing supply and demand. I think pretty much all of them have water efficiency within their business plans, both for the five years and for the 25 years.¹⁹⁰

Lord Krebs told us that “we know from consumption figures that metered households have had declining consumption over the past few years whereas non-metered households have not,” but that “there has been reluctance on the part of Government to make water metering mandatory”.¹⁹¹ Dan Rogerson saw metering as “a powerful tool ... but we took the decision as the Government that we would not want to compel everybody down that route”.¹⁹²

Conclusions

76. Infrastructure and networks—roads, railway, energy grids, airports and so on—are increasingly vulnerable to disruption from extreme weather events, but the economic and public-service impacts on them from climate change are not fully understood. *The Government should support further research into critical network ‘pinch-points’ and interdependencies, starting by coordinating the necessary data-gathering which is currently incomplete.*

77. *The Government should give a more explicit direction to all of the infrastructure network providers and their regulators to give greater weight to adaptation investment, and initiate a public debate about the costs that will have to be borne by customers and taxpayers. An early action should be to reconsider the case for introducing universal water-metering in water-stressed areas.*

189 Yorkshire Water Written ([CCA0035](#)), para 2.4

190 Q4

191 Q271

192 Q365

6 National Adaptation Programme

78. “The UK is one of the first countries to have a statutory basis for both mitigating climate change and adapting to climate risks.”¹⁹³ We discussed in Part 1 the key elements for that statutory work on adaptation, including the Climate Change Risk Assessment and the National Adaptation Programme (NAP).¹⁹⁴ The 2013 NAP contains 31 separate objectives and over 370 actions,¹⁹⁵ guided by the Government’s overarching vision of a climate-ready society, “which makes timely, far-sighted and well-informed decisions to address the risks and opportunities posed by a changing climate”.¹⁹⁶ Kristen Guida of Climate UK believed that “the fact that we actually have a national adaptation programme at all is a credit, and something we need to be proud of”.¹⁹⁷ However, in our inquiry we have also heard from witnesses who see scope for the NAP to be improved in a number of areas, most notably through setting a clear top-down direction for adaptation, and through incorporating a wider spatial dimension to the programme.

Top-down direction

79. The NAP was produced through what Lord Krebs, Chair of the Adaptation Sub-Committee (ASC), told us was a bottom-up process of “co-creation”. This process, he told us, involved “asking a lot of people what they are doing and then summarising that in a document”.¹⁹⁸ As a result the NAP does not in itself contain any new Government policy, nor any new allocation of Government funding or resources.¹⁹⁹ Daniel Johns believed that you might expect a NAP to include “a discrete set of activities overseen by some kind of governance arrangement, with resources to allocate as those priorities change” but instead the NAP was “a collation of existing activity summarised within a document”.²⁰⁰

80. By asking industry, civil society and Government to think about climate change adaptation in a systematic way, Lord Krebs concluded that the NAP had generated buy-in to the adaptation process.²⁰¹ The preparation of the NAP had helped “to raise awareness about adaptation at board level for the first time”.²⁰² Dan Rogerson emphasised the benefit of the NAP’s bottom-up approach:

193 Q239

194 The NAP report is primarily for England but also covers reserved and non-devolved matters. Statutory adaptation programmes were published in 2014 for [Northern Ireland](#), [Scotland](#), and in [Wales](#) a non-statutory Climate Change Strategy was published in 2011 (The Government ([CCA0029](#)), para 7)

195 HM Government, [The National Adaptation Programme: Making the country resilient to a changing climate](#) (July 2013)

196 *ibid*, p 9

197 Q73

198 Q241

199 Q241

200 Q241

201 Q241

202 Q247

We have very much taken the approach—certainly, in the first cycle and moving into the next cycle of this process of reporting and Government response to it—that we need to make it everybody’s issue. So we needed to hear from everybody their understanding, what they would be able to do to contribute to that process and so that is the approach that we have taken. We feel that that is the right one.²⁰³

