

Environmental Evidence for the Future

Regional Workshop Consultation

Report from the England and
Overseas Territories Workshop
14 September 2017

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1. Introduction

The Environmental Evidence for the Future (EEF) initiative has been set up by NERC to

- pave the way to addressing crucial challenges and opportunities for our environment presented by the UK leaving the EU. These include optimising sustainable environmental management, ensuring the resilience of our ecosystems and the quality of our environment
- define, prioritise and address the knowledge gaps in the environmental science evidence base to inform policy and practice in the medium- to long-term (+5, +10, +20 years)
- focus on areas which have the scope to be addressed in the main via the NERC community and NERC's investments

EEF is an independent, co-developed initiative that is designed to complement, not duplicate, parallel initiatives. The project is focused on identifying cross-cutting challenges that address multiple needs across organisations and departments from a position of building on and strengthening the longer term environmental science evidence base. It will not answer overly-specific or short-term/current evidence needs and it will not be prescriptive in how prioritised environmental evidence needs are or should be addressed.

To help achieve these aims, NERC is holding four regional meetings around the UK in August and September 2017 in which participants from government, NDPBs and academia identify, describe and prioritise future environmental policy challenges and opportunities in the context of the UK's exit from EU Environmental Frameworks.

This report documents the workshop process and outputs from the England and Overseas Territories workshop held on 14 September at the De Vere West One Hotel, London. There are eight main sections:

- **Section 1** is the introduction to the report
- **Section 2** sets out the workshop methodology
- **Section 3** provides an overview of the prioritised policy areas
- **Section 4** sets out the priority policy challenges for food, farming, timber and forests
- **Section 5** sets out the priority policy challenges for water, fisheries and marine
- **Section 6** sets out the priority policy challenges for the environment, conservation and wildlife
- **Section 7** sets out the priority policy challenges for climate change, air quality and energy
- **Section 8** sets out the priority policy challenges for UK overseas territories

2. Workshop methodology

Introduction

The workshop was designed around a 5 step process in which participants:

1. Reviewed and discussed a series of drivers that may shape the UK environment over the next 25 years
2. Mapped the drivers according to whether they perceived them
 - To be more or less important for the UK environmental policy in the future
 - To have a certain or an uncertain outcome
3. Identified a series of priority drivers that are
 - More important and have a certain outcome
 - More important and have an uncertain outcome
4. Explored how priority drivers might play out over the next 25 years and, in particular
 - Whether drivers are more likely to create opportunities or threats to the UK environment in a post Brexit world
 - What evidence policy makers will need to capture those opportunities and mitigate the threats
5. Described a number of 100 word challenges that reflect these conversations

The detailed workshop programme is set out in Annex 1. The participant list is set out in Annex 2.

The drivers

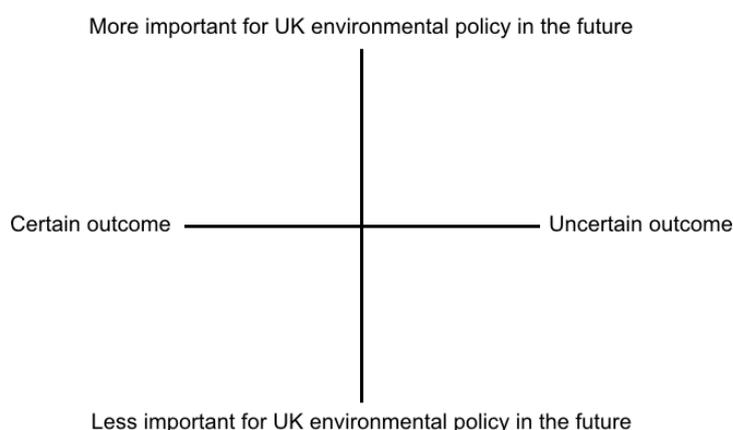
The drivers were drawn from the UK National Ecosystem Assessment Technical Report (published in 2011) and updated to reflect more recent geopolitical developments. During the course of the discussion, participants had the opportunity to add to the list of drivers if they felt there were any obvious gaps.

The full list of (amended) drivers is set out in Annex 3.

Mapping and prioritising the drivers

Participants split into four groups (Annex 2), each of which focussed on one thematic area. Each group reviewed and added to the list of drivers if they noted any specific gaps.

Each group then mapped the full set of drivers on the importance and certainty matrix and identified the priority drivers in the top right and top left quadrants.



Exploring how the priority drivers might play out

Groups discussed the priority drivers in both the top left and top right quadrants.

Drivers that mapped in the top left quadrant are **more important for UK environmental policy in the future and have a certain outcome**. For these drivers, participants explored

- What the outcome is and why it is important
- Whether the outcome offers an opportunity or a threat for the UK post Brexit
- What the impact will be in 2030 and in 2042
- What evidence policy makers will need to consider the policy response
- What links/dependencies exist to wider policy areas

Drivers that mapped in the top right quadrant are **more important for UK environmental policy in the future and have an uncertain outcome**. For these drivers, participants explored

- What the might outcome be post Brexit
- The possible threats and opportunities for the UK environment in 2030 and in 2042
- What evidence policy makers will need to develop an effective response
- What links/dependencies exist to wider policy areas

Given the constraints of time in the workshop, groups did not discuss all the priority drivers.

The 100 word challenges

For each priority driver that they discussed, groups identified a 100 word challenge to encapsulate the issues and research need.

3. Overview of the workshop outputs

Introduction

The tables on pages 5-8 provide an overview of the priority issues.

The prioritised drivers from all four group discussions are listed in the tables and then assigned a colour code according to whether groups believed the driver to be

- an opportunity for the future (green)
- a mixture of opportunity and threat (orange)
- a threat (red)

Drivers that were prioritised but not discussed are coded grey.

The detailed analysis and discussions of the issues are set out in sections 4-8.

More important for UK environmental policy in the future and with a certain outcome

	Food Farming Timber Forests	Water Fisheries Marine	Env't Conserv'n Wildlife	Climate change Air quality Energy	OTs
2. Circular economy practices will become more widely used and change what society values				●	
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.		●	●	●	
5. Consumption is likely to increase steadily			●		
7. Data analytics will enable sophisticated mapping of demand and supply		●			
8. Decarbonisation will significantly impact on policy formulation and implementation			●		
12. Global population is likely to exceed 8.5 billion by 2030					●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development			●	●	
17. Improvements in farming techniques and technology will boost productivity and food security				●	
21. Lowland/upland land capability and use will face increasing and competing demands		●			
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040				●	
26. Pests and diseases will be more widely dispersed			●		●
28. Retailer power will drive farming systems			●		
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance			●	●	
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers			●		
34. Poverty and social injustice is creating a disconnection between people and the environment				●	
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process		●			
37. The internet of things will change production processes and practices profoundly			●		

39. The sale of petrol and diesel vehicles will be banned in 2040			●		
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality		●	●	●	●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit					●
45. The world economy will double in size by 2045			●		
47. Waste will continue to increase and is likely to cause significant environmental challenges					●
Micro-plastics, waste pollutants and emerging contaminants have increasing impacts on marine ecosystems (See also 47)					●
Invasive alien species and diseases will be more widely dispersed and arrive more frequently					●
Loss of agricultural soils/Declining soil quality			●		

More important for UK environmental policy in the future with an uncertain outcome

	Food Farming Timber Forests	Water Fisheries Marine	Env't Conserv'n Wildlife	Climate change Air quality Energy	OTs
1. Agricultural support payments are increasing, focussed on public goods		●			
2. Circular economy practices will become more widely used and change what society values					●
3. Citizen engagement is likely to become increasingly important across a range of policy areas			●	●	
9. Demand for energy will continue to increase			●		
11. Food security and water security will become significant challenges; perhaps even sources of conflict			●	●	
13. Global resource shortages (metals, nutrients for example) will begin to bite		●		●	
14. GM crops and animals are likely to become culturally accepted in the UK			●		
15. Governments will continue to collaborate to address Climate Change and Sustainable Development		●			
17. Improvements in farming techniques and technology will boost productivity and food security			●		
19. Local economic performance around the UK will be uneven, leading to increased regional disparity			●		
20. London and other major UK cities will continue to grow in size and population			●	●	
21. Lowland/upland land capability and use will face increasing and competing demands			●		
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040					●
23. New technology will continue have an impact on the natural environment			●		
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs			●	●	
25. People will have increased mobility and job flexibility			●		
27. Planning needs to be future proofed and more embedded				●	
28. Retailer power will drive farming systems	●				
29. Smart cities and autonomous vehicles will change how we live and travel			●		

