

Impact Evaluation of Research undertaken to deliver the Forestry Commission's Science and Innovation Strategy for British forestry

Reported submitted November 2012

Laura R. Meagher, PhD, Technology Development Group¹
and Stephen Hunter, PhD²

CONTENTS

| | |
|--|----|
| EXECUTIVE SUMMARY | i |
| Background | i |
| Key Findings | i |
| Key Recommendations..... | ii |
| 1. INTRODUCTION | 1 |
| 1a. Background and Objectives for the Evaluation | 1 |
| 1b. Approach | 1 |
| 1c. Methods | 2 |
| 2. SUMMARY OF FINDINGS..... | 3 |
| 2a. Overview of Strategy and Its Impacts | 3 |
| 2b. Evidence Base and Capability..... | 3 |
| 2c. Interdisciplinarity and flexibility | 4 |
| 2d. Impacts | 4 |
| 2e. Dissemination and other Factors in Impact Generation..... | 9 |
| 2f. Issues/Obstacles for Impact Generation | 11 |
| 2g. Lessons Learned/Insights from Interviewees for Researchers & Stakeholders..... | 12 |
| 2h. Lessons Learned/Insights from Interviewees for the Forestry Commission | 13 |
| 3. CASE STUDIES | 19 |
| 4. RECOMMENDATIONS..... | 25 |
| 4a. General Comments | 25 |
| 4b. Key Recommendations..... | 25 |
| ANNEX A: FRAMEWORK OF CORE QUESTIONS | 27 |
| ANNEX B: SEMI-STRUCTURED INTERVIEW TEMPLATE | 28 |
| ANNEX C: BIBLIOGRAPHY | 29 |

¹ Contact Details: Edengrove House, Dairsie, Fife KY15 4RP, Laura.meagher@btinternet.com

² Contact Details: Petergarth, Marton, Sinnington, York YO62 6 RD, stephen.hunter.15@btinternet.com

EXECUTIVE SUMMARY

Background

The third iteration of the Forestry Commission's *Science and Innovation Strategy for British forestry* (2010-2013) sets out how the Forestry Commission intends to apply its capabilities (financial, scientific and technical) through research into forestry and woodland foci that will support the development of policy and delivery of objectives, within the context of multiple pressing issues. Prior to the next iteration, this external evaluation of the strategy's impact on the policy and wider forestry sector focused on research funded and includes:

- an assessment of the extent to which the research is making an impact on policy formulation;
- an assessment of the extent to which the research is making an impact on innovative practice within the wider forestry sector;
- an investigation of Knowledge Exchange processes and issues ;
- gathering relevant tacit knowledge and insights from interviewees;
- recommendations for consideration by the Forestry Commission.

Drawing upon understanding of impact-generation and using a Framework of Core Questions, key methods included close analysis of relevant documents and 25 semi-structured interviews of individuals with diverse perspectives, and an illustrative case study.

Key Findings

No major deficiencies were found in regard to the provision of a firm base of scientific evidence for policy and practice.

Multiple research impacts on policy were seen particularly in relation to plant/tree health and disease, and climate-change, while several specific examples of contributions to innovative practice were also identified. Tree health research was seen as leading to tangible changes in policy and practice, with continuously emerging challenges calling for a dynamic research response. A significant conceptual impact occurring in both policy and practice was increasing recognition and acknowledgement, by both Government and stakeholders, of the multi-faceted roles forests play, for example in relation to climate change.

Among issues identified were: lack of involvement of stakeholders in the recent public spending reduction exercise relevant to the strategy; lack of involvement of stakeholders in shaping useful communication modes; limited website access to specific project information likely to constrain utilisation; and the need to balance highly respected research articles with stakeholder engagement/dissemination. More broadly, there is concern over missed opportunities due to sometimes limited engagement with stakeholders.

Generally, stakeholders in particular convey that room exists for improvement in Knowledge Exchange, in terms of engaging with stakeholders early in the framing of the Strategy or individual research projects, and throughout the process of creating and delivering the Strategy and its impacts. Engagement and dissemination could both benefit from leverage provided by closer working with key individuals in organisations playing "Knowledge Intermediary" roles.

Sustaining a critical mass within Forest Research - while also utilising relevant research capacity elsewhere - was seen as important, with concern expressed over the shrinking nature of forest and timber research in the UK.

