

The Forestry Commission Science and innovation strategy for British forestry 2010-2013

Foreword

Much has changed since the launch of the first Science and Innovation Strategy in 2005. Climate change, energy security, and eco-system health and resilience are now even more important for the rural economy in Great Britain. Never before has forestry had the opportunity to make such a significant contribution to government priorities in England, Scotland, and Wales, whether it be securing a healthy natural environment and dealing with environmental risks, or promoting a sustainable, low-carbon and resource-efficient economy.

The strategy acknowledges forestry's key role in both mitigating, and helping our environment to adapt to climate change. It recognises the need to provide greater research effort to address the problems caused by ever increasing numbers and varieties of pests and diseases, which can harm our trees. And it seeks to ensure that the supply of raw material from British forests for conversion to carbon sequestering products, or carbon-lean fuels are fit for purpose.

As both a regulator and a forest manager, the Forestry Commission has a need for high quality, leading science research and innovation to support a rapidly evolving policy and practice agenda. Much is now understood about producing the raw materials, with which industry can deliver a healthy and sustainable economy. However, the knowledge of the complex natural processes involved in forest and woodland management is still developing. Similarly emerging is the nature of forestry's relationship with wider society, and through it the provision of tangible benefits of value to us all.

We very much welcome this new Science and Innovation Strategy, which reflects the Forestry Commission's priorities. It recognises that truly effective science is best achieved through strong and enduring partnerships, both across government, and with other stakeholders. Lastly, there is a strong commitment contained within it to communicating the results of the Forestry Commission's research. This is on the basis that science, no matter how good, needs to be properly communicated to enable knowledge to be exchanged for the benefit of everyone.



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Executive summary

This refresh of the Science and Innovation Strategy details how the Forestry Commission will apply its financial, scientific and technical capability through research into forestry and woodland matters to support the development of policy and the delivery of its objectives. In doing this we will comply with the Government's approach to the management and use of science, research and engineering in government¹.

Forestry policy is a fully devolved responsibility of the separate administrations in England, Northern Ireland, Scotland and Wales, and continues to develop in distinctive ways. As a reflection of this, research relationships with the Northern Ireland Forest Service will be formalised through a memorandum of understanding.

The UK government and the devolved administrations have adopted the principles of sustainable development to underpin their policies as detailed in the UK's shared framework for sustainable development *One future – different paths*². Our research will be guided by the common purpose and principles adopted in the framework and contribute to a range of priority areas

A common requirement for all countries is efficient and sustainable forestry practice, which integrates effectively with other rural and urban land-uses and wider government policies. In the research arena, this should be reflected in multi-disciplinary research and, above all, in partnership-working. We will therefore work in partnership with other organisations, through fora such as the Environmental Research Funders Forum, to enable the delivery of our objectives and assist the delivery of wider objectives of government and society.

The countries have endorsed *The UK Forestry Standard*³, which provides the framework for policies and practices to deliver sustainable forest management and sets the standards by which progress towards it can be measured. The outcome sought by the Standard is an enduring forest and woodland estate that serves the social and economic needs of communities while providing robust, diverse, and resilient woodland ecosystems in tune with the wider environment.

The scope of forest research is from horizon scanning, strategic sometimes long-term research and monitoring in support of policy, to technical development in support of practice. However, we will ensure that a major cross-cutting thread for our research will be the role that forests and woodlands can play in helping society adapt to, and mitigate, the impacts of climate change. We will invest public funds in forestry and woodlands research to provide the evidence base for the development and delivery of policy. This will ensure that the UK's forests and woodlands are able to maximise their contribution to the social and cultural development of communities through research into:

- the maintenance of a diverse, healthy, and resilient environment;
- people's enjoyment of the countryside, both rural and peri-urban;
- efficient utilisation of forest products to maintain and improve economic competitiveness

¹ www.dius.gov.uk/~media/publications/GO-Science/GO-ScienceSEG

² *One future – different paths: the UK's shared framework for sustainable development*. March 2005. Available from www.sustainable-development.gov.uk.

³ www.forestry.gov.uk/forestry/infid-5yyezz

Executive summary

Section 1 sets out our science and innovation programme. **Chapter 1** outlines the purposes of this Strategy and the outcomes it aspires to deliver. The three core purposes are:

- To provide a firm base of scientific evidence for effective policy and practice
- To ensure effective dissemination of knowledge
- To develop a cadre of forest researchers characterised by excellence and connectivity to the wider scientific community.

In **chapter 2** we outline the key themes supporting our research. These need to address both current and emerging issues with climate change being the most significant. Over the next five years we will give a higher priority to monitoring and biosecurity research particularly with regard to tree health. This is increasing in importance as the impacts of climate change manifest themselves in a range of new pests and pathogens. We will also continue to gradually increase our spend on climate change, forest products and research into innovation and new markets. This will mean that other programmes will have to reduce, but we will maintain a strategic focus on all areas to ensure that research spend reflects the key priorities for research needs in the forestry and woodlands sector.

Research and innovation are often seen as the same thing. However, the process of creating innovation from research is complex, and often demanding. **Chapter 3** details how we propose to address this.

Arrangements for monitoring our science and innovation are outlined in **Chapter 4** and are accompanied by a detailed series of measures in the appendix.

Section 2 deals with our delivery mechanisms. Communication and integration of research are two fundamental areas for the Strategy. We believe that we have improved in both these areas over the last five years, but acknowledge that there is more we can do. **Chapter 5** on communication identifies eleven ways in which we will deliver this. Key among these are commitments to devote more resources in this area, to continue to deliver the very effective face to face communication between researchers and stakeholders, and to make better use of diverse media and targeting.

Finally, in **chapter 6** we detail how we commission our research. The Commission's Research Agency, Forest Research, will continue to be our main source of research and scientific advice and will receive approximately 90% of the Commission's science budget to support its activities in this role, including those of knowledge transfer. We will deploy the remaining 10% of our science budget to:

- promote understanding of sustainable forest management in the wider research community;
- engage in partnerships with other funders;
- secure specialist expertise and competencies not available from Forest Research;
- maintain expertise in external centres of excellence where key competencies and facilities are of strategic importance to UK forestry and woodland management; and
- benefit from alternative perspectives.

Equality Impact Assessment

This strategy has been screened and does not require a full Equality Impact Assessment.

Section 1: Science and Innovation

1. Our vision for forest research in GB

Our research will:

- **support evidence based policy making,**
- **stimulate innovation and forward thinking in policy and practice**
- **deliver increased benefits to society**
- **improve the skills of our research base.**

1.1. The strategic context

This Science and Innovation Strategy details how the Forestry Commission will apply its financial, scientific and technical capability through research into forestry and woodland matters to support the development of policy and the delivery of its objectives. In doing this we will comply with the Government's approach to the management and use of science, research and engineering in government⁴.

The UK government and the devolved administrations have adopted the principles of sustainable development to underpin their policies as detailed in the UK's shared framework for sustainable development *One future – different paths*⁵. Our research will be guided by the common purpose and principles adopted in the framework and contribute to a range of priority areas. These relate to the key priorities of the devolved administrations as shown in Figure 1 below.

Forestry policy is a fully devolved responsibility of the separate administrations in England, Northern Ireland, Scotland and Wales, and continues to develop in distinctive ways. **As a reflection of this, we will formalize our research relationship with the Northern Ireland Forest Service through a memorandum of understanding.** A common requirement for all countries is efficient and sustainable forestry practice, which integrates effectively with other rural and urban land-uses and wider government policies. In support of this, the countries have endorsed *The UK Forestry Standard*⁶, currently undergoing consultation following revision. The Standard provides the framework for policies and practices to deliver sustainable forest management and sets the standards by which progress towards it can be measured.

⁴ www.dius.gov.uk/~media/publications/GO-Science/GO-ScienceSEG

⁵ *One future – different paths: the UK's shared framework for sustainable development*. March 2005. Available from www.sustainable-development.gov.uk.

⁶ www.forestry.gov.uk/forestry/inf-d-5yyezz

Similarly, climate change is a cross cutting issue for all administrations, and the Read report⁷ emphasized the need for a concerted programme of research aimed at both mitigation and adaptation.

The forest industry in the UK operates in a global market, and its research interests are reflected in both the European Forest Technology Platform Strategic Research Agenda and the associated UK National Research Agenda. These provide a useful statement reflecting a consensus across the European forest industries regarding research priorities, which this strategy acknowledges.