31. The average age of the UK population will be 42.9 years in 2045. 1 in 12 will be over 80					●
33. The contribution that natural capital makes to UK growth will become more important		●			
34. Poverty and social injustice is creating a disconnection between people and the environment			●		
35. The economic centre of gravity will continue to move away from the west towards China and the east				●	
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process					●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit		●			
44. The value of the UK's ecotourism markets is likely to increase					●
47. Waste will continue to increase and is likely to cause significant environmental challenges		●			
Game changing new technologies				●	
Relative costs of different energy technologies				●	
Unexpected catastrophic events (e.g. sea level rise from permafrost melt or new local pollution)				●	
High seas closed areas/MPAs will increase					●
High environmental standards and impact on food, farming and forestry	●				
Water security will become significant challenges; perhaps even sources of conflict		●			

4. Food, Farming, Timber and Forests

Stats

- **16 drivers** mapped as more important for UK environmental policy in the future and having a certain outcome
 - The group did not prioritise the drivers *per se*, but grouped them into 4 clusters: Technology; Resources; Regional; and Climate. None were discussed in detail.
- **26 drivers** mapped as more important for UK environmental policy in the future and having an uncertain outcome
 - The group did not prioritise the drivers *per se*, but grouped them into 6 clusters: Natural capital; Ecosystem services; Supply chain; Data/technology; Global; Well-being/quality of life. 2 were discussed in detail and one 100 word challenge generated.
- **4 drivers** mapped as being less important for UK environmental policy in the future and having a certain outcome. These drivers can be **parked**.
- **5 drivers** mapped as being less important for UK environmental policy in the future and having an uncertain outcome. It may be worth **monitoring** these drivers to determine whether – as the outcome becomes clearer – they become more important for UK environmental policy in the future.
- The group identified **4 additional drivers**:
 - *Failure to achieve WFD good water status*
 - *High environmental standards and impact on food, farming and forestry*
 - *Increased importance of human health and wellbeing*
 - *Declining soil quality*
- Driver 32 was changed to "*The continued decline of species populations is part of a complex biodiversity picture...*"; 'vertebrate' was removed as it felt too limiting

Drivers that are MORE IMPORTANT for UK environmental policy and have a CERTAIN OUTCOME	Challenge	Priority	Not ranked
2. Circular economy practices will become more widely used and change what society values			●
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events			●
5. Consumption is likely to increase steadily			●
9. Demand for energy will continue to increase			●
12. Global population is likely to exceed 8.5 billion by 2030			●
13. Global resource shortages (metals, nutrients for example) will begin to bite			●
17. Improvements in farming techniques and technology will boost productivity and food security			●
19. Local economic performance around the UK will be uneven, leading to increased regional disparity			●
21. Lowland/upland land capability and use will face increasing and competing demands			●
23. New technology will continue have an impact on the natural environment			●
26. Pests and diseases will be more widely dispersed			●
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance			●
39. The sale of petrol and diesel vehicles will be banned in 2040			●
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality			●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit			●
45. The world economy will double in size by 2045			●

Drivers that are MORE IMPORTANT for UK environmental policy and have an UNCERTAIN OUTCOME	Challenge	Priority	Not ranked
1. Agricultural support payments are increasing, focussed on public goods			●
3. Citizen engagement is likely to become increasingly important across a range of policy areas			●
7. Data analytics will enable sophisticated mapping of demand and supply			●
8. Decarbonisation will significantly impact on policy formulation and implementation			●
11. Food security and water security will become significant challenges; perhaps even sources of conflict			●
14. GM crops and animals are likely to become culturally accepted in the UK			●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development			●
16. Governments will seek to achieve a global free trade agreement			●
18. International investment in the UK will increase			●
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040			●
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs			●
27. Planning needs to be future proofed and more embedded			●
28. Retailer power will drive farming systems	●		
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers			●
33. The contribution that natural capital makes to UK growth will become more important			●
34. Poverty and social injustice is creating a disconnection between people and the environment			●
35. The economic centre of gravity will continue to move away from the west towards China and the east			●
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process			●
37. The internet of things will change production processes and practices profoundly			●
38. The risk of interstate conflict will continue to rise			●
42. The UK will not retain exclusive fishing rights of the 200 mile exclusive economic zone post Brexit			●
46. There will be no magic bullet that eases pressure on the natural environment to provide food and energy			●
48* Failure to achieve WFD good water status			●
49* Declining soil quality			●

50* High environmental standards and impact on food, farming and forestry	●		
51* Increased importance of human health and wellbeing			●

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have an UNCERTAIN outcome

<p>The Driver</p>	<p>28. Retailer power will drive farming systems New driver: High environmental standards will impact on food and forestry</p>
<p>The Challenge</p> <p>145 words</p>	<p>Market forces could drive farming systems in two distinct directions, both of which have consequences for the environment. First, retail power could continue to drive more low cost production with consequences for farm consolidation and land management whereby only the most efficient producers survive. Conversely, high environmental standards could push retailers and other institutional actors to become investors in natural capital throughout the supply chain, or require these standards from producers as the new norm. This raises important questions in terms of impact on the environment - who pays for the environment and who benefits. This challenge requires a range of data covering different disciplines, e.g. economic, cultural, social and environmental and a commitment to long-term data collection and potentially brings new actors into knowledge management, e.g. citizen scientists. Engagement is required with several other areas of policy, e.g. trade, technology, innovation and consumer protection.</p>

<p>Possible outcomes</p>	<ul style="list-style-type: none"> • More mass production to deliver commodities at low cost driving farm consolidation and increasing efficiencies • If there is a push to higher environmental standards, more niche products, more sustainable production • Retailers and other private companies become investors in natural capital through their private investments • Higher environmental standards could lead to an increase in goods of lower environmental standards being imported to meet demand
<p>Possible threats</p>	<ul style="list-style-type: none"> • Price pressures – less investment in environmental action by farmers • Commodifying the environment and shifting the priorities • Certainty of funding? Long term investment strategies for environment might be more at risk • Higher environmental standards mean retailers expect these standards from farmers as the norm
<p>Possible opportunities</p>	<ul style="list-style-type: none"> • Retailers could pass on the corporate social responsibility (CSR) down the supply chain • Shift to more low intensity resource-efficient farming systems • More private investment in environmental activities, alleviating burden on taxpayer
<p>Evidence needs</p>	<ul style="list-style-type: none"> • Investment in long term datasets – use new technology and integrate for different purposes • Involve a broader range of people in collecting data, e.g. citizen science • Understand the relationships between different actors in the supply chain and how these impact on the environment • Economic, social and environmental data

Connections to
other policy areas

- Trade, Agriculture, Finance, Consumer Protection, Environmental regulation and policy, Supply chains, Technology and innovation, Food regulation

5. Water, Fisheries and Marine

Stats

- **27 drivers** mapped as more important for UK environmental policy in the future and having a certain outcome
 - The group prioritised 5 and discussed 1 in detail
- **12 drivers** mapped as more important for UK environmental policy in the future and having an uncertain outcome
 - The group prioritised 7 and discussed 1 in detail
- **4 drivers** mapped as being less important for UK environmental policy in the future and having a certain outcome. These drivers can be **parked**.
- **5 drivers** mapped as being less important for UK environmental policy in the future and having an uncertain outcome. It may be worth **monitoring** these drivers to determine whether – as the outcome becomes clearer – they become more important for UK environmental policy in the future.
- The group identified **1 additional driver by splitting driver 11 into**
 - *Food security will become a significant challenge; and perhaps even a source of conflict*
 - *Water security will become a significant challenge; and perhaps even a source of conflict*

Drivers that are MORE IMPORTANT for UK environmental policy and have a CERTAIN OUTCOME	Challenge	Priority	Not ranked
2. Circular economy practices will become more widely used and change what society values			●
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events		●	
5. Consumption is likely to increase steadily			●
6. Cyber security will be a continuing threat to international security			●
7. Data analytics will enable sophisticated mapping of demand and supply		●	
9. Demand for energy will continue to increase			●
11. Food security and water security will become significant challenges; perhaps even sources of conflict			●
12. Global population is likely to exceed 8.5 billion by 2030			●
16. Governments will seek to achieve a global free trade agreement			●
19. Local economic performance around the UK will be uneven, leading to increased regional disparity			●
21. Lowland/upland land capability and use will face increasing and competing demands	●		
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040			●
23. New technology will continue have an impact on the natural environment			●
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs			●
26. Pests and diseases will be more widely dispersed			●
27. Planning needs to be future proofed and more embedded			●
28. Retailer power will drive farming systems			●
29. Smart cities and autonomous vehicles will change how we live and travel			●
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance			●
34. Poverty and social injustice is creating a disconnection between people and the environment			●
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process		●	
37. The internet of things will change production processes and practices profoundly			●

38. The risk of interstate conflict will continue to rise			●
39. The sale of petrol and diesel vehicles will be banned in 2040			●
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality		●	
42. The UK will not retain exclusive fishing rights of the 200 mile exclusive economic zone post Brexit			●
43. The UK's reputation as a migrant unfriendly country will have an impact on jobs and wealth creation			●