Key Recommendations

Recommendation 1

Genuinely involve a range of stakeholders in Knowledge Exchange:

- early on in the strategy-setting/problem-framing stage and investigate the impacts they are looking for;
- throughout the research process in ongoing dialogues with greater transparency about ongoing research progress;
- later in dissemination of findings.

Recommendation 2

Improve awareness among researchers, research managers and also stakeholders of Knowledge Exchange processes that can lead toward impacts so that they are enabled both to improve processes and to identify diverse impacts and impacts-in-progress on policy and practice. This should include consideration of a more informative annual report on the Strategy and better access to research project proposals and reports, as well as qualitative descriptions of even subtle impacts or impacts-in-progress, perhaps as they fall under categories of Instrumental, Conceptual, Capacity-building, Enduring Connectivity or Attitude Change. (Developing a habit of capturing impacts in an ongoing fashion will facilitate future impact evaluations and increase organisational learning.)

Recommendation 3

Consider who within the Forestry Commission as a whole (including Forest Research) and who in the wider forestry sector (either individuals or organisations) are best placed to act as “Knowledge Intermediaries”. Seek to engage with them and enhance research impacts by leveraging their capabilities and networks in order to reach multiple stakeholders.

Recommendation 4

Develop a Communications Plan to help disseminate impacts. Take advice from stakeholders early on as to how communication mechanisms (such as events, websites, guides) and the timing of communications can be used to optimise the impact of research outputs.

Recommendation 5

Take a strategic view of where the Forestry Commission Science & Innovation Strategy fits into the wider research agenda and how to create the dynamic and flexible capability and capacity required to deliver it. This should include determining the role and critical mass of Forest Research but also how connectivity with others in the research community can enhance the evidence base and its impacts.

Recommendation 6

Consider how genuine interdisciplinary research can be encouraged by the Strategy so that complex problems can be addressed and the socio-economic dimensions of the solutions fully explored.

Recommendation 7

Consider whether the Strategy needs to be more transparent as to how much resource is allocated to scientists for research and how much to them for providing advice to policymakers and the forestry sector at large.

1. INTRODUCTION

1a. Background and Objectives for the Evaluation

The third iteration of the Forestry Commission's Science and Innovation Strategy for British forestry (2010-2013) sets out how the Forestry Commission intends to apply its capabilities (financial, scientific and technical) through research into forestry and woodland foci that will support the development of policy and delivery of objectives, within the context of multiple pressing issues. Prior to the next iteration of the strategy, the Commission wished to secure:

- an external evaluation of the strategy's impact on the policy and wider forestry sector, including:
 - an assessment of the extent to which the research is making an impact on policy formulation;
 - an assessment of the extent to which the research is making an impact on innovative practice within the wider forestry sector.

This evaluation thus considered the Strategy's context and aims, including the three purposes of the strategy:

- "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".

1b. Approach

Our approach to this and other impact evaluations is that they should be *useful*. Thus this evaluation provides robust assessment of impact to date and also relevant tacit knowledge and insights useful for future strategic decision-making by the Forestry Commission. We have drawn upon our own extensive experience in evaluation of non-academic impacts from research and scientific outputs, and also upon understanding of others in the impact evaluation field. Informed by the ESRC's Conceptual Framework for Impact Evaluation (ESRC 2011) and our own flows of knowledge conceptual model (Meagher et al. 2008), this evaluation was grounded in a conceptual model which considers research impact to be a function of the interaction between: the content of the research; the context for its application and the processes of user engagement. These processes involve multidirectional flows of knowledge, expertise and influence across a web of networks and relationships. We have been aware of heterogeneity, as for example noted in the 2007 PA Consulting/SQW Economic Impact Study's Final Report to RCUK (p.4) observation that "impact assessments will, in most cases, need to consider a wide range of outputs and impacts and consequently beneficiaries", as well as in a large-scale examination of knowledge exchange between academics and the business, public and third sectors (Abreu et al., 2009), among others. Particularly given the range of stakeholders potentially reached by Forestry Commission - supported research, we have sought out multiple perspectives and impacts that are diverse in nature and scope.