81. While Oliver Letwin was able to point to the same strategic priorities for Government adaptation—water scarcity, flooding and the ecological effects of climate change²⁰⁴—that the ASC also identified, it is less clear that the NAP is itself highlighting this message more widely. Climate UK told us that the NAP was a poor driver for change and lacking in strategic coherence. They believed that “the vision and objectives in the NAP need to be linked more coherently to tangible outcomes”.²⁰⁵ Yorkshire Water told us that they felt that the NAP’s infrastructure chapter was too focused on new infrastructure “rather than addressing the resilience of existing infrastructure”. They also felt that the NAP was too focused on the risk to assets rather than the risk to service”.²⁰⁶ The Local Adaptation Advisory Panel also told us that the NAP actions “could be more specific in nature, specifying clear lines of responsibility and timelines for actions to be delivered”.²⁰⁷ Lord Krebs reiterated these concerns:

We think that although the NAP has a large number of objectives, and an even larger number—370 or so—of actions, many of those are difficult to measure. It is not clear who is responsible for them, and it is really more a description of what is happening, rather than a strategy for preparing for climate change in the future, so it is not introducing new priorities and activities.²⁰⁸

82. Martin Budd from Kingston upon Hull City Council told us that he felt the Government should take a stronger leadership role:

The NAP sets out very clear responsibilities around areas, but unfortunately our view is that it does not have the teeth that it could potentially have. It has some very good actions in there and it very clearly sets out the programme of work that we need to do to address adaptation, but because there is no compulsion upon organisations within there to take action, there is certainly a weakness within the NAP at the moment, and certainly an element of monitoring and clearer time scales would be really effective.²⁰⁹

203 Q292

204 Q294

205 Climate UK ([CCA0010](#)), para 2.6

206 Yorkshire Water ([CCA0035](#)), para 3.2

207 East Sussex County Council ([CCA0014](#)), para 4.1

208 Q237

209 Q33

To drive action through the NAP, the Woodland Trust wanted to see the Government take “a stronger lead ... both in setting targets for adaptation responses and leading on delivery”.²¹⁰ Alex Nickson of the Local Adaptation Advisory Panel wanted greater integration of adaptation policy into everyday decisions:

It is about how we mainstream delivery. Government has brought about a very unifying focus on growth and jobs. All of us in our day jobs are looking at how our particular policy or project delivers growth. In the same way, I think perhaps if we have the same approach with adaptation, we could implement at a far greater rate. Am I missing an easy opportunity to deliver some incremental adaptation here? What is the disbenefit of me not considering it at this moment? If we just mainstreamed it and stopped believing that adaptation is going to be delivered through enormous great concrete barriers on the Thames or new tidal reserves or something like that, it is about small incremental adjustments with a view to the longer term. If we could just mainstream it at that level I think we would make significant headway.²¹¹

83. Lord Krebs concluded that there was a balance to be struck between what local and central Government could achieve, but ultimately “central Government need to show more leadership than has perhaps been the case so far”.²¹² Knitting these criticisms together, he told us that overall he would score the NAP “well under five, and probably in the two to three range [out of ten]”.²¹³ Looking forward, Lord Krebs also told us that for the next NAP, “the key things that need to happen ... is to have more of a top-down, prioritised strategic approach”.²¹⁴ Neither Dan Rogerson nor Oliver Letwin accepted Lord Krebs’ assessment. Oliver Letwin was wary of placing too great an emphasis on the NAP: “I think there is a danger of being monomaniacally focused on ‘the’ NAP as opposed to the effort to tackle the effects of climate change and to adapt our country to meet them”.²¹⁵ Indeed, he wanted the next NAP process to be “a much more textured and bottom-up approach to many of the other issues, in order that the centre can focus on the things it needs to focus on most urgently”.²¹⁶ Mr Letwin was particularly concerned that in creating adaptation targets there was a danger of reducing “what is an enormously serious issue ... into some kind of neatly compartmentalised bureaucratic fantasy”.²¹⁷