Drivers that are MORE IMPORTANT for UK environmental policy and have an UNCERTAIN OUTCOME	Challenge	Priority	Not ranked
1. Agricultural support payments are increasing, focussed on public goods		●	
8. Decarbonisation will significantly impact on policy formulation and implementation			●
13. Global resource shortages (metals, nutrients for example) will begin to bite		●	
14. GM crops and animals are likely to become culturally accepted in the UK			●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development		●	
18. International investment in the UK will increase			●
33. The contribution that natural capital makes to UK growth will become more important		●	
35. The economic centre of gravity will continue to move away from the west towards China and the east			●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit	●		
44. The value of the UK's ecotourism markets is likely to increase			●
47. Waste will continue to increase and is likely to cause significant environmental challenges		●	
11* Water security will become a significant challenge; perhaps even sources of conflict		●	

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have a CERTAIN outcome

The Driver	21. Lowland/upland land capability and use will face increasing and competing demands affecting water quantity and quality
The Challenge	Brexit will have impact on UK environmental policy. It is, however, an opportunity to reconfigure our landscape (post CAP and other directives), but calls for a series of legislative controls and a legislative authority with teeth. Water is a critical resource; poor management can increase floods, degrade water quality, cause soil erosion and droughts. We need better joined up models to understand how systems function and what effect changes will have. We need to model the whole water system joined up at all scales supported by comprehensive long term (decadal) monitoring. Research is needed on representative catchments with whole system monitoring and modelling and relevant data analytics and new technologies (middleware).
111 words	

Outcome of this driver	<ul style="list-style-type: none"> • [Other tasks not completed]
Why the outcome is important	<ul style="list-style-type: none"> •
Opportunity or threat?	<ul style="list-style-type: none"> •
Impact of the driver	<ul style="list-style-type: none"> •
Evidence needs	<ul style="list-style-type: none"> •
Connections to other policy areas	<ul style="list-style-type: none"> •

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have an UNCERTAIN outcome

The Driver	41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit
The Challenge	There is an opportunity enshrined within the EU exit for the UK to become a world leader in terrestrial and marine environmental management and technology and to derive significant economic, social and environmental public benefits. In order to achieve this in the short term, policy must remain effective and robust. To support long term growth, we must retain exemplar policies and build upon them, through clear targeting of outcomes. This also requires an effective system to measure ecosystem benefits and to communicate and embed both of these clearly across all policy areas. All of the above requires long term strategic planning and resourcing in order to reap the full benefits which can clearly deliver net economic, environmental and social gains.
120 words	

Possible outcomes	<ul style="list-style-type: none"> • [Other tasks not completed]
Possible threats	<ul style="list-style-type: none"> •
Possible opportunities	<ul style="list-style-type: none"> •
Evidence needs	<ul style="list-style-type: none"> •
Connections to other policy areas	<ul style="list-style-type: none"> •

6. Environment, conservation and wildlife

Stats

- **16 drivers** mapped as more important for UK environmental policy in the future and having a certain outcome
 - The group prioritised 8 and discussed 5 in detail, 2 as a cluster to produce 4 100 word challenges
- **18 drivers** mapped as more important for UK environmental policy in the future and having an uncertain outcome
 - The group prioritised 10 and discussed 3 in detail as a cluster to produce 1 100 word challenge
- **5 drivers** mapped as being less important for UK environmental policy in the future and having a certain outcome. These drivers can be **parked**.
- **5 drivers** mapped as being less important for UK environmental policy in the future and having an uncertain outcome. It may be worth **monitoring** these drivers to determine whether – as the outcome becomes clearer – they become more important for UK environmental policy in the future.
- **4 drivers** were not mapped:
 - *27. Planning needs to be future proofed and more embedded*
 - *41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit*
 - *42. The UK will not retain exclusive fishing rights of the 200 mile exclusive economic zone post Brexit*
 - *46. There will be no magic bullet that eases pressure on the natural environment to provide food and energy*
- **1 driver** was added:
 - *Loss of agricultural soils*

Drivers that are MORE IMPORTANT for UK environmental policy and have a CERTAIN OUTCOME	Challenge	Priority	Not ranked
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.	●		
5. Consumption is likely to increase steadily			●
7. Data analytics will enable sophisticated mapping of demand and supply		●	
8. Decarbonisation will significantly impact on policy formulation and implementation			●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development			●
26. Pests and diseases will be more widely dispersed	●		
28. Retailer power will drive farming systems			●
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance			●
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers	●		
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process		●	
37. The internet of things will change production processes and practices profoundly			●
39. The sale of petrol and diesel vehicles will be banned in 2040			●
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality	●		
45. The world economy will double in size by 2045			●
47. Waste will continue to increase and is likely to cause significant environmental challenges		●	
48* Loss of agricultural soils	●		

Drivers that are MORE IMPORTANT for UK environmental policy and have an UNCERTAIN OUTCOME	Challenge	Priority	Not ranked
1. Agricultural support payments are increasing, focussed on public goods			●
3. Citizen engagement is likely to become increasingly important across a range of policy areas		●	
9. Demand for energy will continue to increase		●	
10. Demand for greater regional and local autonomy will continue			●
11. Food security and water security will become significant challenges; perhaps even sources of conflict		●	
13. Global resource shortages (metals, nutrients for example) will begin to bite			●
14. GM crops and animals are likely to become culturally accepted in the UK		●	
16. Governments will seek to achieve a global free trade agreement			●
17. Improvements in farming techniques and technology will boost productivity and food security		●	
19. Local economic performance around the UK will be uneven, leading to increased regional disparity	●		
20. London and other major UK cities will continue to grow in size and population		●	
21. Lowland/upland land capability and use will face increasing and competing demands	●		
23. New technology will continue have an impact on the natural environment		●	
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs	●		
25. People will have increased mobility and job flexibility		●	
29. Smart cities and autonomous vehicles will change how we live and travel		●	
33. The contribution that natural capital makes to UK growth will become more important			●
34. Poverty and social injustice is creating a disconnection between people and the environment		●	

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have a CERTAIN outcome

The Driver	4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.
The Challenge	Climate change is a continuing and major threat to UK society, economy and the environment and will impact upon health, well-being and use of resources. This is an issue for the short, medium and long term. A lot of planning and modelling has taken place but this has not always been tested in UK communities and the natural environment. Research is needed into how the application of adaption and mitigation measures is working, e.g. through pilots, demonstrations and scenario testing. At the acute end of the spectrum, we need knowledge on how systems deal with flooding or heatwaves, but it is also applicable to the loss of species, crop failure, etc. Research also needed on complexity and systems thinking under conditions of uncertainty.
123 words	

Outcome of this driver	<ul style="list-style-type: none"> • No longer subject to EC regulations • Still want to deal with the impacts • Rising sea levels; more extreme weather events; more flooding • Diversion of resources to deal with these issues • Experiencing the effects of climate change • More heatwaves, wildfires • Loss of species; change in species populations – more winners and losers • Species adaptation • Prioritising one area over another – tougher choices around allocation of resources • Potential outcomes also include: import of better adapted species • How well prepared we are will impact on the need for emergency response in the longer term
Why the outcome is important	<ul style="list-style-type: none"> • Drain on resources and time • Impact on well-being and health (mental and physical) • Is this how we want to spend UK money? • Could reshape landscapes and how they are used, e.g. stop certain activities, move uphill, move inland. • Loss of biodiversity • Impact on soils
Opportunity or threat?	<ul style="list-style-type: none"> • Threat: Un-insurability of assets • But opportunity to develop innovative solutions to address some of these issues and import/export of ideas • Adaptability of urban and rural areas to cope with climate change – create new solutions • Urban regeneration is an opportunity • Natural environment change /restoration – coastal retreat becomes a wetland; these need to work though and do we know enough? Need functioning landscapes – what habitats do we need where? Informed evidence based planning for this.

