

# What do Forest Managers want to know about adaptation

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## Summary

Adaptation to climate change involves adjusting Forest Management to anticipate future changes. Starting to adapt woodland and forests to the changing climate now is important if owners and society wish to continue to benefit from the range of services they provide, capitalise on opportunities and manage risks. Management decisions taken today will influence, in part, the extent to which future forests are able to adapt to the changes occurring to the climate. Forest managers, woodland owners and practitioners face challenging decisions when thinking about planning up to and beyond the end of the century. They will have to navigate the projected changes in temperature, rainfall pattern, length of growing season and other as yet poorly understood or unanticipated changes. Integration of adaptation measures into forest plans and management plans will better prepare our forest and woodland resource for future conditions. Although some aspects of climate change remain uncertain, there is sufficient confidence over likely changes to inform management decisions. It is possible to start to implement a range of “no-regrets” adaptation measures.

The research reported here aimed to better understand what opportunities and barriers practitioners consider there are to implementing adaptive practice and what they want to know about the topic in order to direct future knowledge exchange activity. A series of practitioner workshops were conducted across the UK, to discuss a wide range of forestry topics and concerns. Active listening was undertaken at these workshops to collect evidence about owners/managers, including stakeholder concerns about the multiple aspects of adaptation to climate change, their information and knowledge needs, and their recommendations to improve adaptive practice.

The recommendations identified could support efforts to raise the quality and extent of adaptive practice undertaken by forestry practitioners and enhance the ability of UK forests to continue to deliver essential ecosystem services as the climate changes. For example, by: exploring opportunities to combine adaptation with more popular forestry related topics; identifying how to overcome practitioner concerns that prevent adaptive practice; and developing practical advice on climate change adaptation for forest and woodland managers. Such advice would, where possible, explain the circumstances under which adaptation is required. It would present the evidence base for climate change, explain that climate change adaptation is important, and signpost routes to information and tools about multiple adaptation measures.

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# 1. Introduction

A current understanding of what forest managers want to know about adaptation is presented in this report. We outline key adaptation concerns, before highlighting barriers and opportunities to improve adaptive practice. The primary purpose of this work is to understand how best to improve awareness and provide information about adaptation measures, and how future engagement activity with Forest Managers might be directed. Secondary to this, we draw out recommendations to encourage the integration of adaptation measures, to better prepare our forest resource for future climate conditions and to continue to deliver ecosystem services.

Forest and woodland owners, managers and forestry practitioners have an important role in directing management and operations to the end of the century. Decisions taken today will influence, in part, the extent to which future forests are affected by the changes occurring, such as increasing incidence and severity of drought, flood, tree pest and disease outbreaks and heightened risk of windthrow. Drier, warmer summers increase the risk of drought and fire and may reduce tree growth; those forests and woodlands with uniform-aged stands will be at greater risk than more diverse forests. However, there are new opportunities: less known species will become more suitable for the UK climate and where other factors such as water are non-limiting, there may be a temporary or permanent increase in tree growth for some species.

The UK Forestry Standard Climate Change Guidelines present a range of climate change adaptation measures that could be implemented, but responding to these presents a challenge for forest managers and other forestry professionals, because it adds complexity to planning, species selection and silvicultural practice. New planting needs to be suited to both current and anticipated future conditions. New approaches to forestry and woodland management are needed for existing woodland, so that threats such as increased risk of drought, fire, pests and diseases are addressed as far as they can be.

Adaptation to climate change involves actively adjusting forest management to anticipate future changes in temperature, rainfall, seasonality and extreme events. The aim of adaptation is to increase forest resilience by reducing exposure to risks in both forestry and other ecosystem services. Starting to adapt forests and woodland to the changing climate now, is important if society is to continue to benefit from the range of services they provide to wildlife, people and continue to produce timber for future generations.

## 2. Methods

The evidence base used to prepare this report was drawn from a data set of Active Listening notes, taken during four workshops involving 48 participants conducted as part of the process of developing the British Woodlands Survey 2017 (BWS2017 see Appendix 1). Active Listening comprises participant observation and close listening of the content and meaning of conversations, actively recording key points against a predefined set of research questions of specific interest. Using what was described as a 360 degree research and consultation process, the workshops invited participants to discuss a set of key themes and topics and then prioritise by ranking and scoring which were the most important to take forward into the next national survey. The participants in the workshops included commercial woodland owners, estate managers, owners of small woodlands and forest agents, as well as forestry researchers, policy makers and representatives of NGOs and membership organisations.