210 Woodland Trust([CCA0037](#)) para 2

211 Q11

212 Q259

213 Q239

214 Q241

215 Q305

216 Q303

217 Q296

A spatial NAP

84. The National Adaptation Programme sets out a vision for buildings and places to be resilient to a changing climate and extreme weather. A NAP objective, for instance, is:

to provide a clear local planning framework to enable all participants in the planning system to deliver sustainable new development, including infrastructure that minimises vulnerability and provides resilience to the impacts of climate change.²¹⁸

To achieve this objective, the NAP identifies implementation of the National Planning Policy Framework (NPPF)—“a key part of the government’s reforms to make the planning system less complex and more accessible”²¹⁹—as a priority action. Daniel Johns believed, however, that climate change adaptation in the planning system was “a great example of how the NAP is not actually driving activity”.²²⁰ The Town and Country Planning Association (TCPA) made the same point in respect to the NAP and the planning system:

The UK is critically unprepared for the medium and long term impacts of climate change because there is no effective mechanism for translating the high level messages in the National Adaptation Program into specific practical action through planning on the ground.²²¹

The TCPA concluded that, in their view, the current system was planning for the wrong geography; over the wrong time periods; with outdated science and flawed methodologies; and with inadequate skills and resources.²²²

85. Neither the NAP nor the NPPF address spatial considerations. Dr Hugh Ellis of the TCPA said that this limited their usefulness. He told us that without a spatial component to the NAP or NPPF—“very simply telling you what goes where”—local authorities found it “very difficult for it to be helpful”.²²³ “The problem of not having that spatial bite”, Dr Ellis told us, “is that very hard decisions—building scale upwards; district/neighbourhood decisions—then do not have a framework to inform them.”²²⁴ The TCPA stated that:

The issue of scale is of critical importance to the efficiency of the response we make. Deciding on, for example, whether to flood defend the best agricultural land around the Wash, or whether to relocate strategic rail

218 HM Government, [The National Adaptation Programme: Making the country resilient to a changing climate](#) (July 2013), p20

219 DCLG, [National Planning Policy Framework](#)

220 Q254

221 Town and Country Planning Association ([CCA0028](#)), para 2.2

222 Town and Country Planning Association ([CCA0028](#)), para 2.2

223 Q161

224 Q163

infrastructure in Devon, requires a national perspective both in terms of costs and benefits of such actions.²²⁵

In a similar vein, Paul Crick of Kent County Council told us that “adaptation needs ... a far wider spatial basis than a district level”.²²⁶ The Local Adaptation Advisory Panel concluded that

The current NAP for England does not prioritise risks by geography or sector. Large urban areas compared to rural areas will have different and localised climate challenges to address. The regional summaries contained within the Climate Change Risk Assessment could be a useful starting point to help disaggregate key messages at a local level and make them more meaningful.²²⁷

Adaptation reporting power

86. The UK Adaptation Reporting Power grants the Secretary of State the power to require public service organisations to produce reports on what they are doing to adapt to climate change. The NAP, the Government told us, “makes clear which government departments and arm’s length bodies are responsible for the delivery of actions and commitments”.²²⁸ But others, in the private sector and civil society, also have a role. The ASC’s statutory advice to the Government, on the implementation of the NAP, will be informed by reports prepared under the second round of the Adaptation Reporting Power (paragraph 4). This aims:

- to ensure climate change risk management is systematically undertaken by reporting authorities;
- to help ensure public service and infrastructure are resilient to climate change; and
- to monitor the level of preparedness of key sectors to climate change.

Reports prepared and submitted under the adaptation reporting power provide an opportunity for Government departments and organisations to provide an update on their climate risks and adaptation actions.