Impact of the driver	<ul style="list-style-type: none"> • Not joined up biodiversity and habitat planning is a risk • Close to 2 degrees – not meeting the Paris Agreement targets • Impacts on economic growth • Environmental migration – from within and outside the UK • Infrastructure issues – planning and what not protected/adapted – transport, sea defences, etc. • On red alert all the time • ‘Just in time’ will have mushroomed to increase vulnerabilities
Evidence needs	<ul style="list-style-type: none"> • Are we in Emergency mode or Adapted mode? • Need to get ahead of the game - mitigation • Lots of evidence already available – not acting upon it • Understanding about how systems (natural, social, financial, physical (infrastructure)) respond to climate change – systems thinking to build resilience • How do systems adapt, respond or bounce back? • Data integration and modelling, scenario testing • Options around dependencies, e.g. food system and how to respond • Better understand the complexity, interconnectedness and impacts of policy • Better models and the application of them through the professionals using them across different parts of public service • More community involvement • Pilots & demos – ‘rehearse in advance’ to think through a response; scenario test in real-time • Social evidence, e.g. evidence of what situation will be like in 2042 • Spatial variability
Connections to other policy areas	<ul style="list-style-type: none"> • Yes, lots as described as above

The Driver	26. Pests and diseases will be more widely dispersed
The Challenge	<p>Pests and diseases will increasingly cause destruction and loss of natural capital and ecosystem services including wildlife, agriculture, fisheries, population and human health, and heritage assets. This may impact public attitudes towards the natural environment. An effective toolkit is needed to identify and respond to emerging pests and diseases. This includes understanding the origins of pests and diseases; modelling pathways and dispersal; a risk based assessment of the potential impacts; and measures to control, mitigate or adapt. This must be supported by an understanding of the role of social attitudes and behaviours and innovative approaches to detection and monitoring.</p> <p>99 words</p>

Outcome of this driver	<ul style="list-style-type: none"> • Destruction / loss to natural capital and ecosystem services including wildlife, agriculture, fisheries, population and human health, and heritage assets.
Why the outcome is important	<ul style="list-style-type: none"> • As above
Opportunity or threat?	<ul style="list-style-type: none"> • Increase in global trade outside of EU may lead to greater biosecurity threat
Impact of the driver	<ul style="list-style-type: none"> • Nature of pests / diseases will change ecological communities and crops • Currently recognised pest and diseases will have eroded certain habitats / species affecting natural capital • Impact on landscape character and human health will occur • Changing attitudes towards wildlife and the natural environment and the measures required to mitigate / control the spread of pests and disease
Evidence needs	<ul style="list-style-type: none"> • Risk assessments for pests / diseases. • Establishing thresholds for implementation of control measures. • Modelling threats of pests / diseases • Implications of mitigation / control measures on wider ecosystem
Connections to other policy areas	<ul style="list-style-type: none"> • Environment, biosecurity, trade and transport, food and agriculture, public health

The Driver	New driver: Loss of agricultural soils
The Challenge	Soils have a fundamental role in our environment with extensive dependencies on other goods and services. Despite this, soils are not valued in our society and economy. We do not have enough knowledge about our soil and its diversity, quality and health, and policy around soil is currently weak or non-existent. Are we losing our soils? What are problems are there and what are we storing up for the future? Is this an issue that requires policy attention and interventions?
80 words	

Outcome of this driver	<ul style="list-style-type: none"> • Loss of fertile growing medium • Loss of stable soil structure • Infertile soils; reduce crop yields and nutrition • More easily eroded soils, • Soil in rivers and seas – sediment build up, siltation • Loss of carbon storage, organic content • Peatland not so good as a carbon store under climate warming
Why the outcome is important	<ul style="list-style-type: none"> • ‘Denial of mortality thinking’ – short term gain and not thinking ahead • Soils feed us – food security and the agricultural economy • Regulatory medium, e.g. carbon storage, pollutant sink • Land stability
Opportunity or threat?	<ul style="list-style-type: none"> • Threat
Impact of the driver	<ul style="list-style-type: none"> • Nature of problem will change • Less rain fed crops; more irrigated – problems around salination • Will we be so dependent on soils? E.g. growth of hydroponics, vertical growing systems? Where are we getting our protein from – less livestock? More in a vat? • Growth of bioenergy and feedstocks • May be using soils very differently • May become a yet more valuable resource
Evidence needs	<ul style="list-style-type: none"> • Soil quality measures • Soil health indicators – biological soil quality (soil microbial diversity) • Urban soils – do we understand them? • Soil as an asset – do we have enough information for soil natural capital accounting? • Soil monitoring • What works in different places for different soils? • No single solution – e.g. peatland different to sandy soils • Implications of soil friendly production on crops and agroforestry • New technology might be more soil friendly, e.g. precision farming (already here) and robotic farming • Time series data – need to see mitigation measures are working • Effects of sewage sludge on soils – heavy metal pollution, etc. (quality standards) • Do we need a soil policy?
Connections to other policy areas	<ul style="list-style-type: none"> • Agriculture; Environment; Urban environment; Waste; Water

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have an UNCERTAIN outcome

The Driver	19, 21, 24 (grouped under a Land use cluster) New driver: Patterns of land use will change as a result of competing demands and regional disparity
The Challenge	Brexit provides opportunities to develop new approaches to shaping local and national land use and management policy. There is an opportunity to develop a pattern of land use which optimises multiple benefits for society whilst recognising the sensitivity of regional and local character and needs, and builds resilience for future generations. This requires a better understanding of the dynamics of land use change and associated environmental impacts, and an understanding of decision making by people and organisations. A range of modelling and support tools are needed to enable evidence based decision making that takes into account competing demands, potential synergies and trade-offs.
102 words	

Possible outcomes	<ul style="list-style-type: none"> • Positive – optimise land use to respond to demands of the UK, achieves net gain • Negative – competing demands could lead to fragmentation and disparity, reducing natural capital and leading to unsustainable practice
Possible threats	<ul style="list-style-type: none"> • Competing demands resulting in degradation and loss of environmental value. • Lack of coherent policy (environmental, economic) etc. to support competing demands • Lack of tools / resources / evidence to predict future demands and develop a joined up policy approach • Loss of landscape, quality, character, and value. • Will the protection of land as defined in EU legislation continue?
Possible opportunities	<ul style="list-style-type: none"> • Optimise land use to ensure resilience beyond 2042 • Allows land use management to be driven by UK need, reflects local conditions and is responsive to evolving land practice • Engage people in understanding the value of land, establishing uses and protecting these • Better local rural economy through land use • Creation of attractive landscapes • Respect multiple land uses – needs a coordinated approach • Responsive and supportive planning system
Evidence needs	<ul style="list-style-type: none"> • What are the current land uses and condition? • Establish a database and a method of categorising value of natural capital / ecosystems. How do we prioritise natural capital / ecosystems? • How will the removal of EU subsidies impact land use? • What economic tools are required to support land use decision making processes? • Scenario modelling capability (economic, demographic, environmental changes) • What policy instruments are needed to create a resilient landscape?
Connections to other policy areas	<ul style="list-style-type: none"> • Land use planning policy • Economics / trade

7. Climate change, air quality and energy

Stats

- **15 drivers** mapped as more important for UK environmental policy in the future and having a certain outcome
 - The group prioritised 8 and discussed 4 in detail and wrote 3 100-word challenges (drivers 4 and 40 were clustered and considered together)
- **21 drivers** mapped as more important for UK environmental policy in the future and having an uncertain outcome
 - The group prioritised 10 and discussed 3 in detail and wrote 2 100-word challenges (drivers 11 and 24 were clustered and considered together)
 - The group also clustered driver 20 with the first two new drivers but did not complete the 100-word challenge task sheet.
- **3 drivers** mapped as being less important for UK environmental policy in the future and having a certain outcome. These drivers can be **parked**.
- **11 drivers** mapped as being less important for UK environmental policy in the future and having an uncertain outcome. It may be worth **monitoring** this drivers to determine whether – as the outcome becomes clearer – they become more important for UK environmental policy in the future.
- The group identified **3 additional drivers**
 - *Game changing new technologies*
 - *Relative costs of different energy technologies*
 - *Unexpected catastrophic events (e.g. sea level rise from permafrost melt or new local pollution)*

Drivers that are MORE IMPORTANT for UK environmental policy and have a CERTAIN OUTCOME	Challenge	Priority	Not ranked
2. Circular economy practices will become more widely used and change what society values		●	
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.	●		
5. Consumption is likely to increase steadily			●
8. Decarbonisation will significantly impact on policy formulation and implementation			●
12. Global population is likely to exceed 8.5 billion by 2030			●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development	●		
17. Improvements in farming techniques and technology will boost productivity and food security		●	
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040		●	
29. Smart cities and autonomous vehicles will change how we live and travel			●
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance	●		
38. The risk of interstate conflict will continue to rise			●
34. Poverty and social injustice is creating a disconnection between people and the environment		●	
39. The sale of petrol and diesel vehicles will be banned in 2040			●
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality	●		
46. There will be no magic bullet that eases pressure on the natural environment to provide food and energy			●

Drivers that are MORE IMPORTANT for UK environmental policy and have an UNCERTAIN OUTCOME	Challenge	Priority	Not ranked
1. Agricultural support payments are increasing, focussed on public goods			●
3. Citizen engagement is likely to become increasingly important across a range of policy areas	●		
7. Data analytics will enable sophisticated mapping of demand and supply			●
9. Demand for energy will continue to increase			●
11. Food security and water security will become significant challenges; perhaps even sources of conflict	●		
13. Global resource shortages (metals, nutrients for example) will begin to bite		●	
20. London and other major UK cities will continue to grow in size and population		●	
21. Lowland/upland land capability and use will face increasing and competing demands			●
23. New technology will continue have an impact on the natural environment			●
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs	●		
26. Pests and diseases will be more widely dispersed			●
27. Planning needs to be future proofed and more embedded		●	
33. The contribution that natural capital makes to UK growth will become more important			●
35. The economic centre of gravity will continue to move away from the west towards China and the east		●	
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process			●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit			●
45. The world economy will double in size by 2045			●
47. Waste will continue to increase and is likely to cause significant environmental challenges			●
48* Game changing new technologies		●	
49* Relative costs of different energy technologies		●	
50* Unexpected catastrophic events (e.g. sea level rise from permafrost melt or new local pollution)		●	