Figure 1. How the strategy relates to wider UK and devolved administration outcome indicators

UK Framework Indicators	Scotland	Wales	Research Programmes
Resource use	Wealthier	A Prosperous Society	Forest Products and resources
Economic output			Inventory and forecasting
Waste			Sustainable forest management
Greenhouse gas emissions	Greener	A Sustainable Environment	Climate Change
Ecological impacts of air pollution			Monitoring and biosecurity
Environmental equality			Ecosystems and biodiversity
Bird populations			
River quality			
Education	Smarter	Learning for Life	Social, Economic Development & Urban Greening
Health inequality	Healthier	A Healthy Future	
Well being			
Employment	Fairer	A Fair and Just Society	
Social justice			
Active community participation		Living Communities	

It should be understood that this strategy represents the demand side of research commissioning. Forest Research is currently reviewing its own science strategy, which represents the supply side, and addresses more of the governance and human resource issues required to support delivery. Thus the two documents complement each other. The annual actions to deliver the strategy will be published separately, as will an annual report on progress. This structure will improve transparency, and provide greater currency.

⁷ <http://www.forestry.gov.uk/forestry/inf-d-7y4gn9> or www.tsoshop.co.uk/bookstore.asp?FO=1159999

1.2. Public funding of forestry and woodlands research

The UK has a well-established commitment to the development of evidence-based policy. Thus policy-related research is a key function of government and its non-departmental bodies. The Forestry Commission both at the GB level, and in the devolved forestry administrations, contributes to research and policy development and delivers policy through our support for forest and woodland owners and managers. In addition, the separate administrations have taken the view that effective delivery of policy requires a substantial national forest estate, currently 29% of UK forest area⁸. We therefore share the needs of private forest owners for well-founded research.

Woodlands are now a major feature in the British landscape (they cover 12% of UK land area⁹), and their management can have a major impact on the overall quality of the biological and physical environments. They also deliver many public benefits and make a significant contribution to the UK economy from the value that is added to forestry goods and services. For example, the wood-processing industry is internationally competitive, regional economies benefit from a wide range of tourism facilities, and forest screening increases the value of land for development. Becoming increasingly well known are the ways in which forests can help mitigate climate change, and provide means of flood management control with direct relevance to both the rural and urban environments. Though often external to the forests themselves, these benefits depend upon the continued existence of sustainably managed forests.

The challenge facing the forestry and woodlands sector is to increase the net value of benefits that our forests can deliver. The objective of this Strategy is to provide the knowledge to address this challenge, and ensure that it is used by policy makers, by forestry and woodland owners and practitioners, and by users of forestry goods and services. **In pursuing this objective, we will work in partnership with other organizations, and government departments to optimise the efficiency of our research commissioning.**

1.3. Our strategic outcomes and objectives

Our science and innovation strategy for British forestry will improve the resilience, competitiveness, sustainability, and public benefit delivery of the UK forestry sector by achieving the following outcomes:

⁸ Forestry Statistics 2008 Table 1.1. www.forestry.gov.uk/statistics

⁹ Forestry Statistics 2008 Table 1.2. www.forestry.gov.uk/statistics

Purpose 1. To provide a firm base of scientific evidence for effective policy and practice	
Outcomes	
1.1 Woodlands contribute fully to a healthy, diverse, and resilient environment. <i>Activities:</i> - Improved knowledge about climate change adaptation and mitigation - New research into ecosystem management - Clear guidance on sustainable soil and water management	1.2 The UK Forestry Standard is founded on a good understanding of how sustainable forestry can be achieved and is widely recognised as such. <i>Activities:</i> - Monitor and improve the effectiveness of The UK Forestry Standard and associated guidelines - Add to the suite of guidelines as new information becomes available - Review best practice from elsewhere
1.3 Scientific knowledge and understanding of sustainable forestry is advanced. <i>Activities:</i> - Climate change – understanding adaptation and forestry's contribution to mitigation - Identification of and addressing gaps in knowledge - Commission a wide range of research from FR and external providers - Utilising other research to improve our own knowledge (e.g. land use research)	1.4 Woodlands are able to maximise their contribution to the social cohesion and cultural development of communities. <i>Activities:</i> - Research into the social and cultural heritage of woodlands and forests - Urban woodland research
1.5 The importance of economic, social, and environmental outcomes is reflected in research programmes. <i>Activities:</i> - Research to support sustainable forest management and integrated land use - Addressing the challenges posed by biosecurity threats - Research into timber properties and wood products to enhance sector competitiveness and economic contribution	
Purpose 2. To ensure effective dissemination of knowledge	
Outcomes	
2.1 All interested parties have access to the conduct and results of forestry research in the UK. <i>Activities:</i> - Transparent commissioning procedures for research are adopted; - Develop improved mechanisms for encouraging wider stakeholder engagement - Facilitate the transfer of knowledge and technology to our stakeholders by improving the way we communicate our research	2.2 Highly effective knowledge delivery mechanisms. <i>Activities:</i> - Dissemination by a variety of different mechanisms - Improved monitoring and evaluation of processes - Effective translation of research into policy and operational guidance.
Purpose 3. To develop a cadre of forest researchers characterised by excellence and connectivity to the wider scientific community	
Outcomes	
3.1 Greater understanding is fostered through research partnership and collaboration <i>Activities:</i> - Undertaking European partnership and integrated land management research projects - Encouraging secondments to other research establishments - Extensive research network development - Researchers connected to policy makers and practitioners	3.2 Increased connectivity to other government science groups through Head of Science and Engineering Profession membership <i>Activity:</i> Increase membership of the Government Science and Engineering community by FC and FR scientists and engineers
3.3 Improved and more proactive support for PhDs <i>Activity:</i> An annual open call for PhDs by Forest Research and CFS, supported by partner organisations	

1.4. Looking ahead

The nature of forestry means that many of its social, environmental and economic outcomes require a long-term perspective. This requires research capacity to look ahead and around. Thus, our research has to be guided by an intelligent vision about the forces that will shape UK woodlands over the next 50 years, to enable them to best serve the changing demands society will place upon them. Horizon scanning, as defined below, is important in helping Government to develop policies based on evidence and futures analysis.

'The systematic examination of potential threats, opportunities and future developments, which are at the margins of current thinking and planning. Horizon scanning may explore novel and unexpected issues as well as persistent problems or trends. Overall, horizon scanning is intended to improve the robustness of policies and evidence base.'

The Government's Foresight Programme¹⁰ led from the Government Office for Science within the Department for Business, Innovation & Skills has, since 2002, carried out in-depth projects using cutting-edge science combined with futures analysis to address long-term cross-cutting opportunities and challenges. **We will increase our participation in this programme.** Delivered projects with relevance to forestry include *Detection and Identification of Infectious Diseases* and *Flood and Coastal Defence*. New ones are investigating *Global Food and Farming Futures*, *Land Use Futures*, and *Sustainable Energy Management and the Built Environment*. In addition, the challenges posed by the

The value of Foresight projects to our strategic research planning has been confirmed by the Flood and Coastal Defence project that reported in April 2004. The development of 2050 and 2080 scenarios, and examination of 'soft engineering' approaches to flood management have been built into policy and have important implications for rural land management. Outputs from the project have strengthened or initiated several cross-government research programmes in which we are either participating directly or taking a strong external interest.

UK Climate Change 09 (UKCC09) predictions will be an important part of our foresighting approach. Horizon scanning in forestry and woodlands should be a cross-cutting activity with other government agencies, which may already have developed alternative land-use and society scenarios for the future. This is because we believe that forestry's impact on society is best reflected by the success of integrating forest policies with those governing other land-uses, as well as with environmental and social policies. **To encourage this, we will participate in the network of scientific experts and stakeholders, which works closely with the Foresight project teams.**

¹⁰ The Foresight programme and projects within it are described on www.foresight.gov.uk.

The outcomes of this strategy are strongly influenced by the strategic priorities of the devolved administrations. These are detailed in:

- England's trees, woods, and forests¹¹
- The Scottish Forestry strategy¹²
- Woodlands for Wales¹³ – The Wales woodland strategy
- Northern Ireland Forestry - A Strategy for Sustainability and Growth¹⁴

¹¹ www.defra.gov.uk/wildlife-countryside/forestry/strategy.htm

¹² www.forestry.gov.uk/sfs

¹³ www.forestry.gov.uk/wwstrategy

¹⁴ www.forestserviceni.gov.uk/index/publications/policy-and-standards/a-strategy-for-sustainability-and-growth.htm

2. Our strategic research priorities

2.1. The context for our priorities

In determining our priorities, we will use and comply with the government *Guidelines on scientific analysis in policy making*¹⁵. This sets out three key messages for government departments to:

- think ahead and identify early the issues on which they need scientific advice and early public engagement, and where the current evidence base is weak and should be strengthened
- get a wide range of advice from the best sources, particularly when there is uncertainty
- publish the evidence and analysis and all relevant papers

In broad terms, our priorities are grouped into four key areas as shown in Figure 2 below.