87. In the first round of reporting (December 2010 to December 2011), over 100 organisations, primarily from the energy, transport and water sectors, provided reports.²²⁹ The Government published an updated strategy for the second round of reporting in July 2013, alongside the NAP.²³⁰ In preparing the NAP, the reporting power was applied in the first round to make reporting mandatory for certain sectors, but the Government has since

225 Town and Country Planning Association ([CCA0028](#)), para 2.6

226 Q63

227 East Sussex County Council ([CCA0014](#), para 2.2

228 The Government ([CCA0029](#)), para 10

229 Defra, [Policy: Adapting to climate change](#), Gov.uk

230 Defra, [Adapting to climate change: 2013 strategy for exercising the adaptation reporting power](#) (July, 2013)

decided that reports can be made on a voluntary basis. Explaining the new voluntary approach to the adaptation reporting power, Dan Rogerson told us that:

The approach we have taken is that we want people to engage with it and to do that thinking themselves, so a lot of representative organisations as well as bigger players. If we instruct them to do it in a particular way they will do what they have to do in a fairly cursory fashion and it has to be a lot more than that.²³¹

And Oliver Letwin that:

We need to get these companies to focus on doing things other than just filling out forms. What matters is that we work with them and prove to them that there are people in Government who are willing to help.²³²

88. The ASC's progress report noted that "as participation is voluntary, coverage across all infrastructure sectors is likely to be partial and the least prepared sectors may choose not to report".²³³ Kristen Guida of Climate UK told us that

A voluntary approach is necessarily going to be piecemeal. It is not going to have strategic coherence and it is also not going to recognise you have that coalition of the willing and able there, but it really does not reflect the needs of all the organisations out there that do not necessarily have the capacity, cannot necessarily make those connections and do not have any explicit responsibility in terms of climate change adaptation.²³⁴

Lord Krebs rehearsed many of the same concerns and told us that he thought that the reporting power should be used to make reporting compulsory.²³⁵ He believed that making reporting voluntary was a risk as "some of the infrastructure providers and people who reported in round one have said they are not going to report in round two".²³⁶ On the positive side, he told us that:

Some sectors—for example ICT infrastructure ... are voluntarily producing an adaptation report. ICT was excluded from the first round and we said that that was a bad thing. But my general answer is, yes, we should have it as a mandatory requirement. The evidence from the first round is that it did in some organisations help to raise awareness about adaptation at board level for the first time. I think there was a bit of disappointment that there was not

231 Q309

232 Q310

233 ASC, [Managing climate risks to well-being and the economy](#) (July, 2014), p60

234 Q73

235 Q247

236 Q247

a lot of follow-through, so the documents were submitted and it wasn't clear what the consequences were.²³⁷

Wider engagement

89. Since 2010, the ASC has published regular progress reports scrutinising the progress on climate change adaptation. Lord Krebs told us that

The point of those interim reports was to expose to everybody—stakeholders, Government, civil service officials and so on—how we were intending to evaluate whether or not the country is preparing for climate change. Right from the very beginning we said, “Where possible, we want to focus on measurable actions and particularly actions that result in outcomes, as opposed to processes that can be measured in terms of the country becoming better prepared for climate change”.²³⁸

We heard from several of our witnesses how beneficial it was to have the ASC's continuing scrutiny. Martin Budd of Kingston Upon Hull City Council told us that the ASC's latest report “gives some interesting and useful analysis for us at a local level and provides us with ... an evidence base for discussions within the local authority”.²³⁹ However, we also heard that the reports were not structured to facilitate effective follow-up. Alex Nickson of the Local Adaptation Advisory Panel explained that “there are a lot of recommendations and if they were written in a way where the recommendations or the key points were made more clearly, we would be able to see who they are assigned against and how those bodies are following up on them”.²⁴⁰ Furthermore, John Dora told us that “we have a lot of knowledge about climate change impact and adaptation” which is academically based, but “we do not have the skills, the knowledge or the capacity in many organisations to take that knowledge from the academic side and translate it into delivery day by day in organisations”.²⁴¹