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have a CERTAIN outcome

The Driver	4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events. 40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality
The Challenge	Recent extreme events have raised public awareness of exposure to risk and expectations that action will be taken. Climate change is likely to increase the frequency and potentially magnitude of extreme events. While climate risks are largely identified, we still need to know how much adaptation we need and what form it should take. Research is needed to work with statutory agencies to understand what works and identify when resilience building ends and a change in practice is needed.
79 words	

Outcome of this driver	<ul style="list-style-type: none"> Climate change impacts e.g. flooding, heat stress, poor air quality, change in ecosystems
Why the outcome is important	<ul style="list-style-type: none"> Risks to coastal communities infrastructure, biodiversity, water supply See Climate Change Risk Assessment (CCRA2)
Opportunity or threat?	<ul style="list-style-type: none"> Threat, but some opportunities (e.g. new crops e.g. vines)
Impact of the driver	<ul style="list-style-type: none"> Could be ~10°C warmer (less dependent on emissions pathways to 2042) Sea level: increased effects ~3mm ↑ now and in future Heatwaves more frequent As a consequence: heat related deaths ↑ (unless adaption prevents) Coastal communities flooded more often More frequent interruptions to costal infrastructure and services Loss of coastal habitat Civil disruption – looting, etc. All depends on how much adaptation has happened
Evidence needs	<ul style="list-style-type: none"> What are effective climate change adaption solutions? When do they need to be implemented? What works (learning by doing)? What will people accept? Social equity issues from market failure – poor people are more vulnerable
Connections to other policy areas	<ul style="list-style-type: none"> Yes – many – housing, food, biodiversity, spatial optimisation of land use Urban areas – built/natural environment, Green and blue infrastructure

The Driver	15. Governments will continue to collaborate to address Climate Change and Sustainable Development; not just national governments, also cities and regions (para-diplomacy)
The Challenge	<p>Global consensus is thought to be the most effective route to environmental protection. We need evidence that initiatives such as the SDGs and international climate change frameworks are effective. How can multiple agencies deliver more than the sum of their parts at the local level, at pace and cost-effectively?</p> <p>We need an improved understanding of how environmental issues are treated in international institutions, and how these structures and processes could be optimised. This improved understanding of the politics, governance and other elements can help the UK government use its research base to deliver a better global environment.</p>
97 words	

Outcome of this driver	<ul style="list-style-type: none"> • Collaborative solutions, consensus on action to address CC and achieve SDGs, more rapid progress, better monitoring, commonly accepted research findings, pooling of resources, economies of scale, global cost-effectiveness (or improves cost-efficiency), increased international stability, dialogue within nation states as well as between nation states.
Why the outcome is important	<ul style="list-style-type: none"> • More likely to achieve global change at appropriate pace • Environment is a shared global good and needs to be treated at an international level • There is a wider impact on increasing stability
Opportunity or threat?	<ul style="list-style-type: none"> • Opportunity: we can contribute positively to global fora, maximise UK soft power • It is also important that we remain an international player • Showcase our environmental knowledge
Impact of the driver	<ul style="list-style-type: none"> • Actions to tackle climate change have been widely implemented, and embedded in the global economy • Significant progress towards achieving all of the SDGs and across a range of different economies • Financial support has been leveraged from international markets in this direction thanks to the global support and certainty of the policy framework • UK governance processes at the heart of other governance processes • Global consensus will make it easier for individual countries or sub-national governments to take meaningful action
Evidence needs	<ul style="list-style-type: none"> • Evidence of how new business models can work, e.g. closed-loop economy, climate change mitigation • Improved understanding of what the SDGs mean at the local level • Evidence to help actors at the local level integrate SDG commitments in local decision-making • Shared knowledge about practical elements of reaching SDGs across the global community, e.g. how can the smart city concept be effectively deployed, how can technology support conservation, etc. • Economic and other evidence on the benefits of a global collaborative space to encourage continued consensus and collaboration

	<ul style="list-style-type: none">• Options for reconfiguration of international governance institutions to improve facilitation of dialogue between different countries and enforce and support action.
Connections to other policy areas	<ul style="list-style-type: none">• Links with wider political issues e.g. nation building, stability, conflict etc.• This driver constitutes a wider strategic framing of most environmental issues and has a downstream connection with a wide range of policy drivers.

The Driver	30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance
The Challenge	<p>Joined-up policy is increasingly important post-Brexit to work with multiple partners and achieve multiple environmental policy outcomes.</p> <p>Fully joined-up monitoring and modelling from emissions through to impacts, will enable international bodies, governments, regulators, businesses and individuals to work together to improve the environment and quality of life.</p> <p>The UK needs to understand the strengths and weaknesses of current monitoring and modelling capability. The challenge is to develop robust, trusted technology and tools to develop an end-to-end understanding of emissions and their impacts, reducing climate change, improving air quality and delivering sustainable energy within the context of the sustainable development goals.</p>
100 words	

Outcome of this driver	<ul style="list-style-type: none"> Increasingly better informed about progress of cross sector policy and regulation Helping to inform development of new policy to maximise co-benefits and minimise risk More reactive to regulatory breaches
Why the outcome is important	<ul style="list-style-type: none"> Opportunity to monitor co-benefits and threats of different policy drivers (with the aim of a joined up approach to policy, avoiding mistakes of the past e.g. diesel cars)
Opportunity or threat?	<ul style="list-style-type: none"> Implications for international agreements and governance – ensuring data and comparable across regions; this is an opportunity for wider collaboration The full benefits of monitoring will only be realised if we are able to share data (and models) and that it is trusted across jurisdictions. Risk of implementing only policy that can be measured Following Brexit, it is likely that we will have to comply with multiple regulatory requirements due to bilateral agreements rather than operating through the EU framework
Impact of the driver	<ul style="list-style-type: none"> Empowering individuals and businesses to make the right choice (e.g. if they have access to real time measurements) through providing the tools for behaviour change. This works best when you combine the right regulation with reliable and cheap technology and societal attitudes. By using technology to help create joined up policy, creating clear and consistent messages with clear responses from consumers Provides the evidence base to support trade negotiations and compliance with international agreements
Evidence needs	<ul style="list-style-type: none"> Need to be able to link monitoring and models together Need a range of technologies to monitor a range of impacts of a given activity so we can join up policy across disciplines, e.g. impact of diesel cars on climate change, air quality and thereby health and agriculture; land use and land use change on food, bioenergy, ecosystem services, biodiversity, air quality and climate change. Developing and validating models to link information from monitoring, e.g. from tailgate emissions through to impact on human health
Connections to other policy areas	<ul style="list-style-type: none"> Yes – included above!

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have an UNCERTAIN outcome

The Driver	3. Citizen engagement is likely to become increasingly important across a range of policy areas
The Challenge	How can we capitalise on increased citizen engagement to improve our environment? In a more interconnected world, how can social media and other types of networking be harnessed as a power for good? How can UK citizens bolster the UK's position as a global leader in environmental protection post-Brexit? How can we create the frameworks in which all citizens are able – economically, politically and emotionally – to protect environment? Building a fully enfranchised society through a new form of social contract between the state and society for environmental change in central government will be a vital part of more democratic environmental protection.
101 words	

Possible outcomes	<ul style="list-style-type: none"> • How can domestic civil society help support the UK's position on environmental issues post-Brexit?
Possible threats	<ul style="list-style-type: none"> • Disenfranchised from environmental issues due to de-industrialisation (via other drivers such as automation, global competitiveness) • Distrust of government grows, leads to distrust or antipathy towards environmental change • Scapegoating of environmental issues due to disillusionment with centralised/elitist power • People with more choice and power may choose to do less environmentally friendly things to exercise individual decision-making power • Throwaway society exacerbates resource scarcity • Strong civil society can weaken the state and therefore might challenge the robustness of environmental mandate
Possible opportunities	<ul style="list-style-type: none"> • Enhanced power to local governments can empower individual citizens to interact with their local environment • Devolution to cities, regions and thus citizens can give greater control over the local environment • Opportunities for individuals to engage in new economic activity around new environmental functions • Opportunities for individuals to engage with technology to improve environmental change, e.g. mobility, managing heat supply • Environmental activism remains a powerful route to environmental protection; civil society can act as a global force for a common cause to fight for environmental protection.
Evidence needs	<ul style="list-style-type: none"> • How do people connect with local place, and how does this relate to their valuation of environment and willingness to take action on environmental protection? • How do people's experiences – immediate and otherwise – affect their willingness to take actions to protect the environment? • How do people interact with technology? What are their drivers for doing so? How do these new technologies contribute or otherwise to reducing emissions?