A wealth of information was recorded through Active Listening by social researchers observing each of the workshop discussion tables. Notes were summarised and organised around a set of structured Active Listening questions. Two of these questions were focused specifically on aspects of climate change. Active Listening picked up on the key points made by participants in their deliberations where they were related to:

- a. what participants, particularly woodland forest owners and managers, wanted to know about adaptation, and how this might vary between different kinds of practitioners
- b. any evidence of adaptive practice being undertaken by different owners and managers and what, if any, barriers woodland owners and managers experienced to implementing adaptive practices

Workshop notes were examined using content analysis to identify recurrent issues around the practical advice and key issues participants sought information and advice about. These notes were then coded for key phrases and concepts using Nvivo, a standard social science qualitative data management programme.

Results from the two datasets were tabulated to show:

- i. opportunities for, and barriers against adaptation measures
- ii. adaptation practice reported
- iii. what forest and woodland managers wanted to know about adaptation
- iv. opportunities for knowledge exchange activities reported and recommended during conversations

## 3. Results

### 3.1. Adaptation concerns

When adaptation was discussed, understanding of climate change and adaptation as a concept or topic was mixed. There was better awareness amongst forestry professionals and those working in a policy, research or managerial role. Owners of small woodlands appeared to be less aware.

Those participants involved in forest policy appeared to be well aware of adaptation and measures to adapt; furthermore, several expressed their views on what forest managers needed to be doing to adapt. Generally, those involved in forest policy accepted the climate was changing and didn't question if adaptation was required or not, they were comfortable with the concept and terminology around adaptation and clearly thinking about it as a topic. Some expressed concern that climate change adaptation was perceived as being too difficult or unrealistic and suggested that professionals needed information and management options to support adaptive practice. Several participants involved in policy suggested that species selection was the cornerstone of adaptation coupled with some reference to other adaptation measures such as genetic diversification and mixed age rotation (i.e. Continuous Cover Forestry -CCF).

There was a strong desire to better understand economic dimensions and implications of adaptation. The participants' logic appeared to be that in order to adapt to climate change, people need to plant alternative species and in order to choose these they needed advice and expertise on the financial implications, without which they would continue with business as usual. Those involved in policy thought that an understanding of the financial implications of adaptation would help enable businesses to diversify. The need for economic information expressed by those working in policy was also indicated by forest managers.

Similarly, there was consensus amongst a range of participants that it was the economic implications of adaptation, such as the financial impact of species diversification which were particularly important to understand. Overall, there was a strong desire expressed by a range of participants to know more about what other people are doing to adapt, how they're doing it and what their experiences are.

Woodland owners, land owners, forestry professionals and those in managerial roles had mixed views on climate change and if there was a need to adapt or not. Managers were generally more accepting than woodland owners of the need for adaptation. However, several participants stressed a need to show people that climate change is actually happening, as a means to encourage adaptation. As one forestry professional expressed it:

*"there are still people who still believe it's not happening!"*

and as another woodland manager explained

*“if people think it’s [i.e. climate change] untrue they’ll resist doing anything”.*

Professional managers expressed concern that planning adaptation measures using decision support tools (DST) could slow down decision making, and that professionals needed years of experience in order to start making decisions about adaptation. One professional explained that they only consider planning for climate change at a client’s request or when their client has a particular interest in climate change. Several owners of small woodlands expressed a strong desire for information tailored towards their context and suggested that a lack of such information was a significant barrier to their adaptation actions. One person explained that owners of small woodlands need information to reflect the scale of their woodland and wanted to know how to plant and what to plant to ‘future proof’ their woodland, as they put it:

*“everything out there [on climate change] is for commercial ... [purposes] for the big boys”.*

## 3.2. Topics of interest

Forest managers and others raised a number of topics within the adaptation theme about which they wanted to know more (see Table 1). In particular:

- a) under what circumstances they should adapt
- b) how to give weight to adaptation in management decisions
- c) an interest in what others were doing, how and what their experiences are
- d) advice on ‘doing’ adaptation
- e) economics and financial implications of adaptation (particularly species diversification).