We have remained aware that many if not most impacts are often subtle and 'textured' rather than obvious (e.g. Nutley et al 2007). Measures of impact across an array of instrumental, conceptual and capacity-building impacts of Forestry Commission sponsored research were sought, and also two additional types of process-embodied early impacts found to be important in other studies (Meagher et al., 2008): enduring connectivity between researchers and research users and attitudinal/cultural change regarding knowledge exchange. We have in addition been alert to opportunities to identify "impacts-in-progress" as well as

various types of fully-fledged impacts. Given the inevitable timelag over which impacts often manifest themselves, some of the impacts we have identified will have come from research initiated in previous iterations of the Strategy.

To benefit future learning by the Forestry Commission and Forest Research, we also brought to bear our ability to illuminate roles and processes of knowledge exchange that can lead to impacts, alert to various components of the Strategy's Delivery Section such as alignment of research outputs with requirements of stakeholders, dissemination events, networking, user advisory groups, linkages with professional bodies/institutions, balancing scientific publication and 'practical' outputs, communicating and working in partnership with other organisations, linkages to policy development and delivery, contribution to cross-government approaches to critical issues such as land use or climate change, ensuring scientific quality or interacting internationally.

1c. Methods

Framework of Core Questions

Based on the call for tenders, a Framework of Core Questions was designed and revised in light of review with the Forestry Commission project sponsor to serve as a base for the analysis. This Framework acted as a common "spine" across methods and perspectives, as we developed an objective triangulated, integrated analysis. Key methods included: close analysis of relevant documents and semi-structured interviews, along with two illustrative case studies.

Document Analysis

To address the evaluation's questions, key documents were examined, including but not limited to: the Strategy; Annual Report - and key relevant publications of the Forestry Commission and of Forest Research along with website information available on the two bodies, themes and projects.

Semi-structured Interviews

Through semi-structured interviews, with a template based on the Framework of Core Questions, we were able to elicit thoughtful deliberation on the more subtle evaluation questions, particularly those calling for judgment, insight into processes such as the unfolding of impacts, or suggestions for the future. Following the "Inception Interview" with the Forestry Commission project sponsor, we were provided with a list of possible stakeholder interviewees falling into different categories; discussion led to the selection of the 30 semi-structured interviews we conducted. Interviewees fell into the following categories:

- "Overview" individuals, e.g. senior individuals at Forestry Commission, Forest Research;
- Research project leaders;
- Policy-related Stakeholders;
- Delivery-related Stakeholders.

This array of interviewees allowed us to explore impacts and impact-generating processes in policymaking and innovation in the forestry sector.

Case studies

Two case studies (Section 4) were developed through document analysis and four semi-structured interviews to illustrate successes and trace impact-generating processes or practices, and to explore possible connections between the Strategy through research onto eventual impact(s) or impacts-in-progress.

2. SUMMARY OF FINDINGS

2a. Overview of Strategy and Its Impacts

The Science and Innovation Strategy for British forestry 2010-13 sets out the strategic context, strategic outcomes and objectives, the different research themes and their priorities. There are also sections on innovation, monitoring progress, communications and the research commissioning process. Whilst the generation and identification of impacts is not specifically covered in the Strategy, a sense of some impacts that might be anticipated can be drawn from the outcomes and objectives. Although the Strategy covers all the research commissioned by the Forestry Commission, the vast bulk of it is actually undertaken by Forest Research, the Commission's own research agency. The Strategy also covers evidence activities that are not specifically research such as monitoring, surveillance and advice, although these are not separately specified. These activities may be important in their own right (e.g. field inspections that lead to the identification of diseases) or feed into research activities (e.g. National Inventory data used to help investigate carbon sequestration). Essentially all these evidence-based activities exist on a continuum and we have not tried to disentangle those just relating to research per se.

As agreed with the Forestry Commission project sponsor for this study, research funded under the Strategy is the primary focus for examination of impacts. Whilst we do consider the evidence base and capability briefly, we emphasise: identification of impacts from the Strategy and its funded research; exploration of issues involved in generating impacts from the Strategy and its funded research; illustrating development of impacts through two case studies; and capturing of interviewees' insights, leading towards our own recommendations in the concluding section.