Climate change mitigation and renewable energy Where the wider benefits of forests and woodlands are recognised for their key role in supporting the Government’s objectives on climate change	Sustainable consumption and production Where the UK forest resource plays its full role in supporting a strong and sustainable economy
Natural resource protection and environmental enhancement Recognising that the natural heritage and landscape of much of the UK is enriched by well-designed forests, which support a wide range of ecosystem services	Sustainable communities Which benefit from the opportunities provided by both urban trees and rural woodlands for recreational, tourism, health, skills, and economic benefits

Increasingly the management of our forests in the UK is being influenced by developments at the European and international levels, in particular linked to developments on land use and climate change. Recent examples include the EU Due Diligence Regulation and the United Nations Framework Convention on Climate Change agreements from Copenhagen. Thus the strategy also takes into account international and EU policy drivers, such as the requirement to be able to monitor and demonstrate sustainability in forest management and wood product use. **Our research will also**

¹⁵ *Guidelines on scientific analysis in policy making*, Dept. for Business Innovation and Skills October 2005. Available on www.dius.gov.uk/partner_organisations/office_for_science/science_in_government/strategy_and_guidance/advice_and_policy_making/guidelines

contribute to the European Commission's mid-term review of the EU Forest Action Plan and help to prepare for the mid-term review of the Rural Development Regulation. In addition, the work on the National Forest Inventory will support UK reporting for the FAO Global Forest Resources Assessment 2010.

The following research themes represent our key priorities during the life of this Strategy. These, understandably, have a strong British perspective, but are in all cases linked to European and global concerns. Contact and collaboration with overseas research, especially that represented by the European Research Area, will be reinforced. **We will also play our part in promoting the excellence of British research and deploying it to help solve international problems.**

Our research needs to address both current and emerging issues with climate change being the most significant. **Over the next five years we will increase our budget for monitoring and biosecurity research particularly with regard to tree health to 15% of our research spend.** This is increasing in importance as the impacts of climate change manifest themselves in a range of new pests and pathogens. **We will also continue to gradually increase our spend on climate change, wood and timber properties, and research into innovation and new markets.** **Overall, this will mean that our spend on ecosystems and biodiversity will reduce by 5%.** However, we will maintain a strategic focus on all areas to ensure that research spend reflects the key priorities for research needs in the forestry and woodlands sector.

2.2. Research themes

To take the research agenda forward we will organise research under seven themes. These give a framework to our many programmes and projects to aid ease of comprehension and management. There will be many cross-overs and because our underpinning aim is sustainability, all programmes will be expected to take on board social, environmental and economic drivers, with varying emphasis.

In order to encourage this multidisciplinary approach, we will require the researchers we sponsor to look beyond the delivery of specialised outputs in their own programmes to where their expertise could improve outputs from other areas of research. **We will ensure that our commissioning mechanisms are flexible enough to support such integration across themes, programmes and projects.**

These thematic areas are chosen to reflect the priorities given in the country forestry and woodlands strategies. There is a clearly expressed wish by internal and external stakeholders for more effort to be devoted to monitoring of outcomes from forestry and woodlands policy. There is also a widespread recognition that long-term experiments and datasets are important to sustainable land management, perhaps especially so for forestry and woodlands. In a changing climate, such long term information provides an important perspective. Some monitoring will not be a research-linked activity, but much will be in that it will require scientific input and analysis. It may be seen principally as underpinning other research themes and will provide a capacity for data analysis to support evaluation and policy development across many areas. Research expenditure on Inventory and Forecasting, which previously was included in several other themes, is now represented as a separate theme.

The themes are:

- Counting the Carbon - Climate change theme
- Protecting what we have - Forest monitoring and Biosecurity theme
- Working towards a sustainable future – Sustainable forest management theme
- Underpinning a thriving forest economy – Wood and timber properties theme
- Supporting a resilient environment - Ecosystems and biodiversity theme
- Trees and forests for society - Social, Economic Development & Urban Greening theme
- Understanding our resource - Inventory and forecasting theme

Each of these themes is discussed in detail below.

2.2.1. Counting the Carbon - Climate change theme

Research is essential to provide robust evidence of forestry and woodlands' contribution to underpin strategies for meeting Government objectives on climate change,. The Read report¹⁶ 'Combating Climate Change - a role for UK forests' identifies a number of areas where more research is required. The Climate Change Act (2008)¹⁷, which applies to England, Wales and Northern Ireland and the separate Climate Change Scotland Act (2009)¹⁸, commit countries in the UK to reduce greenhouse gas emissions by at least 80 per cent by 2050, compared to 1990 levels. The Government's Low Carbon Transition Plan published in summer 2009 highlights the important role that forests have to play.

Trees and forests help to tackle, and allow society to adapt to, climate change in different ways. Trees absorb atmospheric carbon as they grow and store it in woodland ecosystems and in low embedded energy timber and wood products after sustainable harvesting. Using wood for fuel and in industrial and consumer products avoids greenhouse gas emissions generated through the use of fossil fuels. Trees and woodlands also help people to adapt to a changing climate, for example by providing shade and protecting us against flooding. However, to develop mitigation and adaptation policies we must continue to develop our understanding of how forest and woodland ecosystems function in a changing physical environment. We also need to know more about what affects the resilience of forests and woodlands to changes in their environment. Climate change is a rapidly developing area of forest research and we need to take stock regularly of our understanding and to review where there are gaps in our knowledge.

The Forestry Commission has identified six priority actions for its work on climate change. Our research activity will play an essential part in helping us to progress these, including how we manage our woodlands in future. The priorities are to:

- protect and manage what we already have;

¹⁶ www.forestry.gov.uk/forestry/infid-7y4gn9 [ask Web team to give us a /ReadReport page name]

¹⁷ www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1

¹⁸ www.opsi.gov.uk/legislation/scotland/acts2009/asp_20090012_en_1

- reduce deforestation;
- restore the world's forest cover;
- use wood for energy;
- replace other materials with wood; and,
- plan to adapt to our changing climate.

We will fund major programmes on the potential of forestry and woodlands to mitigate climate change and to understand how trees and woodlands can help us adapt to its impacts. It will be vital to explore further the effects of pests and pathogens on trees as our climate changes, and to understand how trees can improve living and working environments in urban areas.

We also need to deepen our understanding of the social and economic perspectives of forestry and woodlands and climate change. This will include work to support the creation of carbon markets. Our research in this area will help to provide the breadth of evidence that policy-makers and managers require to support, amongst other things, our reporting to the UK Greenhouse Gas Inventory. **We will also exploit opportunities to develop our research portfolio in partnership with other research institutes and universities.** We intend that our research programmes on climate change will underpin policies and management strategies across the UK, and demonstrate at an international level the unique contribution that trees and woodlands can make to addressing the greatest challenge facing us in the 21st century.

2.2.2. Protecting what we have - Forest monitoring and Biosecurity theme

The UK has a range of mechanisms to provide data for international, UK and national country reporting, and to monitor forests for the effects of a range of biotic and environmental factors. The main GB source is a comprehensive assessment through the national forest inventory. A range of plots provides additional data across the UK for environmental monitoring, which forms part of international co-operative programmes. **Where appropriate, we will ensure that all monitoring and reporting will comply with the Code of Practice for Official Statistics.**

The Forestry Commission is currently preparing a common digital base map for all woodland as part of the national inventory, which will ensure monitoring takes place against definitive woodland areas. This map will be in place in 2010. We anticipate that new technologies of remote sensing developed by Forest Research will help ensure the digital map is regularly updated. Based on the digital map, a sample survey will be undertaken to provide data on wide range of forest attributes.

The UK Forestry Standard sets out a framework of performance requirements for forest management in the UK. The UKFS is currently being revised (expected publication 2010) and the new version will link more closely with the Forestry Guidelines. These articulate the principles of good forest practice on a range of forest management topics including climate change. They have the scientific backing and support of Forest Research. The UKFS is implemented through the regulatory functions of the Forestry Commission and the Forest Service at country level. In addition an overarching independent sample audit will be introduced.

The Forestry Commission is a competent GB authority under the Plant Health Acts ; the Department of Agriculture and Rural Development is the competent authority in Northern Ireland. Scientific support for the Commission's plant health officers will continue to be provided from the science budget.

Recent tree health outbreaks caused by Phytophthora species, Red band Needle Blight, and Oak Processionary Moth have underlined the need to maintain an experienced team of pathologists and entomologists capable of carrying out both strategic research and 'fire brigade' investigation of new problems. This capacity will be maintained in Forest Research and its effectiveness enhanced by seeking opportunities for collaboration with other experts experienced in this area. The Phytophthora programme with the Food and Environment Research Agency (Fera) to contain and eradicate the two new diseases has clearly demonstrated the value of partnership at all levels. We recognise that emerging threats, such as this, may demand immediate reallocation of resources and impact on planned strategic shifts in the balance of resources.