90. The ASC progress report warned that public awareness of climate change risks is low and that there was no specific Government initiative to raise it. Paul Crick of Kent County Council told us that “generally, people that live in the flood risk areas are only interested in whether they are flooded or not”.²⁴² And Alex Nickson highlighted the inherent difficulty of getting others engaged: “People are not in the streets demanding ‘What do we want? Adaptation. When do we want it? Before the next statistically significant event.’”²⁴³

91. Lord Krebs told us nevertheless that it was “important that the Government communicate to people what level of risk they think is acceptable, and that risk to

237 Q247

238 Q238

239 Q12

240 Q13

241 Q195

242 Q68

243 Q34

individual property is likely to increase”.²⁴⁴ He acknowledged the difficulty of communicating a message about climate change adaptation, but said that a message based around a set of things that you need to do whatever the future holds could be effective.²⁴⁵ He wanted the Government to assign the responsibility to improve communications:

Somebody should have that role, so if it is not central Government, I think they should say it is the Adaption Sub-Committee’s role or the Environment Agency’s role... The motivator of this has to be partly that people see it as important. It is local, so it has more salience than mitigation, which is somehow out there with people thinking, “China is pumping out stuff, so why should we bother?” This is about, “My life in my local community, my home and my local recreation ground,” or whatever. So there is an opportunity to motivate people and inform them.²⁴⁶

Lord Krebs highlighted the Flood Re reinsurance scheme as a possible mechanism for communicating the increasing risk of flooding. In his letter to the Flood Re Chief Executive (paragraph 42) he explained that:

Flood Re will provide insurers with information about flood risk for their customers, and the temporary nature of the scheme, but there is no guarantee that insurers will pass this on. This should be made a requirement, as a condition of being able to cede policies to Flood Re. Many high risk households are currently unaware that they live on the floodplain.²⁴⁷

92. Allen Creedy of the Federation of Small Businesses (FSB) saw “a crying desire from small and micro-businesses to better understand what the likely [climate] impacts are going to be on their businesses.”²⁴⁸ The Environment Agency’s Climate Ready Support Service is one such support mechanism, established in April 2012 by Defra to provide adaptation advice and support to the public sector, businesses and other organisations.²⁴⁹ In an FSB survey of its members, Allen Creedy explained that access to information on resilience planning had found an “absolutely appalling” level of awareness.²⁵⁰

Conclusions

93. The UK’s National Adaptation Programme process—required by the Climate Change Act—puts us ahead of most countries. The Government’s NAP has created buy-in through its bottom up approach but the Government has not identified proactive adaptation policies or driven action in a coordinated way, demonstrating

244 Q253

245 Q279

246 Q279

247 Letter: Lord Krebs to Brendan McCafferty “[Designing Flood Re to encourage flood risk reduction](#)” (2 February 2015)

248 Q199

249 Environment Agency ([CCA0002](#)), para 1.2

250 Q193

inadequate Government leadership. The NAP document has also lacked a spatial focus to help develop landscape-scale or regional strategies. *When the next Government comes to produce the next NAP, it needs to take a more top-down strategic oversight, with a strong spatial focus, and create a set of measures and targets against which progress can be measured. It should clearly assign, to specific organisations and groups, responsibility for the actions needed to deliver the required climate resilience.*

94. The Government has relaxed its 'reporting power' so that it is now only a voluntary code. That risks data gaps in further work to identify and monitor adaptation risks. *The Government should consider making adaptation reporting a mandatory requirement again, at least for organisations managing critical infrastructure and services.*

95. The message on our climate change risks and the required adaptations is not getting across. *In preparing the next NAP report, the Government should assign explicit responsibility to a named body or individual—an envoy—for raising awareness of our climate change risks. Once the ASC produces its statutory advice on the first NAP report later this year, and thereafter reverts to informal annual progress reports, the next Government should introduce a requirement for Government to respond formally to those progress reports.*