**Table 1. Opportunities and barriers to adaptation and topics raised.**

<b>Opportunities</b>			
<i>Theme</i>	<i>Findings</i>	<i>What did participants want to know about adaptation?</i>	<i>Observations</i>
Management Priorities	Greatest awareness of species diversification as the main adaptation measure compared to other options, despite role or experience.	How to give weight how to adaptation in management decisions and what species to plant.	
Communication	Combining adaptation with other interests of greater concern may help raise interest in the topic.  Explore opportunities to combine topics to spark interest in adaptation.	There was mixed interest in adaption as a management concern. When other topics were prioritised they were sometimes linked back to adaptation, particularly pest and disease risk, genetic diversification and provenance.	Awareness of pest and disease and climate change risks are greater than adaptation. Interest in genetic diversification and whether to use more southerly provenances or not.
Communication	Use case studies to tap into a strong interest in what others are doing to adapt, their experiences and financial implications of adaptation.	Forestry Professional <i>“Are others adapting? If so how? And what are peoples experience of adaptation, e.g. are rotation lengths coming down?”</i>	Theories from environmental psychology suggest that people are more likely to act if they’re aware others in their sphere are already doing so.
Understanding adaptation	Put risks from climate change and adaptation into real, long-term time horizons.	There was some interest in what impacts will happen when.	Interest in what risks and opportunities are on the horizon. Opportunity to direct people to action-expiration charts.
Specific adaptation measures: Species diversification	An interest in non-natives and species diversification. Opportunity to use non-natives as a hook to raise awareness that species diversification is only one of many adaptation measures.	Commercial practitioners in particular were interested in non-native species where these are expected to perform well in future.	Fits with findings of Hemery <i>et al</i> 2015.
Awareness and perception of adaptation	Opportunity to raise awareness of adaptation as a concept amongst non-professional forestry audience.  Opportunity to identify how to overcome concerns that planning adaptation will slow down decision making and that you don’t need lots of experience to start adapting.	Found that for some non-professionals, adaptation isn’t yet a ‘concept’ however, it did crop up within discussion about other topics, including a) pest and diseases, b) future proofing, c) species choice and d) bottom up approaches.	Mixed understanding of adaptation as a concept. Recognition amongst professionals that adaptation is an important concept. However, concerns that planning adaptation slows down decision making and that you need lots of experience to start making decisions about adaptation.



<b>Barriers</b>			
<i>Theme</i>	<i>Findings</i>	<i>What did participants want to know about adaptation?</i>	<i>Observations</i>
Advice	Lack of practical advice for managers.	Practical advice on adaptation, particularly to woodland owners and managers.	Participants reported a lack of practical advice for managers and a need for this.
Awareness of climate change and adaptation	Include evidence that the climate is changing in knowledge exchange activity alongside description of adaptation as a concept with time horizons for local species outlined.	Perception that there are still practitioners who deny climate change is happening and some woodland owners who are unfamiliar with adaptation as a concept.	
Support to adapt	Financial implications of climate change and adaptation and any support measures were a common concern across participants.	What financial support is available to adapt. What are the financial implications of climate change and implementing adaptation measures?	Identify opportunities to signpost to financial support mechanisms for adaptation or tools to inform them of financial implications of climate change and implementing adaptation measures. Develop case studies which show financial implications of diversification.
Commercial Implications	Perception that adaptation mainly concerns species diversification.  The message that 'species diversification' can be used to adapt is better understood than other options.	What are the commercial opportunities and constraints of species diversification?	Opportunity for the knowledge exchange activity to present information or sign post to information on new markets?  Participants interpret adaptation as meaning species diversification and suggested that because there are constraints on what you can sell commercially, it limits the extent to which you can adapt.
Attitudes and delegated responsibility	Opportunity for knowledge exchange activity to explain a) the opportunities and benefits of adaptation and b) touch on how science, policy and practitioners can work together to implement and support change.		One woodland owner thought that those who undertake research and set policy are responsible for interpreting how to adapt to climate change. Is this attitude reflected more widely across forest owners and managers?
Awareness and perception of support tools	Need to better signpost decision support tools alongside case studies – clearly demonstrating how results were interpreted to overcome barriers to their use.	Indirectly suggested that Forest Managers may benefit from understanding a) who and at what scale to adapt b) when to apply information on adaptation and b) how to interpret results from support tools such as Ecological Site Classification (ESC).	Perception that ESC is not suitable for their woodland because it's too large, small or would slow down decision making process. Uncertainty about the applicability of results and how to interpret results.

### 3.3. Were people doing anything to adapt?

There were very few examples of adaptation practice mentioned. Those who described things they were doing to adapt were typically 'informed respondents' with an appreciation of how the climate has changed and predicted changes in the future. The main examples described were planting of alternative species which were considered to perform better under future climate conditions, as one land owner explained,

*"I planted eucalyptus for climate change adaptation, well, [for] resilience really".*

The other examples of work to inform forest management activity was the use of the decision support tool 'Ecological Site Classification' (ESC) to identify the yield class of various species under future climate conditions and the consideration of sourcing and planting more southerly provenances in Scotland and England.