	<ul style="list-style-type: none">• How can employment opportunities in growth areas of the environment be shared with citizens – especially those who needs jobs? What are the skills that need to be developed to help citizens access these jobs?• What networks exist for sharing information? What is the architecture of social media to allow public participation in a way that allows for sharing of fact in the context of opinion?
Connections to other policy areas	<ul style="list-style-type: none">• For citizens to feel empowered and an effective part of environmental solutions, there needs to be a healthy relationship between governance structures, emerging economic processes and individual citizens. To achieve this healthy relationship requires action at a number of different policy areas (e.g. addressing economic stability, inequality etc.)• What other issues are closely related to environmental concerns of citizens, e.g. food security, energy prices, etc.?

The Driver	<p>20. London and other major UK cities will continue to grow in size and population</p> <p>Game changing new technologies</p> <p>Relative costs of different energy technologies</p>
<p>The Challenge</p> <p>? words</p>	[Not completed]

Possible outcomes	<ul style="list-style-type: none"> • The challenge of improving the environment and quality of life will increase therefore the need for good policy and regulation will increase.
Possible threats	<ul style="list-style-type: none"> • Opportunity and risk is how we translate EU legislation into UK law; public perception on these issues will be important • Accurate, reliable information is needed at all levels of society to inform people of the risks and benefits of decisions and to drive the most effective policy and regulations or responses to one-off events • Energy demand may be more concentrated but may be less per person • Greater impact of peak demand in 2042 • Potentially a constant lag in infrastructure (e.g. transport) due to high rate of growth. This creates technical and societal tensions and inefficiencies. In turn this makes sustainable development unachievable. National infrastructure implications on transmission networks and water/sewage systems – they may be unable to cope with concentration of demand. • Rural/urban split may become more pronounced – this may impact on split of funding, e.g. for climate change adaptation
Possible opportunities	
Evidence needs	<ul style="list-style-type: none"> • Infrastructure needs (labour, investment, timing) • Policy needs to be sufficiently flexible to encourage and respond to innovation
Connections to other policy areas	

The Driver	<p>11. Food security and water security will become significant challenges; perhaps even sources of conflict</p> <p>24. Patterns of land and marine use will need to change to meet the UK's food and energy needs</p>
<p>The Challenge</p> <p>100 words</p>	<p>The UK relies on home grown and imported food and patterns of production are not optimal, but Brexit presents an opportunity to change this. Because of climate change and competing land use pressures, this situation is likely to be worse without intervention to protect long term sustainability. We need research that explores scenarios and options to provide evidence for decision makers on what best to do where. Management for multiple use is required acknowledging that more people will live in increasing proximity to food and energy production systems. People will have higher expectations of good amenity value, air quality, etc.</p>

Possible outcomes	<ul style="list-style-type: none"> • Climate change brings opportunities for new crops etc., but also risks – pests, floods, water shortage. • But the UK may be relatively better than southern Europe • Post Brexit there may be different patterns of agricultural support
Possible threats	<ul style="list-style-type: none"> • Coastal water pollution from agriculture • Loss of grade 1 land to housing • Loss of low lying land to sea • Erosion of peat and other resources, etc. • →Increasing pressure
Possible opportunities	<ul style="list-style-type: none"> • Aquaculture • Agroforestry • High rise hydroponics • Rewilding of unproductive land • Use of land for flood storage
Evidence needs	<ul style="list-style-type: none"> • How to balance/optimize land use? • Tools to explore scenarios (play games) to meet needs for food & other ecosystem services incl. water at national scale • Innovative approaches to food production • How to use lowland peatlands in a sustainable way, e.g. Fens
Connections to other policy areas	<ul style="list-style-type: none"> • Yes • Water supply • Flood defences • Biodiversity • Housing

8. Overseas Territories & International

Stats

- **12 drivers** mapped as more important for UK environmental policy in the future and having a certain outcome
 - The group prioritised 7 and discussed 4 in detail, 2 as a cluster to produce 3 100 word challenges
- **16 drivers** mapped as more important for UK environmental policy in the future and having an uncertain outcome
 - The group prioritised 6 and discussed 2 in detail
- **14 drivers** mapped as being less important for UK environmental policy in the future and having a certain outcome. These drivers can be **parked**.
- **12 drivers** mapped as being less important for UK environmental policy in the future and having an uncertain outcome. It may be worth **monitoring** these drivers to determine whether – as the outcome becomes clearer – they become more important for UK environmental policy in the future.
- **7 drivers** were added:
 - *High seas closed areas/MPAs will increase*
 - *Aquaculture will be increasingly important to OT's economy*
 - *The UK and OT's will be leaders in research for environmental management*
 - *The relationship between health and well-being and the environment will become more important*
 - *Micro-plastics, waste pollutants and emerging contaminants have increasing impacts on marine ecosystems (Driver 47)*
 - *Ocean acidification and changes to ocean currents will have increasing impacts in marine ecosystems*
 - *Invasive alien species and diseases will be more widely dispersed and arrive more frequently (Driver 26)*

Drivers that are MORE IMPORTANT for UK environmental policy and have a CERTAIN OUTCOME	Challenge	Priority	Not ranked
3. Citizen engagement is likely to become increasingly important across a range of policy areas			●
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.		●	
11. Food security and water security will become significant challenges; perhaps even sources of conflict			●
13. Global resource shortages (metals, nutrients for example) will begin to bite			●
15. Governments will continue to collaborate to address Climate Change and Sustainable Development			●
19. Local economic performance around the UK will be uneven, leading to increased regional disparity			●
23. New technology will continue have an impact on the natural environment			●
26. Pests and diseases will be more widely dispersed			●
27. Planning needs to be future proofed and more embedded		●	
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance			●
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers			●
33. The contribution that natural capital makes to UK growth will become more important			●
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality	●		
47. Waste will continue to increase and is likely to cause significant environmental challenges	●		
50* UK and OT's will be leaders in research for environmental management			●
51* The relationship between health and wellbeing and the environment will become more important			●
52* Micro-plastics, waste pollutants and emerging contaminants have increasing impacts on marine ecosystems	●		
53* Ocean acidification and changes to ocean currents will have increasing impacts in marine ecosystems		●	
54* Invasive alien species and diseases will be more widely dispersed and arrive more frequently	●		●

Drivers that are MORE IMPORTANT for UK environmental policy and have an UNCERTAIN OUTCOME	Challenge	Priority	Not ranked
2. Circular economy practices will become more widely used and change what society values		●	
5. Consumption is likely to increase steadily			●
8. Decarbonisation will significantly impact on policy formulation and implementation			●
21. Lowland/upland land capability and use will face increasing and competing demands			●
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040		●	
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs			●
31. The average age of the UK population will be 42.9 years in 2045. 1 in 12 will be over 80	●		
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process		●	
44. The value of the UK's ecotourism markets is likely to increase	●		
48* High seas closed areas/MPAs will increase		●	
49* Aquaculture will be increasingly important to OT's economy			●

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have a CERTAIN outcome

The Driver	40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality
The Challenge	<p>Many of the UKOTs will be very seriously impacted by predicted climate change effects, leading to reduced environmental quality for terrestrial, marine and human life. These effects will likely be more serious than in mainland UK, requiring innovative and robust mitigation and adaptation technologies/strategies. Innovation in adaptation will be critical, as well as integrating climate models with socioeconomic understanding, research into cumulative impacts and risks, and a full range of associated understanding of epidemiology and habitat envelope modelling. The resulting outputs will have relevance to the UKOTs, but also to other nations in tropical and subtropical locations.</p> <p>98 words</p>

Outcome of this driver	<ul style="list-style-type: none"> • Reduction in land area • Loss of coastal areas and tourist developments • Required flood defences • Reduced quality of life
Why the outcome is important	<ul style="list-style-type: none"> • Massive economic implications
Opportunity or threat?	<ul style="list-style-type: none"> • Threat
Impact of the driver	<ul style="list-style-type: none"> • Reduced health including respiratory ailments • Loss of wellbeing • Reduced habitable environment • Increased mortality • Emigration • Greater impacts on remaining land area • Loss of biodiversity • Cumulative impacts
Evidence needs	<ul style="list-style-type: none"> • Integrating climate/ sea level modelling with socioeconomics and epidemiology • Cumulative impact and risk studies • Climate adaptation strategies • Habitat envelope modelling
Connections to other policy areas	<ul style="list-style-type: none"> •

The Driver	<p>47. Waste will continue to increase and is likely to cause significant environmental challenges</p> <p>52. Micro-plastics, waste pollutants and emerging contaminants have increasing impacts on marine ecosystems</p>
<p>The Challenge</p> <p>107 words</p>	<p>Waste disposal will need to diversify and scale up to cope with both domestic- and externally-driven increases in waste production. The impacts of uncontrolled increases in waste pose a number of risks to environmental and public health, prosperity and the local economy. The UK's commitments to meeting its biodiversity targets require a greater focus on assisting its overseas territories in their transition towards more environmentally sustainable practices and green economic development. Further research and innovation in supply chain analysis, industrial production, disposal systems, and ecotoxicology is needed to examine and implement forward-looking solutions. These steps will both reduce consumption and support moves towards a more circular economy.</p>