2.2.3. Working towards a sustainable future – Sustainable forest management theme

There is an increasingly complex set of drivers for, and deliverables expected of, forest management in the UK. These include increased environmental pressure, social and recreational needs, biodiversity, economics, and the essential requirement for adaptation to and mitigation of climate change. Land managers also have a wide variety of management objectives from timber production to biodiversity and will need to adapt a range of SFM practices to meet the needs of the UK Forest Standard. Research to define a range of options and alternatives will be a key part of our work. **Our research in this area will focus on managing our forests, including the protection of soil and water, for long term sustainability.**

Woodland creation to mitigate the impact of climate change is a high priority for government. **To support this we will investigate new and more sustainable methods of woodland creation, such as natural regeneration and direct seeding, combined with research into reducing chemical usage.** Adapting to the changing environment will require appropriate seed management techniques to support this, including species and provenance choice. It will also require research to respond to changing threats during crop establishment and development. This might include potential increases in pests and diseases, possible drought, and a need to maintain and enhance an appropriate gene pool.

We are using some of our public forests to trial and implement alternative silvicultural systems, such as continuous cover, and short rotation, forestry. These systems may reduce our impact on soil carbon reserves, support biodiversity and provide greater adaptive capacity to our forests. All of these will complement the work we are doing on climate change. Further research in this area will allow us to better predict rotations and yields, future timber quality, and the balance sheet of inputs versus outputs.

Policy, regulation and practice to protect soil and water resources have increasingly recognised land use and land management as major influences. This is already evident in the EU's Water Framework

Directive, Floods directive and in the European debate on soil monitoring and the development of the soil framework directive. Forestry and woodlands are involved in these developments and research will continue to understand the relationships between woodland cover and the soil and water environments. In the past much of our research has been reactive, investigating means to prevent forestry and woodland practices from damaging soil and water. **We will now focus our resources towards research that supports policy development and the implementation of practices, which use woodlands to assist soil and water protection and help to mitigate against flooding.**

2.2.4. Underpinning a thriving forest economy – Wood and timber properties theme

By using wood sustainably, either to replace materials such as steel and concrete, or as a substitute for non-renewable fossil fuels such as coal, oil and gas, CO₂ emissions can be reduced. One of the best ways to address climate change and help to reduce other GHG emissions is to use more wood from more forests and woodlands.

Forest products can deliver significant impact in meeting Government targets for a low carbon economy. **This will be delivered through commissioning and promulgating robust and defensible scientific evidence that supports the use of timber in relation to climate change adaptation and mitigation.**

Forest owners and managers are already well aware of the environmental and social impacts of forestry and woodlands. They are equally aware that such benefits are not easily translated into tangible income for those who provide them. Revenue from products, principally wood, remains crucial to the future sustainability of British woodland. Wood and wood products are traded on an international market and research and advice to add value to traditional home-grown forest products is essential. Continuing competitiveness also requires research, which supports management systems that deliver wood products wanted by the market. This includes procedures for quantifying what will be delivered by past, present and future management practice. These are particularly important in relation to climate change predictions and the potential impact of pests and pathogens.

In section 6 we emphasise the value of our partnerships with timber research institutes, both at home and abroad, and these will continue. The research carried out by Forest Research on timber properties is closely linked to these and other external providers and will be strongly supported.

The UK Renewable energy strategy¹⁹ sets out UK energy policy and strategy, looking towards 2050. Carbon reduction is a central goal of Government policies and the increased use of renewable energy from biomass is recognised as an important resource. Forestry and woodlands can be an important contributor and it is vital for forest products to gain their proper place in these markets, if the forestry and woodlands sector is to play a full role in sustainable rural economies. Our stakeholders across

¹⁹ Department of Energy and Climate Change 2009

the UK recognise that effective use of wood and its derivatives as fuel sources requires research support.

Wood is one of the oldest fuels, while forests and woodlands have been used for centuries to produce chemicals and fibres. **Our research will continue the development of innovative products from British forests and woodlands, to maintain and enhance industry competitiveness, and provide society with as wide a range of benefits as possible.**

2.2.5. Supporting a resilient environment - Ecosystems and biodiversity theme

Challenges from the changing physical environment require continuing research to develop resilience and robustness of British woodland. Both new and existing woodlands must be safeguarded against the additional stresses, which the changing environment will place upon them. Insights afforded through understanding the resilience of planting stock at a genetic level will provide answers to safeguard our forests and the ecosystem services they provide now and in the future.

Capacity for resilience is critical not only within our woodlands but also at a landscape scale. Our considerable capability in modelling at landscape scale must now be strongly linked to other UK and European research to address such problems as spatial planning, habitat fragmentation, gene flow, and dispersal and colonisation of species – both desirable and undesirable. This research is embracing new opportunities offered through novel applications of genetic technologies. The woodland environment offers sanctuary to many species, of which woodland birds are of high priority. However, if we are to ensure that the quality of these habitats is not adversely impacted by increased pressure from species, both native and non-native, we must renew our research efforts in the areas of herbivore impacts and invasive species.

The restoration of natural and semi-natural habitats, and their associated species, is a major policy objective across the world stimulated by the Convention on Biological Diversity. The desirability of restoration is strongly advocated in EU and British environmental policies, including the UK Biodiversity Action Plan, the EU Habitats Directive and the EU Forestry Strategy. The Forestry Commission was a co-founder of the Global Partnership on Forest Landscape Restoration. Delivering effective restoration is not straightforward and requires co-ordinated research by a wide range of agencies on techniques for restoring threatened habitats that have been inappropriately managed. A particular concern for the forestry and woodlands sector is the restoration of ancient woodland sites that have been converted to plantation forestry. **We will continue to play our part in research directed at conservation and restoration, and will support cross-departmental co-ordinating bodies such as the UK Biodiversity Research Advisory Group, the Environmental Research Funders' Forum, and others.**

2.2.6. Trees and forests for society - Social, Economic Development & Urban Greening theme

The UK framework for sustainable development, 'One Future – Different Paths' published in March 2005 set out five principles, which have been adopted by the UK Government, and each of the devolved administrations. Each of the principles puts society at the heart of sustainability.

- Living within Environmental Limits.
- Ensuring a Strong, Healthy & Just Society.
- Achieving a Sustainable Economy.
- Using Sound Science Responsibly. And
- Promoting Good Governance.

We recognized the social dimension of sustainable forestry and woodlands at an early stage, leading in 1998 to the development of a social research capacity in Forest Research that has continued to develop.

We will continue to organise our social research programme around five key principles, which have been adapted to meet the particular needs of the Commission. Our programme is designed around the following themes:

- Learning from research and interpreting and communicating research findings,
- Wellbeing, supporting a healthy society,
- Supporting communities,
- Good governance in Forestry and woodlands and,
- Applying social research in the Commission's decision-making.

As our experience with social research has developed, our social researchers increasingly are working in cross-disciplinary teams and across the range of research carried out in Forest Research. We see this as a highly positive trend that allows the social implications of all our research to be considered both in the design and in the analysis phases.

Our social research has a strong focus on practice and relies on feedback from managers in the forestry and woodlands sector and from regular contact with diverse stakeholders in order to identify research questions and needs. We will continue to encourage the programme manager to maintain close links with staff at all levels in the four countries and to develop new relationships with key stakeholders in Government. We also wish to see the advisory role of our social scientists develop further, and for the Unit to be seen as a source of internal and external consultancy, especially where this will build capacity or expertise in the unit and in Forest Research.

2.2.7. Understanding our resource - Inventory and forecasting theme

The National Forest Inventory (NFI) will deliver authoritative information on the extent, location and nature of GB woodlands and how they might change in the future. It is therefore an essential component of delivering a robust evidence base for forest policy and programme development and evaluation at GB, Country and Regional scales.

From a scientific perspective, the NFI is underpinned by research in this theme commissioned through the FC Inventory Forecasting and Operational Support unit and covering:

- Forest resource assessment standards and systems
- Models of forest growth, yield and stand dynamics for assessment of productive potential, and for predicting impacts of management interventions on the growing stock. These models utilise empirical data from:
 - A network of permanent sample plots in stands of strategically selected species.
 - Short term mensuration experiments
- Forecast systems that work at strategic and tactical levels to predict long term trends in production and development of the growing stock

It is a significant strength of this research theme that inventory protocols, inventory data, and forecasts for wood, biomass and carbon are developed around a common core. Development of a common inventory and modelling base across the forest sector is not only efficient, it also helps deliver necessary transparency and credibility to resource estimates.

In addition to their broader evidence base contribution, the information and management systems delivered through this theme underpin FC commitments to reporting forest resource statistics and directly support a number of actions and indicators in each of the three countries.

2.3. Research spend by theme

The development of policy and its delivery are key functions, and research must therefore serve policy and practice. Table 1 below shows how research spend has evolved over the last decade to reflect this.

The figure shows that some clear shifts in positive spend have occurred in the areas of climate change and social research. These have mainly been at the expense of monitoring and biosecurity and sustainable forest management. As stated above, we will be addressing the former by increasing our research effort in this area over the next five years. However, we acknowledge that the balance of spend needs to be regularly reviewed to ensure that we are addressing both short term research and policy priorities and longer term strategic needs. These will be considered both in the context of our own objectives, and of wider UK Government priorities. Our governance structures, detailed in section 6, have been designed to ensure that this happens.