2b. Evidence Base and Capability

The structure of the Strategy and the commissioning process that underpins it should lead to the provision of a firm base of scientific evidence for effective policy and practice. In general we found no evidence of major deficiencies in this respect and interviewees seemed broadly satisfied with its content. However, a few issues were raised:

- It is unclear how the recent exercise to reduce substantially overall expenditure has impacted on the actual content of the strategy and the research programme that flows from it. A number of stakeholders felt completely unsighted on this. Obviously, a significant loss of capacity or expertise to carry out research in a particular area is likely to feed through to the generation of impacts and possibly, though not necessarily, their uptake in due course.
- It was not possible for stakeholders to get access through either the Forestry Commission or Forest Research websites to specific project descriptions and their aims and objectives. There also seemed to be a lack of interim or final project reports setting out progress or achievements. Although many projects clearly result in high quality key publications, this lack of reporting means that stakeholders have little opportunity to comment on or contribute to the work and its effectiveness. It also probably limits the opportunities of those not directly involved in the research to use it to generate or extend impacts themselves.

When asked about quality, stakeholders almost invariably focused on Forest Research and generally failed to consider other providers of research or evidence services. In part this was because few of them had exposure to other providers and it is not obvious where they fit into the research programme.

Concern was expressed over the shrinking nature of forest and timber research in the UK. In at least one stakeholder's view, this is "largely because government support has shifted, expecting industry to pay for it. But a lot of research is basic and fundamental, so that it would be difficult to get industry to pay for in cash. (It is easier to get time, materials, access to processing facilities.) The balance between public sector funding and industry funding is going the wrong way; government has moved away and industry is poorer as a result". Particularly given the long timeframe of forestry, the maintenance of a critical mass of forest research expertise is a concern. As experienced individuals retire, they are not necessarily bringing along a next generation of researchers.

A point raised more than once was that forest research is typically published in very forestry-specific journals or publications, so that it doesn't get out to a wider community of environmental managers, non-foresters who work in forest ecosystems. "Often really good work ends up in a venue that the non-forester will not encounter, almost hiding light under a bushel." Another noted "perhaps a shyness regarding publication in broader outlets" and that "getting out there into the broader spectrum.... In some ways is more of an opportunity to draw in more funding, open up more pots". Some stakeholders acknowledged that this restricted both their own view and perhaps that of the researchers in terms of the wider applicability and impact of some of the research and potential opportunities for collaboration and innovation.

2c. Interdisciplinarity and flexibility

It is now generally accepted that there is a greater need for interdisciplinary research in Government in order to more effectively influence policy and practice. The social scientists in Forest Research have a good reputation and indications are that they have become more influential but many interviewees doubted that the Strategy really encouraged interdisciplinary projects as Forest Research budget allocations were divided between disciplines. Interdisciplinarity works best when it is a requirement of the commissioning process (i.e. better top-down than solely bottom-up) so that integration is expected to take place from the start. The best examples seem to come from programmes outside the Strategy (e.g. RELU and the Tree Health Action Plan) which required or explicitly encouraged applications based on interdisciplinary approaches. Issues exist around natural scientists having to find time and resource in order to bring in social science expertise when they consider it useful (often late in the process) rather than there being a mechanism to consider interdisciplinary questions from project inception.

Views on the flexibility of the Strategy seemed to depend on the position of the interviewee. Many evidence managers/policymakers felt that the Strategy process had dealt well with the substantial public service cuts inflicted part way through, whereas researchers and non-government stakeholders felt they were left out of the process and that changes had been imposed with little consultation and understanding of the consequences. Although those stakeholders particularly connected to tree health issues welcomed the substantial increase in funding that has occurred, this was done as an exercise primarily outside the Strategy which was published before the development of the Tree Health Action Plan.

2d. Impacts

General points

Stakeholders tended not to have long lists of research impacts "on the tip of their tongue", and most of those who did come up with impacts were more general than they were specific, such as looking at the quality of woodland resources, how it can be improved, how trees best suited to construction can be identified within forests, and so on. "There are quite a few examples over the years of the private sector looking to Forest Research for advice and

guidance and directly employing (it)". One thoughtful stakeholder, despite citing many types of impact, noted that Forest Research had made its impacts in a "mostly indirect way" and as one among various contributors to changes.