Outcome of this driver	<ul style="list-style-type: none"> • Waste disposal becomes increasingly difficult • Plastics on beaches and sea will continue to increase • Uncontrolled waste pathways
Why the outcome is important	<ul style="list-style-type: none"> • Relevant to UKOTs where storage is limited and capacity to transport is difficult • No economies of scale for waste management
Opportunity or threat?	<ul style="list-style-type: none"> • In a more 'global Britain' scenario, possible opportunity to refresh our understanding of what it means to be a UKOT • On site recycling is not possible without onward production pathways – hard to see an opportunity
Impact of the driver	<ul style="list-style-type: none"> • Economic • Unpredictable impacts, e.g. plastics carrying disease was unanticipated • Localised impacts but affect whole populations • Natural capital reduction – marine livelihoods affected • Tourism reduced – limits to economy • Public health, e.g. what would happen if antimicrobial resistance was caused by waste products?
Evidence needs	<ul style="list-style-type: none"> • Risk assessment • Supply chain analyses • Demonstration of consumer/public demand • New technology – industrial • Ecotoxicology
Connections to other policy areas	<ul style="list-style-type: none"> • Increasing waste will help drive efforts towards circular economy • Health

The Driver	26. Pests and diseases will be more widely dispersed 54. Invasive alien species and diseases will be more widely dispersed and arrive more frequently
The Challenge	There are frequent and widespread problems with invasive species and diseases threatening and displacing endemic species in the OT's, which potentially leads to loss of ecosystem services, and the reduced productivity of farm animals and crops, destroying farmers' livelihoods and causing socio-economic harm. Baseline research is needed on existing habitats, species and taxonomy and longer-term monitoring to understand the impacts and responses, e.g. to climate change. Some of this may be done using new technology such as drones and satellites imagery to understand environmental change.

85 words

Outcome of this driver	<ul style="list-style-type: none"> Increased extinctions, habitat destruction, impacts on human and animal health, impacts on ecosystem services, money to compensate for disease outbreaks
Why the outcome is important	<ul style="list-style-type: none"> Impact on farm animals and crops, devastation of native wildlife, human health and economic impacts Recognition that ornamental plants and animals that are non-native can have unforeseen impacts Time and effort needs to be put into bio-security measures Some invasive trees can take-over, preventing people visiting areas and stopping other fauna growing
Opportunity or threat?	<ul style="list-style-type: none"> Threat Loss of funding for EU invasive species project (South Atlantic RSPB project). Less knowledge transfer if research communities become more insular
Impact of the driver	<ul style="list-style-type: none"> More time and effort required in responding to new invasives/diseases and their impacts. This is exacerbated by climate change – especially if the climatic conditions become more favourable for introduced/naturally dispersed non-native plants and animals.
Evidence needs	<ul style="list-style-type: none"> Baseline research on existing habitats, species and taxonomy and longer-term monitoring to understand the impacts of climate change Using new technology such as drones and satellite imagery to understand environmental change Research on species, populations, communities and ecosystems to understand responses to impacts
Connections to other policy areas	<ul style="list-style-type: none"> Human health, economic growth, environmental protection policies. Climate change and land use policies.

Drivers that are MORE IMPORTANT for UK environmental policy in the future and that have an UNCERTAIN outcome

The Driver	31. The average age of the OT population is likely to increase and result in an ageing population
The Challenge	An ageing population in UKOTs may have major socio-economic impacts, because the consequence of a declining economy will drive up emigration, shift the focus of public services to social care, and rebalance priorities for environmental stewardship. These factors together increase the risks of loss of sovereignty, public order, and reduced emphasis on environmental care. Improved socio-economic modelling will be required to assess the economic impacts of demographic change and to predict changes in the valuation of natural capital, in addition to modelling the expected reduction in environmental degradation as consumption patterns and energy use fall.
95 words	

Possible outcomes	<p>Reduced commitment leads to:</p> <ul style="list-style-type: none"> • Poorer quality public services • Emigration of younger cohort – increases the problem • Economy goes into decline • Ability to care for environment reduced or lower priority
Possible threats	<ul style="list-style-type: none"> • Risk to sovereignty (a better offer comes along) and environment degraded by new owners • Societal priorities shift to care for the elderly • Budgetary conflict with environmental concerns • Economic decline, increase in poverty, short-term monetary degradation •
Possible opportunities	<ul style="list-style-type: none"> • Reduced impact on environment as population and economic activity declines
Evidence needs	<ul style="list-style-type: none"> • Demographic modelling • Valuing natural capital
Connections to other policy areas	

The Driver	44. The value of the UK's ecotourism markets is likely to increase
The Challenge	<p>The UKOT's economies rely increasingly on ecotourism. The impacts of Brexit include loss of EU funding for infrastructure projects and advice on sustainable tourism. To improve living standards new sources of funding and expertise are needed to maximise potential ecotourism benefits and protect and maintain the fragile habitats and species on which this depends. Research is needed to quantify the existing natural environment baseline and the possible impacts of increased visitor numbers by modelling the potential economic, social and environmental effects. Research may also be needed to see if the existing designations will still be fit for purpose.</p> <p>102 words</p>

Possible outcomes	<ul style="list-style-type: none"> •
Possible threats	<ul style="list-style-type: none"> • Exchange rates – the economic value of tourism to OT's • EDF money for infrastructure; will there be less for water, roads, energy? • More demand on natural resources (and imported) • EU funded OCTA will go – less access to human resources and advice, e.g. on sustainable tourism • No environmental regulation on cruise ships – invasive species/pollution threat • Less funding to protect iconic species • No baseline data from which to monitor impacts • Inappropriate (culturally/environmental) behaviours by tourists and those serving the tourism industry • Basic tourist expectations not met in ecotourism destinations – water, food, hotels, wifi and infrastructure. Or understanding of how local resources, crops could generate an income
Possible opportunities	<ul style="list-style-type: none"> • Rules on EDF funding gone or relaxed, allowing cheaper imports of resources from other places • Increased awareness of fragile habitats and the need to preserve as tourism asset • Tourists appreciate local cultures, support for natural environment • Signing up for global ecotourism certification schemes • Growth in ecotourism pushes up the natural environment on politician's agendas (dependent on individual views) • Investment from ecotourism companies • Time and bureaucracy over red tape on investment decisions removed • Focus on specific environmental issues – flagship projects, e.g. removal rats from South Georgia; Giant mice, Gough Island; blue iguana, Cayman Islands. • New partnerships – tourism students as future influencers • Join up between islands to showcase nature as a visitor experience • Multi-destination trips
Evidence needs	<ul style="list-style-type: none"> • Research on species and habitats to monitor the long term impacts of ecotourism • Market research on what tourists want • Understanding the aims and ambitions of current tourism bodies/government agencies • Social and cultural studies

	<ul style="list-style-type: none"> • Business opportunities based around local wildlife, linking up experiences • Best practice on tourism management e.g. Costa Rica? e.g. trails • Evidence – economic, social and environment of impacts on plants, animals and local people • Most effective methods of communication of research to inform behaviours
<p>Connections to other policy areas</p>	<ul style="list-style-type: none"> • Tourism policies, land use and economic planning • Environmental protection policies • Regulation of protected areas – IUCN key biodiversity areas, Ramsar sites • Money to deliver under international designations such as World Heritage Site (DCMS) • CBD • OT residents did not get to vote in the EU Referendum (except Gibraltar)

Annex 1: The workshop programme

1000	Introduction, aims and objectives
1025	Thinking about the future
1045	Mapping the drivers of UK environmental policy post Brexit
1215	Review and discussion of emerging issues
1245	Lunch
1330	Identifying future policy challenges
1530	Tea
1550	Plenary review of group findings
1630	Close