Table 1
Research spend by theme since 2000

Research theme	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	Trend
Monitoring and biosecurity	20%	22%	20%	19%	23%	22%	20%	16%	13%	12%	↓
Biodiversity and ecosystems	18%	19%	19%	20%	18%	17%	17%	16%	20%	19%	↔
Climate change	4%	4%	4%	4%	4%	5%	5%	8%	10%	14%	↑
Sustainable forest management	19%	18%	18%	19%	17%	17%	16%	17%	14%	14%	↓
Forest products	18%	17%	16%	15%	15%	14%	17%	16%	15%	14%	↓
Social, Economic Dev. & Urban Greening	8%	9%	9%	10%	9%	10%	11%	11%	13%	12%	↑
Inventory and forecasting	11%	11%	12%	12%	10%	11%	10%	8%	11%	11%	↔
Miscellaneous	2%	2%	2%	2%	4%	4%	5%	7%	5%	4%	↑
Total Research Spend	11280	10942	10845	10945	11172	11675	11679	11329	11419	11434	↓*

* In real terms

3. Being innovative in what we do

In this strategy, we interpret the concept of innovation in a wide sense, as achieving a new and better way of doing things. To qualify, innovation may be incremental, or occur in fits and starts, but needs to be adopted widely in practice. This conforms to the OECD (2005) definition of innovation in its Oslo Manual²⁰ as 'the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations.'

We will support the delivery of innovation through more integrated multi-disciplinary approaches to research, which are adaptive and responsive to emerging and changing priorities. We also recognise that innovation involves experimentation and risk taking. Some attempts will fail, but the failures themselves generate new knowledge, which if evaluated correctly, can improve the chances for future success. Through our evaluation processes, we will ensure that the reasons for failure are understood, and used to improve our future success rates.

3.1. Research and innovation

Innovation will be one of the main drivers underpinning all our research. Its application and implementation is one of the principal aims of our commitment to improve communication. **To support this, we will encourage communication of 'interim deliverables' through the mechanisms described in section 5.2 to assist new ideas moving to industry from research and vice-versa.** Strengthening the links between research and practice will help to secure innovation in the forestry industry and land management. We are proud of our track record in translating the results of research into the new policies and practices that have underpinned the post-war development of British forestry and woodlands.

As we have broadened our aims from commercial production of wood, social and environmental objectives have often become a primary focus for woodland. These demand increasingly innovative approaches to management and regulation. At the same time, the low commodity value of timber requires continuing research to reduce supply chain costs still further and to add value to our forest products. The processing industries are the leaders in research devoted to wood products but the Commission and the Service have played significant roles in facilitation and provision of 'seed-corn' funding. **We will maintain, and expand where possible, our associations with the wood-processing industries. However, our future focus will be more strategic in nature, as industry increases its involvement in near market research.** This will allow us to apply resources to other areas where the benefits may be less immediate or so closely linked to market incentives.

²⁰ www.oecd.org/dataoecd/35/61/2367580.pdf

Our research will generate new ideas and methods for guiding the practice of woodland management towards better environmental, social and economic outcomes. For example, the strong linkages between land cover and water resources demand imaginative management approaches to protecting water quality and flood management. New thinking will also be required for implementing low impact silvicultural systems and finding alternatives to chemical pesticides. In the social arena, our research has helped to increase community participation in woodland management, but we need to understand more about the causal linkages between forestry and woodlands sector inputs and their social impacts, in given socio-economic and ecological contexts.

The Commission and the Service have direct roles to play in driving innovation through our management of public forests, regulation and standard setting, and promotion and grant aid activities. These are all guided by the revised UK Forestry Standard and its supporting guidance on good practice, which have benefited from our research programmes. These provide a framework for voluntary standards, such as the UK Woodland Assurance Standard, which will also remain important routes to new and better management practice.

3.2. Open publication and intellectual property

We will ensure that the results of research sponsored by us will be deployed to maximise their value to society. In most cases this will be achieved through open access and publication. Therefore, in addition to our commitments on improving communication in section 5, we will place all research results in the public domain, published at suitable levels of detail, unless there are statutory exemptions.

Intellectual property in research carried out for the Forestry Commission by Forest Research, which is a Public Sector Research Establishment (PSRE), will belong to the Forestry Commission but will be administered and exploited by Forest Research. The Forestry Commissioners, through the current Framework Agreement have granted to Forest Research the first right to exploit the commercial potential of its research, unless that would not be in the public interest. The Department for Business Innovation & Skills (BIS) provides financial support to the FC via a PSRE4 grant to facilitate activities in this direction. Forest Research has a hub with a skills base to lead these activities.

Under the PSRE4 'Innovation and New Markets' project, FR plans to support the development of dynamic new timber end markets. This will focus on specific market opportunities, and on dynamic companies, which are able to become associated with developing these opportunities. The project will involve collaboration with sector clusters, trade associations, UK regional bodies, European networks and others. It will develop a 'mosaic' of externally funded projects, which collectively generate significant additional R&D income along the route of developing successful novel, and stronger, timber markets.

The assignment of intellectual property in funding partnerships with non-governmental organisations will be decided on a case-by-case basis at the stage of drawing up contracts, and will take account of our commitment to obtain maximum value for society.

4. How we'll monitor progress

4.1. Responsibilities

We have signalled a number of changes in this Strategy as well as confirming where effort should be maintained on current topics of research and procedures. It will be necessary to monitor progress in order to identify any drift from the directions we have set out. Oversight of monitoring and the evaluation of its results will be among the responsibilities of the Research Strategy Management Board. Corporate and Forestry Support and Forest Research will collate several measures of performance on behalf of the Board. These are detailed in Table 2 below.

4.2. Measuring stakeholder perceptions

It will be more difficult to measure some of the changes we want to achieve in the ways that stakeholders view our research, and even more difficult to monitor the outcomes we list in Section 1. Nonetheless, the Commission is a widely dispersed organisation and close to the delivery of sustainable forest management where we are not actually part of it. It should be possible to obtain some evidence about whether our research is becoming more connected to users and whether its results are being pulled through into innovative practice. **Corporate and Forestry Support, with the help of Forest Research, will consider approaches to gathering and reporting such information.** They will also refine the list of numerical data that can be readily collected. Both strands of evidence will be presented in a separate document to support the Strategy. In addition, Corporate and Forestry Support will consider possibilities for commissioning an external evaluation of the Strategy in 2010. This evaluation will include an assessment of the extent to which the research is becoming more connected to users and the extent to which the results are being pulled through into innovative practice.

4.3. Reporting

Implementation of this Strategy will demand continuous analysis and review. The results will be reported annually to the Research Strategy Management Board. **An annual report of outputs will be published on the internet as a supporting document to the Strategy.** This will contain the analysis of measures detailed in Table 2 below, and a comprehensive summary of research work undertaken and delivered during the year. This annual report, combined with the published Catalogue of research, and the published forward research programme for the coming year will support this process, and aid the transparency of our research procurement programme.

Table 2

Research indicators and measures

Indicator	Measure
Expenditure on themes and programmes	Annual out-turn expenditure % by theme, split between expenditure with FR and external expenditure, to ensure that it follows the priorities identified in Section 2;
Leverage and gearing from partnership work, including in-kind contributions	Annual outturn for partnership work, by theme and programme, showing FC science budget spend and total value, to show total leverage. Partnership projects include FC-led projects with EU co-funding, Research Council funding, funding from other parts of FC, as well as funding from other organisations. It also includes all projects led by others for which the science budget contributes any funding, however minor.
Statistics on publications are the crucial measures of the scientific quality. We will record and publish these annually by research theme.	The number of scientific publications in peer-reviewed journals or delivered at conferences as a result of research sponsored by the Commission The number of other complete publications, and other published articles Annual total number of publications as a result of research sponsored by the Commission, by theme, split between publications in peer-reviewed journals, published papers delivered at conferences
Research liaison officers	Annual report by country on dissemination events supported covering statistics on 'dissemination events' – workshops, demonstrations, publications – to indicate that communication pathways remain open. We will develop an indicator of effectiveness for these communication posts
Programme advisory groups and their role in bringing countries into the process of commissioning research.	Annual report by the chair of each group covering membership, number of meetings, external engagement, and outputs delivered during the year. Summary report covering the outputs of all programme advisory groups
Knowledge transfer	We will develop a measure to reflect the successful linkages between research and policy development
Outward looking focus	We will consider including more outward looking indicators e.g. innovation and presence in new area, and more outcome focussed indicators.

Section 2: Delivery

5. Communicating the results

5.1. Communication is important

Good science needs to be properly communicated. This is a key issue for this Strategy. Iterative knowledge transfer between those who carry out research and its users will lead to innovation through application, and a better understanding of science and the benefits of scientific investigation. Over the last five years, we have increased the range of dissemination activities to allow our stakeholders to benefit from the results of our science. This has been done in a variety of ways, through programme steering groups, focus groups, information notes and published papers, and conferences, seminars and workshops. Some research programmes, such as those in wildlife management, already spend 50% or more of the programme resource in dissemination activities. **We will continue to ask our customers what they want from research, and we will identify areas of good practice that we shall reinforce and build on.**

We also recognise that a highly effective way to enhance communication is through direct involvement of the user communities in the conduct of research. Direct participation is a highly desirable end in itself as not only does it promote understanding, knowledge transfer and innovation, but it also increases the resources available.