The long timespan of research to application in forestry was cited frequently. An example of a specialist area given was brownfield land regeneration: "investment in research over twenty years has paid dividends; we are seen as knowing what we are doing and leading the way". On the other hand, sometimes uptake has been rapid; the use of tree protectors had a quite immediate impact on practice on a wide scale and in a lasting way, as it stemmed from Forest Research work of twenty or more years ago, a stakeholder noted. To the extent that Forest Research is seen largely to serve the needs of the Forestry Commission and the private forestry sector, a view is that it tends to address especially short and medium term needs (up to 10 years), although some very important longitudinal work (e.g. monitoring of tree growth in long-term plots) is also conducted.

Policy formulation (devolved and GB)

Plant/tree health and disease were mentioned often as a pressing issue for multiple stakeholders which research is helping to address. "We absolutely rely on the work of Forest Research to help us navigate through that". There have been major changes in the approach taken to tree health issues and biosecurity, which are now acknowledged as being taken far more seriously by stakeholders and Government. The change was not linked solely to the Strategy as the subsequent development of the Tree Health Action Plan and its launch in October 2011 and the associated funding of new research activities has stimulated more inter-agency collaboration and greater sector involvement. Research-informed changes have taken place in strategic approaches to biosecurity. For example the National Trust (NT) now provides biosecurity guidance to all its sites and has appointed a part-time biosecurity advisor; the Woodland Trust and NT routinely use specific disease notes that come out of Forest Research for management guidance. Understanding how different pests and diseases behave on different host species, including alternative species, can contribute to adaptation to 'exotic invaders', building more resilient ecosystems and incorporating a wider range of native species. "Various measures" taken to reduce the impacts of pests and diseases were cited as coming out of recommendations from Forest Research and the Forestry Commission. One impact example given was a view that the way in which woodlands are operated in Wales was affected through regulation and advice which in turn drew from work on red band needle blight, regarded as a serious problem in Wales. Generally, as the disease arrived in the UK, there was "really good synergy – the sector is responding to research and research is picking up on the sector; there is positive feedback". Acute Oak Decline was another of several diseases cited. Past work included a study on weevil control, as another example of advice and guidance on stopping the spread of tree diseases. "We look to research to reduce the risk of transferring infection". An example of change in action is that the spread of *Phytophthora* infection into larch means that the industry will have to consider alternative species and new ways of managing forests in the future, working with Forest Research and Forestry Commission to seek the best options. More broadly, one stakeholder observed a change in attitude in the sector, related to dealing with pest resistance and policymaking around the issue, seeing a "significant impact on the way the sector works together; as a result of research there has been a huge change, definitely". Clearly, impacts of research on policy and on practice can be interwoven.

Implications of *climate change-related research* were often cited by interviewees. Indeed, a case study of impact in this report illustrates related impacts. An in-progress example of decision-making is the development of criteria prioritising deep peat sites to be restored (or not) in a trade-off of trees versus release of carbon; sites have been visited to see if Forest Research recommendations are relevant. One stakeholder mentioned that the CALM (Carbon Accounting for Land Management) Calculator tool was developed by the CLA, an organisation with a very large land-owning membership, "in close association with Forest

Research building a forest element of it” (although www.cla.org.uk does not seem to cite Forest Research); the stakeholder observed that this collaboration came out of networking at a meeting, seeing it as “a demonstration of the real benefits of Forestry Commission and Forest Research engaging more readily with the private sector”. Forest Research work is seen as making a key contribution to development of policy areas such as carbon sequestration. More broadly, but perhaps a more widespread and lasting impact has been a conceptual change which research and the Read report have helped to bring about: recognition among forest managers and others that forests have/can have multiple roles to play within the context of adapting to and mitigating climate change.

Indeed, it was suggested that the work of Forest Research has contributed to a greater appreciation across the private sector of the many facets of forests that go beyond production, such as mitigation of climate change, environmental protection, landscape values and tourism. This is seen as related to a process of dialogue which has become ‘much more prevalent over the last twenty years’ with NGOs such as the Woodland Trust, WWF, or RSPB; more involvement in policy formulation has led to a culture change within the sector in its recognition that non-timber, non-market benefits are important.

Policymakers too have undergone this conceptual change; for example, the Scottish Government policy on climate change now recognises that opportunities created by woodland creation are a serious contributor to climate change mitigation. The individual noting this change observed that it is “vital to have the underpinning of forest research at the policy level”.