Conclusions

1. The emergency response framework for dealing with extreme weather (and other events) has been repeatedly tested and there are established structures through which the relevant central and local authorities learn lessons and integrate these into improving systems. Cuts to local authorities' and emergency services' budgets may be reducing the capacity of local emergency responders to deal with extreme weather events when required. (Paragraph 18)
2. Flooding is the biggest adaptation risk, and will increase even if significant resources are devoted to it. The Government has sometimes followed what the ASC has called a 'reactive' funding strategy, prioritising the most recent flooding events rather than long term objective needs. (Paragraph 31)
3. Funding for flooding adaptations must be sourced and matched against the value of the benefits available. The challenge is to balance the revenue to natural asset owner against the needs of potential beneficiaries, who currently do not fully pay for those reduced-flooding benefits. The Natural Capital Committee's work is at the heart of this question and it has been doing invaluable research in this area. (Paragraph 32)
4. Despite the clear flooding risks of building on floodplains, this continues. The Environment Agency's advice against doing so is largely followed by planning authorities, but the Agency does not consider smaller developments which can still in aggregate have a significant effect on flooding risk, and the potential knock-on effects for communities downstream from a proposed development can be missed. (Paragraph 56)
5. The Flood Re insurance scheme will not in itself reduce flood risk for individual properties, but it does offer a means for encouraging greater property level flood resilience measures to be delivered. (Paragraph 57)
6. The Government has said that it supports the deployment of Sustainable drainage systems (SuDS) as the default approach to development, but has stopped short of enforcing its use through the existing provisions of the Flood and Water Management Act. It has also stopped short of removing developers' automatic right to connect new homes to the public sewer system, which would provide an incentive for them to include SuDS. (Paragraph 58)
7. Only a minority of Lead Local Flood Authorities have produced the required flood risk management plans, and without a legal duty to manage and reduce flood risks the local authority budgets for this work are liable to be reallocated to other duties. Where flood risk plans are produced, they are unlikely to cover the multi-decade planning horizon commensurate with the infrastructure lives involved. (Paragraph 59)

8. Building standards have so far given less weight to the health risks of over-heating than to energy efficiency. Continuing climate change will require an increasing emphasis on heat as well as cold. (Paragraph 60)
9. Infrastructure and networks—roads, railway, energy grids, airports and so on—are increasingly vulnerable to disruption from extreme weather events, but the economic and public-service impacts on them from climate change are not fully understood. (Paragraph 76)
10. The UK's National Adaptation Programme process—required by by the Climate Change Act—puts us ahead of most countries. The Government's NAP has created buy-in through its bottom up approach but the Government has not identified proactive adaptation policies or driven action in a coordinated way, demonstrating inadequate Government leadership. The NAP document has also lacked a spatial focus to help develop landscape-scale or regional strategies. (Paragraph 93)
11. The Government has relaxed its 'reporting power' so that it is now only a voluntary code. That risks data gaps in further work to identify and monitor adaptation risks. (Paragraph 94)
12. The message on our climate change risks and the required adaptations is not getting across. (Paragraph 95)

Recommendations

13. Without waiting for the ASC's statutory report on the NAP in July 2015 or the results of the Government's 'horizon scanning' of future risks and threats, the Government should commission a review of the physical resources, capacity and skills available for emergency response as well as the coordination between all of the organisations involved, at both national and local level. (Paragraph 18)
14. The Government should make a clear commitment to allow the Environment Agency to allocate flood defence funds according to its objective cost-benefit models without political interference. (Paragraph 33)
15. The Government has indicated that it will leave it to the next Government to decide the NCC's long-term future. The NCC's work on valuing ecosystem services, including those providing 'soft' flooding defences, show its importance for climate change adaptation, but also offers the prospect of finding funding mechanisms to link natural capital 'owners' and adaptation beneficiaries. The next Government must act as quickly as possible to put the NCC on a long-term footing, and encourage it to develop those funding mechanisms. (Paragraph 34)
16. The Government should require the Environment Agency to provide flood risk advice on all sizes of development, including small developments currently exempted. The Government should reassess the Environment Agency's future resources, skills and financial needs, to ensure that these reflect the increasing risks from flooding in the years ahead, and the volume of work needed to deal with these. (Paragraph 56)
17. The Government must enforce the powers it already has under the Flood and Water Management Act to require SuDS in developments, particularly on floodplains, and remove the developers' right to connect homes to the public sewer. (Paragraph 58)
18. The Government should review the rigour of local authorities' flood risk management plans, and put authorities' responsibilities to take action to reduce flood risk on a statutory footing to prevent resources being directed elsewhere. (Paragraph 59)
19. The Government must ensure that its research in the Zero Carbon Hub addresses these [health risk from over-heating] issues, and consider heat-stress issues—including the use of more appropriate building materials—in the next review of building regulations. (Paragraph 60)
20. The Government should support further research into critical network 'pinch-points' and interdependencies, starting by coordinating the necessary data-gathering which is currently incomplete. (Paragraph 76)