Annex 2: Attendees

- Alan Evans, National Oceanography Centre
- Alan Gray, The Centre for Ecology & Hydrology
- Alister Wilson, Waverley Consultants (Facilitator)
- Alyssa Gilbert, Grantham Institute for Climate Change and the Environment
- Andrew Pullin, Bangor University
- Andrew Wade, University of Reading
- Andy Jordan, University of East Anglia
- Andy Stott, DEFRA
- Angela Karp, Rothamsted Research
- Anwen Rees, EFRACOM
- Belinda Phillipson, DEFRA
- Catherine Wensink, UKOTCF (UK Overseas Territories Conservation Forum)
- Charlie Stratford, The Centre for Ecology & Hydrology
- Chris Cheffings, JNCC
- David Righton, CEFAS
- Diane Mitchell, NFU
- Frances Rowe, University of Newcastle
- Gemma Truelove, Natural Environment Research Council
- Geoff McBride, STFC
- Giles Golshetti, DEFRA
- Hannah Evans, ETI
- Hannah Fluck, Historic England
- Hannah Lacey, The Centre for Ecology & Hydrology
- Hannah Nelson, Highways England
- Harriet Orr, Environment Agency
- Helen Doran, Natural England
- Humphrey Crick, Natural England
- Jan Dick, The Centre for Ecology & Hydrology
- Jaqueline Wood, JPI Oceans, Research Council of Norway
- Jo Chamberlain, The Centre for Ecology & Hydrology
- John Newington, DEFRA
- Jonathan, RSPB
- Jonny Wentworth, Parliamentary Office of Science and Technology
- Julian Harlow, DEFRA
- Kaley Hart, IEEP
- Lucy Barnard, DEFRA
- Mike Morecroft, Natural England
- Mike Quigley, Natural England
- Paul de Zylva, Friends of the Earth
- Rebecca Lodge, Natural England
- Sasha Leigh, Natural Environment Research Council
- Stephen Bolt, Association of Inshore Fisheries and Conservation Authorities
- Steve Chaplin, Natural England
- Tom Nisbet, Forest Research
- Vicky Morgan, JNCC
- Vicky Pope, Met Office and Natural Hazards Partnership

Annex 3: The full set of drivers

The list of drivers presented to the workshop participants and the additional drivers created by the workshop participants

1. Agricultural support payments are increasing, focussed on public goods
2. Circular economy practices will become more widely used and change what society values
3. Citizen engagement is likely to become increasingly important across a range of policy areas
4. Climate change will continue to cause increased temperature and increased occurrence of extreme weather and seasonal events.
5. Consumption is likely to increase steadily
6. Cyber security will be a continuing threat to international security
7. Data analytics will enable sophisticated mapping of demand and supply
8. Decarbonisation will significantly impact on policy formulation and implementation
9. Demand for energy will continue to increase
10. Demand for greater regional and local autonomy will continue
11. Food security and water security will become significant challenges; perhaps even sources of conflict
12. Global population is likely to exceed 8.5 billion by 2030
13. Global resource shortages (metals, nutrients for example) will begin to bite
14. GM crops and animals are likely to become culturally accepted in the UK
15. Governments will continue to collaborate to address Climate Change and Sustainable Development
16. Governments will seek to achieve a global free trade agreement
17. Improvements in farming techniques and technology will boost productivity and food security
18. International investment in the UK will increase
19. Local economic performance around the UK will be uneven, leading to increased regional disparity
20. London and other major UK cities will continue to grow in size and population
21. Lowland/upland land capability and use will face increasing and competing demands
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040
23. New technology will continue have an impact on the natural environment
24. Patterns of land and marine use will need to change to meet the UK's food and energy needs
25. People will have increased mobility and job flexibility
26. Pests and diseases will be more widely dispersed
27. Planning needs to be future proofed and more embedded
28. Retailer power will drive farming systems
29. Smart cities and autonomous vehicles will change how we live and travel
30. Technology is likely to play an increasing role in regulation, both in monitoring and compliance
31. The average age of the UK population will be 42.9 years in 2045. 1 in 12 will be over 80
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers
33. The contribution that natural capital makes to UK growth will become more important

34. Poverty and social injustice is creating a disconnection between people and the environment
35. The economic centre of gravity will continue to move away from the west towards China and the east
36. The ecosystem approach, landscape-scale approaches, ecosystem services and natural capital frameworks will be significant components of the policy making process
37. The internet of things will change production processes and practices profoundly
38. The risk of interstate conflict will continue to rise
39. The sale of petrol and diesel vehicles will be banned in 2040
40. The UK and its Overseas Territories will not be immune from rising sea levels, flooding, heatwaves and poor air quality
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit
42. The UK will not retain exclusive fishing rights of the 200 mile exclusive economic zone post Brexit
43. The UK's reputation as a migrant unfriendly country will have an impact on jobs and wealth creation
44. The value of the UK's ecotourism markets is likely to increase
45. The world economy will double in size by 2045
46. There will be no magic bullet that eases pressure on the natural environment to provide food and energy
47. Waste will continue to increase and is likely to cause significant environmental challenges

New drivers:

- Game changing new technologies
- Relative costs of different energy technologies
- Unexpected catastrophic events (e.g. sea level rise from permafrost melt or new local pollution)
- High seas closed areas/MPAs will increase
- Aquaculture will be increasingly important to OT's economy
- UK and OT's will be leaders in research for environmental management
- The relationship between health and wellbeing and the environment will become more important
- Micro-plastics, waste pollutants and emerging contaminants have increasing impacts on marine ecosystems (Driver 47)
- Ocean acidification and changes to ocean currents will have increasing impacts in marine ecosystems
- Invasive alien species and diseases will be more widely dispersed and arrive more frequently (Driver 26)
- Failure to achieve WFD good water status
- High environmental standards and impact on food, farming and forestry
- Increased importance of human health and wellbeing
- Water security will become significant challenges; perhaps even sources of conflict
- Loss of agricultural soils
- Declining soil quality

Annex 4: Less important drivers

Less important and with an uncertain outcome

It is be worth monitoring drivers which map as less important for UK environmental policy in the future and having an uncertain outcome to determine whether they become more important for UK environmental policy in the future.

The table sets out the drivers mapped in this quadrant by each group.

	Food Farming Timber Forests	Water Fisheries Marine	Env't Conserv'n Wildlife	Climate change Air quality Energy	OTs
1. Agricultural support payments are increasing, focussed on public goods					●
6. Cyber security will be a continuing threat to international security					●
9. Demand for energy will continue to increase					●
10. Demand for greater regional and local autonomy will continue	●	●		●	●
14. GM crops and animals are likely to become culturally accepted in the UK				●	
16. Governments will seek to achieve a global free trade agreement				●	
17. Improvements in farming techniques and technology will boost productivity and food security		●			
18. International investment in the UK will increase			●	●	●
19. Local economic performance around the UK will be uneven, leading to increased regional disparity				●	
20. London and other major UK cities will continue to grow in size and population	●				
25. People will have increased mobility and job flexibility				●	●
28. Retailer power will drive farming systems				●	
31. The average age of the UK population will be 42.9 years in 2045. 1 in 12 will be over 80		●	●	●	
32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers		●		●	
34. Poverty and social injustice is creating a disconnection between people and the environment					●
35. The economic centre of gravity will continue to move away from the west towards China and the east			●		●

37. The internet of things will change production processes and practices profoundly				●	●
38. The risk of interstate conflict will continue to rise			●		●
39. The sale of petrol and diesel vehicles will be banned in 2040					●
41. The UK will agree more strategic approaches to environmental delivery through legislative reform as a result of Brexit					●
42. The UK will not retain exclusive fishing rights of the 200 mile exclusive economic zone post Brexit					●
43. The UK's reputation as a migrant unfriendly country will have an impact on jobs and wealth creation	●		●		
44. The value of the UK's ecotourism markets is likely to increase	●			●	
45. The world economy will double in size by 2045		●			●
47. Waste will continue to increase and is likely to cause significant environmental challenges	●				

Less important and with a certain outcome

Drivers which map as less important for UK environmental policy in the future and having a certain outcome - particularly if they map in more than one or two quadrants – may not be important for the project.

	Food Farming Timber Forests	Water Fisheries Marine	Env't Conserv'n Wildlife	Climate change Air quality Energy	OTs
2. Circular economy practices will become more widely used and change what society values			●		
3. Citizen engagement is likely to become increasingly important across a range of policy areas		●			
6. Cyber security will be a continuing threat to international security	●		●		
7. Data analytics will enable sophisticated mapping of demand and supply					●
10. Demand for greater regional and local autonomy will continue				●	●
12. Global population is likely to exceed 8.5 billion by 2030			●		●
13. Global resource shortages (metals, nutrients for example) will begin to bite					●
14. GM crops and animals are likely to become culturally accepted in the UK				●	●
16. Governments will seek to achieve a global free trade agreement				●	●
17. Improvements in farming techniques and technology will boost productivity and food security					●
18. International investment in the UK will increase				●	
19. Local economic performance around the UK will be uneven, leading to increased regional disparity				●	
20. London and other major UK cities will continue to grow in size and population		●			●
22. More than one quarter of the world's population will live with water scarcity on a daily basis by 2040			●		
25. People will have increased mobility and job flexibility	●	●		●	
28. Retailer power will drive farming systems				●	●
29. Smart cities and autonomous vehicles will change how we live and travel	●				●
31. The average age of the UK population will be 42.9 years in 2045. 1 in 12 will be over 80	●			●	

32. The continued decline in vertebrate species populations is part of a complex biodiversity picture creating winners and losers				●	
37. The internet of things will change production processes and practices profoundly				●	
43. The UK's reputation as a migrant unfriendly country will have an impact on jobs and wealth creation					●
44. The value of the UK's ecotourism markets is likely to increase			●	●	
46. There will be no magic bullet that eases pressure on the natural environment to provide food and energy		●			●