Effective communication remains a challenge for most organisations. There is more published information available than ever, and accessibility has improved – particularly due to the Internet. However, this brings its own dilemmas, often making it difficult for users to identify authoritative advice and apply it to their particular situation. The widespread use of email to communicate knowledge can also lead to information overload, where important knowledge is overlooked or ignored. We recognise that the improvements of recent years are a start, but there is much more to do. **Over the period of this strategy, we will make use of a wide range of communication methods and media to ensure that access to our research is as widely available as it can be. We will target our messages more effectively through the use of customer segmentation.**

5.2. What we'll do to improve communication

We recognise the need to make adequate resources available for communicating research to our key stakeholders. In the past, we have used printed media extensively, and to good effect. However, technological and cultural changes in society and the workplace require that we constantly re-evaluate how we disseminate results. **Where possible, we will use face-to-face contact as the preferred means of communication for most stakeholder sectors, though this must be balanced with cost-effectiveness.** This can be achieved through better links with professional bodies and

educational institutions, and by the Commission and the Service working towards partnership in communication as well as in research.

We are convinced that communication of methods and results to the scientific community is best left to scientists, advised when necessary by communications experts, and we will make sure that resources are available to do this. Our catalogue of research will continue, and will be improved and kept up to date, and supported, where appropriate, by other research libraries. **Finally, we will conduct and publish an annual review of progress and our research plans for the coming year.**

5.2.1. We'll make more resources available

With limited budgets, making more resources available for dissemination has to be a trade off, the implication of which is that better communication equals less research. However, on the principle that research that is not effectively communicated is a poor investment, this is a trade off we are prepared to accept. We will continue to ensure that dissemination and communication of results is a significant element of contracts with external providers. Forest Research already has a 'Knowledge Transfer' programme funded by the GB Science, Engineering and Technology budget. This programme, which covers a variety of functions in support of knowledge and technology transfer, will be sustained to allow co-ordinated activity to continue. We will also ensure that dissemination is properly accounted for within the specifications of individual programmes. This will avoid the danger of creating a greater distance between front-line researchers and end-users, and ensure that communication is seen as an integral part of a research programme. This will allow flexibility within projects to develop appropriate communication vehicles throughout the project life cycle. It will also allow time for producing peer reviewed papers, which are an essential element of the evidence base for policy development (See also 4.2.9).

5.2.2. Better use of media and targeting

While web-based information is increasingly important, it is by no means a universal answer to the communication of results to interested parties. 'Hard' publications are valued by many end-users in land and environmental management. While we will continue to produce high quality publications, we have been successfully developing our series of Research Notes, which provide research reports in a short, pithy format. These are very useful in producing interim results for use by managers and policy makers, and can be carefully targeted at specific audiences. We have a strategic aim to improve the linkages between publications, the needs that generate them and the events that can help disseminate them. Recent examples include the Impacts of climate change in Scotland, and the forthcoming conference on Forests and trees in British society. Using our network of research liaison officers, programme advisory groups and project steering groups, we will improve the specification of the outputs required from research programmes at the outset. Forest Research continues to produce its series of newsletters, and will review this to improve their delivery and effectiveness. We will also explore other media, such as web streaming and CDs to deliver presentations at seminars to a wider audience. The use of decision support systems (DSS) has also been an effective way of translating research results into operational practice. Recent examples are the Forester system, which underpins the Commission's inventory and forecasting capability, and other tools which have been made

available to the whole sector, such as ForestGales, and Ecological Site Classification. We will continue to specify and develop DSS, where appropriate. However, their commissioning will be subject to a stringent set of key principles, such as value for money, having a clearly identified and viable target market, and where they demonstrate clear advantages over other forms of 'tech transfer'.

5.2.3. More face-to-face contact

The effectiveness of face-to-face communication is not a new conclusion, but our experience with it has strongly reinforced the value that it provides. It demands a committed and expert staff resource that requires careful development alongside the generation of more opportunities for creative interaction. **We will adopt a targeted approach to better align our research outputs with the requirements of our stakeholders.** This recognises that a mismatch between these may have been one of the underlying reasons for the limited success of the considerable resource already devoted to communication of research.

5.2.4. Dissemination events

Specific events where researchers themselves speak about their work and its results have proved popular and successful. With audiences of practitioners, workshops that combine presentation with practical demonstration – seminar room with forest excursion – are especially appreciated. **These successes will be built on and structured through research liaison officers and country needs.** Face-to-face events, involving a range of staff, also increase the opportunity for feedback of ideas from the field to researchers. However, we must also ensure that best use is made of researchers' time, and we will also explore other routes to providing the expert knowledge in cost effective ways.

5.2.5. Research liaison officers

Our research liaison officers have proved to be highly effective since they were appointed. They are based in Forest Research and are funded centrally from the GB research budget. They provide a link and feedback between our Technical Publications Group and the research commissioning groups, and act as a source of advice and feedback on dissemination activities. Their key role is to link researchers and end-users. Initially, they have concentrated on strengthening the connections between Forest Research and other Commission staff. This is enabling them to tap into the existing strong networks that countries have with external users of research. Through these links with the wider forestry and woodlands community, RLOs feed back research needs intelligence to the country representatives, to inform future research requirements.

We intend that a valuable outcome of grass-roots contact through research liaison officers and field staff will be a better direction of the resources put into communication by Forest Research and other providers.

The research liaison officers will familiarise themselves with our externally commissioned research to allow them, in collaboration with the providers, to play a part in communicating it. A further vital function will be to provide information about commissioning and procurement.

5.2.6. Corporate and Forestry Support

Corporate and Forestry Support (CFS) has access to UK and country networks through its roles of commissioning joint research projects, providing policy advice to countries and UK government and representing the Commission on a variety of committees and working groups. **Our staff in Corporate and Forestry Support will continue to give priority to communicating research conclusions and advice to these networks.**

Our Inventory, Forecasting and Operational Support (IFOS) has a separate central purchasing function for operational research on behalf of the managers of public forests, in addition to its primary interest in inventory and forecasting. This role makes the unit part of a strong network of practitioners and a direct route to transferring technology to managers of the largest single forestry enterprise in England, Scotland and Wales. Our staff, in Corporate and Forestry Support and IFOS, work closely together in the interests of economy, communication and innovation.

5.2.7. User Groups and Steering Groups

As noted in Section 6.3, **we will promote wider involvement in research projects by our external stakeholders and Commission staff.** As this wider involvement develops, it will serve to increase familiarity with processes – at least across the Forestry Commission. We have adopted a strategic aim to increase the number of programmes with steering groups or user groups. We expect key external and internal participants to provide two-way channels of communication into user networks. These groups will advise the Programme Advisory Groups and the researchers on the best means to disseminate results. Much of the engagement with external stakeholders will be done by the countries to ensure that stakeholder issues are properly represented at the PAGs.

5.2.8. Improved links with professional bodies and educational institutions

Although we have strong associations with professional bodies in forestry and woodlands, these tend to be through individuals and unstructured across the organisations. We think that more value can be obtained by formalising these links to establish a more open dialogue. **We will encourage professional bodies to formally offer continuing professional development hours at our structured dissemination events.**

In recognition of our strategic aim to integrate forestry and woodlands research with research and practice in other land-uses, **we will also establish better connections with professional bodies**

and trade organisations outside the traditional forestry and woodlands sector where we think there may be opportunities for collaboration. Currently we see opportunities in farming, waste management, water management, healthcare, tourism, energy, engineering, landscape, construction, and design.

We will continue to make use of expert knowledge within the sector. For example, the very wide range of cross-sectoral interests represented in the development and subsequent revision of the UK Woodland Assurance Standard, an independent forest certification scheme. This exceptionally broadly based panel continues to provide valuable insights into the way ahead for forestry and woodlands and the research that may be needed to support it. These include the need for alternatives to chemical pesticides and management techniques for enhancing biodiversity. However, there are other issues, such as research into the development and use of genetically modified trees, where we might wish to seek alternative views from other sources.

Although we have strong linkages to some university research departments, we need to do more to ensure that professionals in training are fully equipped to practice in modern forestry and woodlands. We will achieve this by developing relationships with those who deliver teaching and training in institutes of higher education, and will seek new opportunities to 'market' our research to educational and training bodies. We are currently preparing plans for offering PhD studentships through an annual open call. This will allow a wider range of academic institutions to engage with the forestry and woodlands sector, and generate new knowledge transfer.