21. The Government should give a more explicit direction to all of the infrastructure network providers and their regulators to give greater weight to adaptation investment, and initiate a public debate about the costs that will have to be borne by customers and taxpayers. An early action should be to reconsider the case for introducing universal water-metering in water-stressed areas. (Paragraph 77)
22. When the next Government comes to produce the next NAP, it needs to take a more top-down strategic oversight, with a strong spatial focus, and create a set of measures and targets against which progress can be measured. It should clearly assign, to specific organisations and groups, responsibility for the actions needed to deliver the required climate resilience. (Paragraph 93)
23. The Government should consider making adaptation reporting a mandatory requirement again, at least for organisations managing critical infrastructure and services. (Paragraph 94)
24. In preparing the next NAP report, the Government should assign explicit responsibility to a named body or individual—an envoy—for raising awareness of our climate change risks. Once the ASC produces its statutory advice on the first NAP report later this year, and thereafter reverts to informal annual progress reports, the next Government should introduce a requirement for Government to respond formally to those progress reports. (Paragraph 95)

Formal Minutes

Wednesday 4 March 2015

Members present:

Joan Walley, in the Chair

Peter Aldous
Martin Caton
Zac Goldsmith
Mark Lazarowicz

Dr Matthew Offord
Mrs Caroline Spelman
Dr Alan Whitehead
Simon Wright

Draft Report (*Climate Change Adaptation*), proposed by the Chair, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 to 95 read and agreed to.

Summary agreed to.

Resolved, That the Report be the Tenth Report of the Committee to the House.

Ordered, That the Chair make the Report to the House.

Ordered, That embargoed copies of the Report be made available, in accordance with the provisions of Standing Order No. 134.

[Adjourned till Wednesday 11 March at 2.00 pm]

Witnesses

The following witnesses gave evidence. Transcripts can be viewed on the Committee's inquiry page at www.parliament.uk/eacom/

Wednesday 5 November 2014

Question number

Martin Budd, Environment and Climate Change Strategic Adviser, Kingston upon Hull City Council; **Kristen Guida**, Director, Climate South East, Climate UK; **Alex Nickson**, Deputy Chair, Local Adaptation Advisory Panel; and **Paul Crick**, Director of Environment Planning and Enforcement, Kent County Council.

[Q1-74](#)

Wednesday 26 November 2014

Paul Leinster, Chief Executive, Environment Agency, **Pete Fox**, Director of Strategy and Investment, Flood and Coastal Risk Management, Environment Agency, **Tony Grayling**, Director of Environment and Business, Technical and Cross-Cutting, Environment Agency; **Dr Ceris Jones**, Climate Change Adviser, National Farmers' Union, **Dr Mike Morecroft**, Principal Specialist, Climate Change, Natural England; and **Sarah Mukherjee**, Director of Environment, Water UK.

[Q75-137](#)

Wednesday 10 December 2014

John Slaughter, Director of External Affairs, Home Builders Federation; **Professor Paul Cosford**, Director for Health Protection and Medical Director, Public Health England; **Dr Hugh Ellis**, Head of Policy, Town and Country Planning Association; and **Paul Everall**, Chief Executive and Company Secretary, Local Authority Building Control.