## 4. Recommendations

The responses suggest that those with a good knowledge of forestry, woodland management and climate change placed more importance on adaptation and were more likely to be thinking about how to adapt, mainly through species diversification. Those less informed participants were less likely to be concerned. Knowledge exchange activity and decision support, such as an adaptation manual could effectively serve to address this gap, by raising awareness of the need to take adaptation into account when considering future forestry and woodland management and providing examples and options. Knowledge exchange activity could:

- Raise awareness of adaptation as a concept amongst non-professional forestry audience and explain why adaptation is necessary.
- Explore opportunities to combine topics to spark greater interest in adaptation. A strong interest in the use of non-natives, genetic diversification and whether to use more southerly provenances or not could serve as a hook to raise awareness that species diversification is only one of many adaptation measures.
- Explain risks from climate change and contextualise adaptation in real, forestry relevant long-term time horizons, to improve understanding that climate change is ongoing and therefore adaptation measures need to be flexible.
- Use case studies to tap into a strong interest in what others are doing to adapt, their experiences and, where possible, the financial implications of adaptation.
- Help to overcome concerns that planning adaptation for forestry and woodland will slow down decision making and to show that people don't need to be experts to start to benefit from implementing adaptive measures.

It is evident that there is a strong need for practical advice on climate change adaptation for forest and woodland managers. Knowledge exchange should:

- Explain the circumstances under which adaptation is required
- Highlight the strong evidence base for climate change and explain that climate change adaptation is important concern.
- Describe adaptation as a concept with associated time horizons for woodland.
- Outline multiple adaption measures and explain how they can reduce the risk of climate change to forests and woodlands. Stress that species selection and diversification is only one of a number of measures.
- Signpost to, or include detail about the financial implications of climate change and adaption and any financial support to underpin change.
- Describe opportunities, barriers, costs and benefits of adaptation measures
- Signpost to information and decision support tools e.g. SilviFuture and ESC.
- Use case studies to demonstrate how the results of using decisions support tools were interpreted (to help overcome barriers to their use). Where possible describe 'bottom up' approaches.
- Identify and communicate ways in which researchers, policy makers and practitioners can work together to implement and support change to increase adaptive practice.
- Build on the information provided in BWS2017 in order to measure changes in practice and the implementation of adaptation measures.

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# Appendix 1. Context for the research

## **Adaptation Manual for Forest Managers**

Forest Research started to deliver the current four-year, Science and Innovation Strategy for Forestry in Great Britain in April 2015. Within this major multi-programme strategy, the delivery of resilient forests forms the focus of Programme 3, led by Dr Ian Willoughby. This programme includes a Work Package on 'Silviculture and resilient forests', led by Dr Gary Kerr which includes a Work Area focused on Demonstrating Adaptation (to climate change), led by Dr Gail Atkinson. The aim is to 'develop forest-scale climate change adaptation demonstrations in order to provide real-world examples of where forest adaptive management and planning can help reduce the impact of changing climate conditions and improve resilience'. One component of this activity is the delivery of an Adaptation Manual for forest managers. The Adaptation Manual will be a significant output from Programme 3 in 2019 and it is important that the content reflects what people who are involved with the management of forests and woodlands need to know about adaptation so that the manual can provide information on how to design, cultivate and manage adaptive resilient and productive woodland in the face of climate change. The purpose will be to stimulate incorporation of adaptation measures in woodland management.

This contribution from Forest Research aims to address the research concerns:

1. Better understand what people want to know about adaptation and how does this vary between particular practitioners, forest managers and those involved in policy.
2. Identify barriers and examples of activity to increase adaptive practice to the changing climate.

## **British Woodland Survey 2017**

The British Woodlands Survey is co-ordinated by Sylva Foundation. BWS2017 was a collaborative project between Forest Research, Sylva Foundation, University of Oxford, and the Woodland Trust, with funding provided by Forestry Commission Scotland, Scottish Forestry Trust, and the Woodland Trust. The collaboration set out to identify the main 'Themes' of the 2017 survey, through an iterative series of four stakeholder workshops across the UK. The aim of identifying themes through the workshop series was to ensure the survey focuses on the most important issues of our time. The workshops were attended by a cross section of representatives from the forestry sector, including woodland owners and managers. Members of several research groups at Forest Research attended the workshops to assess the effectiveness of the approach adopted and to ensure academic rigour. The workshops provided an opportunity to simultaneously better understand participants views on 'climate change adaptation' to underpin future Forest Research knowledge exchange activity with forest managers outlined above. The research presented concerns work undertaken in relation to the questions above only.

Forest Research is the Research Agency of the Forestry Commission and is the leading UK organisation engaged in forestry and tree related research. The Agency aims to support and enhance forestry and its role in sustainable development by providing innovative, high quality scientific research, technical support and consultancy services.

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