5.2.9. Reaching out to the scientific community

Publication in the peer-reviewed scientific literature is crucial to the credibility of the research we sponsor. Such publication is also vital to the standing and career progression of the scientists involved. Scientific publication is in the hands of the learned societies and scientific journals rather than the Forestry Commission – though our scientists are well represented on their governing and editorial boards. **We will continue to encourage such participation by the scientists we fund.** Outputs in the scientific literature and at conferences and science workshops will continue to be an important part of the specification for research projects and programmes.

We accept that a balance may be difficult to achieve between the demands for scientific publication and those for 'practical' outputs. This will be especially the case in Forest Research. Our Research Strategy Management Board, and the Chief Executive and the Director of Communications in Forest Research will guide its resolution. The Chief Executive has responsibility for improving the scientific profile of Forest Research through publication and participation in scientific conferences and symposia. The Research Strategy Management Board and Forestry Commission Chief Scientist will provide support to both roles in the interests of communicating. The Research Strategy Management Board will provide support to both roles in the interests of communicating the excellence of forestry and woodlands research and its contribution to the wider scientific community. The Board will also ensure that, where appropriate, research provided by external providers is properly exposed to peer review through publication.

We will take into account relevant provisions of the *Code of practice for scientific advisory committees*²¹ for committees, such as the Advisory Committee on Forest Research, charged with advising the department on science and with evaluating or steering particular research programmes.

5.2.10. Easier access to our catalogue of research

The structure of our catalogue of research is under review, and it will be relaunched in 2010. This will replace the annual multi-agency compilation of forestry and woodlands-related research published by the Forestry Research Co-ordination Committee, which has now ceased.

5.2.11. Communicating in partnership

Modern forestry has a very wide agenda and strong associations with many other rural and urban agendas. We have a strategic commitment to working in partnership with other organisations to enable the delivery of our objectives and support the wider objectives of government and society. Forestry and woodland management is not an isolated system of land management nor are its products of value only to foresters. Many other organisations commission research that is relevant to the management of woodland and the use of its services and products. **We will move towards linking our communication system with others to avoid mixed messages and loss of opportunities for synergy – and to widen our audience.** These are ambitious aims but we believe they can be achieved incrementally through the strong networks that research liaison officers can build and the existing networks to which our staff are linked. These include the high-level inter-departmental bodies, such as the Environmental Research Funders' Forum. In addition, we will strive to develop our existing relationships with other government partners, and develop new relationships to achieve mutual benefit.

As an example of this, our social scientists, all of whom are associate members of the Government Social Research service (GSR), have rapidly become a significant presence in social research in the land-based sector. They work with partners across Europe on EU funded research and increasingly are recognised as a source of advice not only within the Commission but also to other Departments and agencies.

The National Research Agenda (NRA) for the UK Forest-Based Industries (NRA) sets out the research and development priorities of the UK's forest industries over the next 20-25 years. It has been developed in the context of the Strategic Research Agenda (SRA) of the EU Forestry Technology Platform (FTP) completed in 2006. The NRA aims to provide a broad research framework for the UK's forest industries and the research community. It has been prepared through a collaborative effort

²¹ *Code of practice for scientific advisory committees*, Dept. for Business Innovation and Skills December 2007 www.berr.gov.uk/files/file42780.pdf

involving all sectors of the UK forest industries, research community and research funding bodies. Its publication offers an opportunity for the UK to collaborate to a greater degree with its counterparts across Europe, and to benefit more extensively from EU research funding. In addition, its expression of the issues, direction of travel and priorities for research are helpful in guiding the Forestry Commission's research in this area. Whilst the SRA is consistent with this strategy, there are some key areas of research that find no expression here. These include research into wood chemicals, composites, recycling, the value chain and commercialising soft forest values. We see our strategy as complementing the work in this area, and welcome the focus of other bodies or the private sector in delivering it. At present the Wood Using Industries Research and Development (WUIRD) Group is leading the UK NRA, and acting as the UK National Support Group for the FTP. **We will work closely with the WUIRD group to encourage joint research activity within the UK and across Europe.**

6. How we manage research commissioning

The purposes of this document are to determine the strategic direction for forestry and woodlands research and to inform shorter-term tactical and operational decisions about implementation. This section deals with how we will manage the processes to take the Strategy forward.

The following principles underpin the processes we will adopt to do this:

- there are open and effective channels of communication to support end-user involvement, technology transfer and innovation;
- research is commissioned and funded in a transparent and efficient fashion;
- our research is forward-looking and outward-looking;
- scientific evidence is firmly linked to the development and delivery of policy.

6.1. Our funding

Corporate and Forestry Support holds the GB research budget, which is met from the Westminster vote. The source and use of funds are set out in the GB Corporate Plan²², which provides the context for wider GB spend. CFS uses the research budget to commission and fund research and research services to deliver this strategy. The main provider of research and research services will be Forest Research (See 6.5). However, we will also use some of the budget to commission research from external providers (See 6.6).

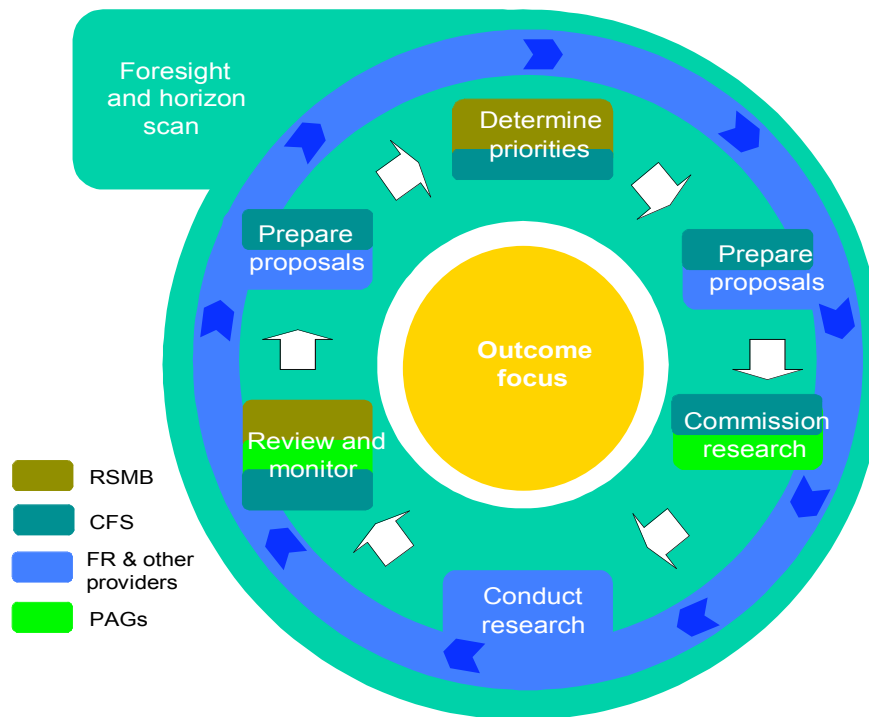
6.2. Our governance

The Commissioners and Executive Board of the Forestry Commission have mandated the Research Strategy Management Board (RSMB) to oversee this Research Strategy and approve annual programmes of research and research services to implement it. Figure 3 provides an overview of commissioning.

Our governance structures ensure that there are strong links between research and policy development and delivery. The RSMB has the mandate of Commissioners and the Executive Board of the Forestry Commission and links country policy development teams (including that of the Forest Service) at high level to the main sources of scientific advice - Forest Research and Corporate and Forestry Support.

²² <http://www.forestry.gov.uk/website/forestry.nsf/byunique/infd-5e4g6a>

Figure 3. The research commissioning cycle



The Head of Corporate and Forestry Support and the Chief Executive of Forest Research are members of the Commission's Executive Board. The Forestry Commission's Chief Scientist is responsible for the quality of science used by the FC, represents the FC on the Chief Scientific Advisors Committee and is a member of the Research Strategy Management Board and Advisory Committee on Forest Research. These arrangements guarantee research input at the highest policy level. **As part of our on-going commitment to improve the efficiency of the way we commission research, we will be reviewing the structure and functions of the RSMB during the life of this refreshed strategy.**

The Head of Corporate and Forestry Support will ensure that that the Commission's advisory and commissioning structures include and serve the interests of the Forest Service in line with the MOU.

Corporate and Forestry Support staff have responsibility for commissioning research and providing advice from it to National Offices. On issues where scientific input is important, they will maintain close contact with policy staff in the countries. The central purchase of research and research services by Corporate and Forestry Support will include provision of advice by scientists directly to policy makers

within the Commission, the Service and other government departments and agencies. This will ensure, particularly for contentious issues, that policy makers have access to an appropriate breadth of advice, including alternative views.

6.3. Steering groups and user groups

The process of commissioning will often involve the setting up of steering groups and user groups. Corporate and Forestry Support will seek advice on the need for, and composition of, such groups from the Research Strategy Management Board, programme advisory groups and Forest Research. Although the ideal would be to convene such groups for all significant pieces of research, we recognise that this is unlikely to be achieved – and might lead to significant overlap between the various types of group. Countries will put mechanisms in place to ensure that the views of their stakeholders are taken into account in the research commissioning process. The Research Liaison Officers will support this by using their links with the wider forestry and land management community to feed back research needs intelligence to the country PAG representatives.