[Q138-188](#)

Wednesday 7 January 2015

Tony Glover, Director of Policy, Energy Networks Association; **Professor Jim Hall**, Director, Environmental Change Institute, Oxford University and Director, Infrastructure Transitions Research Consortium; **Allen Creedy**, Chair, Energy, Water and Environment Policy Unit, Federation of Small Businesses; **John Dora**, Chair, Infrastructure Operators' Adaptation Forum; and **Brian Smith**, Member, Expert Panel on Review of the Resilience of the Transport Network to Extreme Weather Events.

[Q189-235](#)

Wednesday 21 January 2015

Lord John Krebs, Chair, Adaptation Sub-Committee, Committee on Climate Change, **Matthew Bell**, Chief Executive, Committee on Climate Change, and **Daniel Johns**, Head of Adaptation, Committee on Climate Change.

[Q236-291](#)

Wednesday 4 February 2015

Rt Hon Oliver Letwin MP, Minister for Government Policy, Cabinet Office;
Dan Rogerson MP, Parliamentary Under-Secretary of State, Department
for Environment, Food and Rural Affairs; **Steve Quartermain**, Chief
Planner, Department for Communities and Local Government, **Bob
Ledsome**, Head of Building Regulations and Standards Division,
Department for Communities and Local Government; and **Rob Hitchen**,
Team Leader, UK Climate Change Adaptation Policy, Department for
Environment, Food and Rural Affairs.

[Q292-370](#)

Published written evidence

The following written evidence was received and can be viewed on the Committee's inquiry web page at www.parliament.uk/eacom. CCA numbers are generated by the evidence processing system and so may not be complete.

- 1 Barry Wallis ([CCA0031](#)),
- 2 Barry Wallis ([CCA0033](#))
- 3 Brampton A14 Campaign Group ([CCA0038](#))
- 4 Briony Turner ([CCA0022](#))
- 5 British Retail Consortium ([CCA0005](#))
- 6 Ch2m Hill ([CCA0006](#))
- 7 City Of London Corporation ([CCA0027](#))
- 8 Clientearth ([CCA0016](#))
- 9 Climate Uk ([CCA0010](#))
- 10 Committee On Climate Change ([CCA0013](#))
- 11 Dr Karen Johnson ([CCA0032](#))
- 12 East Sussex County Council ([CCA0014](#))
- 13 Edf Energy ([CCA0023](#))
- 14 Energy Uk ([CCA0017](#))
- 15 Environment Agency ([CCA0002](#))
- 16 Federation Of Small Businesses (Fsb) ([CCA0025](#))
- 17 Food And Drink Federation ([CCA0011](#))
- 18 Friends Of The Earth (England, Wales & Northern Ireland) ([CCA0012](#))
- 19 Green Alliance ([CCA0021](#))
- 20 Hastoe Housing Association ([CCA0018](#))
- 21 Labc ([CCA0036](#))
- 22 Met Office ([CCA0030](#))
- 23 National Farmers Union (Nfu) ([CCA0007](#))
- 24 National Flood Forum ([CCA0009](#))
- 25 National Housing Federation ([CCA0019](#))
- 26 Natural England ([CCA0026](#))
- 27 Rspb ([CCA0008](#))
- 28 Sustainable Development Unit For NHS England And Public Health England ([CCA0004](#))
- 29 Sustainable Homes ([CCA0015](#))
- 30 Tcpa ([CCA0028](#))
- 31 The Government ([CCA0029](#))
- 32 The Royal Society ([CCA0003](#))
- 33 The Wildlife Trusts ([CCA0024](#))
- 34 The Woodland Trust ([CCA0037](#))
- 35 Ucl Institute For Environmental Design And Engineering. ([CCA0001](#))
- 36 Yorkshire Water ([CCA0035](#))