6.4. Other stakeholder advisory committees

The Forestry Commission is supported by a variety of advisory structures. There are two whose functions are relevant to research²³:

Advisory Committee on Forest Research This Committee provides expert advice to Forest Research on the quality and direction of research. It is Forest Research's principal advisory committee on science, is chaired by a senior independent scientist and has external members drawn from the academic and research community. The Committee oversees the peer-review and quality assessment of research programmes in Forest Research. The Committee structure aligns closely with the new Forest research three centre structure. It comprises three FC/FR members and up to six external members, who are respected scientists and research managers able to provide advice on the range of subjects on which the FC purchases research. Its remit is to:

- provide advice on, and evaluate FR's delivery of its research programme.
- support the mentoring and development of FR staff, and provide advice on opportunities for collaboration and new research bids
- develop a proactive contribution to the formation and delivery of science and innovation strategies, and support the raising of FR's profile

Expert Group on Timber and Trade Statistics²⁴ This Group advises and assists the Forestry Commission in compiling information and assessing the need for research on the supply and demand for wood and forest products.

²³ [WWW.forestry.gov.uk/fr/INFD-7CEG3U](http://www.forestry.gov.uk/fr/INFD-7CEG3U)

²⁴ <http://www.forestry.gov.uk/forestry/infd-5rac56>

6.5. How we commission and buy research

We will maintain a strategic and high quality research capability in forest science through our Forest Research Agency, a Public Sector Research Establishment owned by the Forestry Commissioners. The agency will be the main provider of research and scientific advice to the Commission. The role of Forest Research is described in more detail in its Framework document²⁵. The mechanisms described in section 6.9 will be used to ensure quality. In addition, we will maintain a level of external expenditure with external providers to link us to other centres of excellence and allow comparisons of service provision to be made. The external expenditure will enable us to:

- promote interest in and knowledge of sustainable forest management in the wider research community;
- engage in partnerships with other funders;
- secure specialist expertise and competencies not available from Forest Research;
- maintain expertise in external centres of excellence where key competencies and facilities are of strategic importance to UK forestry and woodland management;
- benefit from alternative perspectives.

The sawmilling industry is an important strategic market for British timber, but does not fund a significant strategic research and development programme although individual companies make important contributions in kind. Accordingly, the Forestry Commission will maintain its strong relationships with the Centre for Timber Technology and Construction at the Building Research Establishment, the Timber Research and Development Association and the Centre for Timber Engineering at Napier University. However, as outlined in section 3.1, we will look to industry to conduct and fund close-to market research in the future to allow our research budget to concentrate on more strategic issues.

6.6. Creating new partnerships

In order to maintain, and if necessary increase, our collaborative research, we will continue to utilise our budget for external research to join funding consortia with other parts of government, non-governmental organisations, trusts, private sector and industrial interests. Such enterprises will be given high priority in planning expenditure. We will promote collaborative research in which the resources available to Forest Research can be placed alongside the resources of other partners to support the achievement of shared aims and objectives. These projects may include those that attract co-funding for Forest Research from other sponsors, including the EU where the research contributes to the policy objectives or strategic needs of British forestry. However, we will interpret this constraint broadly, accepting that UK objectives form part of a larger whole and that engagement with international teams may be a benefit in its own right through informing the thinking of UK-based researchers.

²⁵ *Forest Research framework document*, Forest Research, 2003.

Collaboration may also occur through contribution 'in kind'. This is often a feature of partnerships with industry and with woodland and environmental managers – and indeed has often been the main element of participation by the Commission and partners in collaborative projects. **Contribution in kind is frequently under-recognised, but has been and will continue to be, extremely valuable to forest science.** In this, we are fortunate to have the immense research resource provided by public forests and the staff associated with their management. Public forests provide the bulk of experimental sites, monitoring plots and demonstrations of practice across the UK; their managers and operational staff support researchers in ways that would be difficult, and extremely costly, to replace.

6.7. Working across government

A holistic view of sustainable land-use is common across government and other government research strategies are committed to it. **We will help to support delivery of these wherever possible and seek partnerships to increase cross-governmental research.** For example, in Scotland, the Commission is represented on the Co-ordinated Agenda for Marine and Rural Affairs Science (CAMERAS) Board. Similarly, climate change requires a cross government approach to research to ensure that the full complexity of the issues it presents us with, can be adequately explained. The UK Low carbon Transition Plan²⁶, published by DECC in 2009, represents a huge opportunity for forestry and woodlands to play a major role in contributing to wider government objectives. The Commission is also a member of the Environmental Research Funders' Forum²⁷, which promotes partnership in research funding and dissemination.

6.8. Transparency in our procedures

All major programmes of research in Forest Research are supported by formal proposals (similar to ROAME²⁸ statements), though the research is currently funded through an annual service level agreement. We review all proposals annually to reflect indicative spend for the next five years. **Programme summaries and delivery against them will be published on the internet each year.**

Research with external providers will be specified in tender documents and in schedules to research contracts when these are awarded. Where no other considerations apply, projects will be awarded by open tender. Single-tender offers will be justified on a case-by-case basis. The principal justification is likely to be that the provider is a unique centre of excellence in a particular topic or is sole owner of the intellectual property required to carry out the research, or that the project builds on a line of

²⁶ http://www.decc.gov.uk/en/content/cms/publications/lc_trans_plan/lc_trans_plan.aspx

²⁷ <http://www.erff.org.uk/>

²⁸ ROAME refers to *Rationale, Objectives, Assessment, Monitoring, and Evaluation*. It provides a standard description of why a research project is required, what its objectives are, how it will be carried out, what it will deliver and how it will be monitored.

investigation established through previous contracts.

We will continue to consider reactive funding for unsolicited project proposals when funds are available and Corporate and Forestry Support judges the proposals to be compatible with the objectives and research priorities in this Strategy. The Commission will continue to fund, wholly or in partnership, studentships, lectureships and post-graduate research fellowships in order to:

- strengthen partnerships with existing external suppliers who have given us value for money in previous contracts and who possess key competencies of strategic value to forest research;
- develop new relationships with centres of excellence in research;
- increase awareness of sustainable woodlands and forests in the academic community, especially among young scientists;
- assist in delivering UK government objectives for strengthening the UK science base.

We are currently reviewing the process of awarding PhD grants with the aim of offering an annual call for proposals, based on our own, and other partners', research needs. Our aim is to provide the opportunity for a wider range of organisations to engage with forest research, and to improve the value for money, which we invest in supporting PhDs.

6.9. Ensuring Quality

The Forestry Commission will expect all research providers to comply with the Joint Code of Practice for Research²⁹ jointly developed by the Department for Environment, Food and Rural Affairs and the devolved administrations.

We will use the Advisory Committee on Forest Research to support peer review for formal external assessment of in-house research. The Committee will appoint panels ('visiting groups') of three or four appropriate experts (usually scientists and including international experts) to scrutinise particular areas of research and report on scientific quality and other relevant matters to the Committee. The system enables major blocks of research to be reviewed on a 4–5 year cycle. The outcomes of these reviews will be made public.

Corporate and Forestry Support will evaluate research purchased from external providers, and will call on the views of other assessors where appropriate. Other assessors will be drawn from the scientific and user communities.

A key independent measure of scientific excellence is publication in peer-reviewed scientific journals. All our scientists are required and encouraged to publish original work through this medium. **We will publish figures on the number of papers accepted by peer-reviewed journals in Forest Research's annual report.**

²⁹*Joint Code of Practice for Research*, issued by the Biotechnology and Biological Sciences Research Council, the Department for Environment, Food and Rural Affairs, the Food Standards Agency and the Natural Environment Research Council. Available from www.defra.gov.uk/science.

6.10. Accessing world class advice

There are cost constraints on the level of our direct access to scientific advice from the international research community. However we recognise the value of the opportunities for interaction at the European level offered by EU funding. **We will encourage researchers funded by the Commission to engage in collaborative European projects and in the EU scientific networks such as 'COST Actions' and 'Networks of Excellence'.** We are confident of benefiting from the expertise and knowledge generated by such activities.

More generally, all researchers funded by the Commission will be encouraged and expected to attend relevant international conferences, to communicate regularly with colleagues abroad and to keep the Commission and our partners in touch with foreign opinion relevant to sustainable forest management in the UK.

We value the opportunity of meeting visiting scientists – both to researchers and policy-makers – and will continue to manage suitable programmes for such visitors each year. We will also pursue opportunities to work with others to generate the funds required for formal and informal support of visiting scientists.

Meeting our customers' needs

Anyone with comments on this Plan, or suggestions for future Plans is welcome to write to the address below.

If you need this publication in an alternative format, for example in large print or in another language, please contact:

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