Research commissioned under the Strategy has led to a major input into the Woodland Carbon Code which has had an influence on climate change policy as the role of forests as carbon sinks and in meeting carbon reduction targets is now better understood. This and the move by Government to substantially increase the consideration of ecosystem services models in policy making means that outputs from forestry research are now being used to a much greater extent.

A stakeholder cited the UK Forestry Standard Guidance into how to manage woodland in an integrated way that pulls together different interests in forestry, suggesting that “a lot of that guidance sits on research carried out by Forest Research”. (A senior evidence manager/policymaker also made this observation, reflecting that “without that underpinning of research, it is hard to see how there could be an approach to sustainability for management”.) Another stakeholder saw management of public forest estate in Wales as moving toward more of an emphasis on resilient woodlands with mixtures of species; Forest Research possesses a great deal of relevant knowledge about how different species perform so “it is a matter of bringing it together”. In light of public opinion and concerns over impacts on the environment, although perhaps not so favoured by commercial companies, Forest Research work could contribute to a possible shift toward continuous cover forestry, adapting principles and public programmes.

Innovative practice in the wider forestry sector

While many mentions of research impacts on the wider forestry sector were interwoven with impacts on policy, several examples of more specific and direct impacts on practice were also cited.

In the commercial arena, the view appears to be that there is now a more strategic approach to research in support of developing a cross-laminated timber industry which should help facilitate UK companies moving into production in this area. For instance, while noting that much of the forest products work, even if commissioned by the Forestry Commission, is done in BRE and universities, along with the timber industry, one stakeholder mentioned that product research done by Forest Research has had some implications for forestry (in Wales)

in areas of timber drying or preservation and new product development (such as laminated products).

The timber growth modelling conducted by Forest Research, based on comprehensive inventory data developed over more than 50 years, produces every six years a forecast of timber production/availability from Forestry Commission and private woodland estates for the next 20 years. "These (forecasts) are absolutely crucial for the private sector in planning its investments."

Social research into landowners' attitudes has led to changes in the approach to communications about and conditions of woodland grant schemes as a result of understanding better what drives landowners.

Research into the role of woodland in providing clean water has led to changes of thinking and the production of guidance for landowners.

Different Types of Impacts

Different sorts of impacts can arise from research; use of several categories can help to illuminate impacts and their generation. Although other definitions exist for types of impacts, we use the following five definitions, with the first three conventional (definitions 1 and 2 quoted from Nutley et al. 2007, p.36) and the remaining two suggested elsewhere (Meagher et al. 2008) as process-based types of impact:

1. "Broadly, *instrumental use* refers to the direct impact of research on policy and practice decisions. It identifies the influence of a specific piece of research in making a specific decision or in defining the solution to a specific problem, and represents a widely held view of what research use means."
2. "*Conceptual use* is a much more wide-ranging definition of research use, comprising the complex and often indirect ways in which research can have an impact on the knowledge, understanding and attitudes of policy makers and practitioners. It happens where research changes ways of thinking, alerting policy makers and practitioners to an issue or playing a more general 'consciousness-raising role'. Such uses of research may be less demonstrable but are not less important than more instrumental forms of use".
3. *Capacity-building* covers a range of impacts, often involving training for example.
4. *Enduring Connectivity* between researchers and research users, such that they stay in touch, visit and perhaps even seek to work together subsequent to a funded piece of work.... enhancing the likelihood of internalisation of research findings and thus impact.
5. *Attitudinal/Cultural Change* such that researchers or stakeholders (or both) change their views of Knowledge Exchange. Positive attitudes are more conducive to continued collaboration and indeed impact, we would suggest.

Some examples follow, illustrating different types of impacts of research conducted under the Strategy.

Instrumental:

In general terms, instrumental impacts are regarded by many as being most the prevalent type because of the applied nature of much of the research. However, few actual concrete examples were given, although the following convey a sense of this sort of change:

- Changes to thinning practice in pines as a result of research showing that heavier thinning gives greater protection against diseases.
- Specific guidance produced on biosecurity practices such as boot and vehicle cleaning for field staff and other practitioners.

- Whole lifecycle model for timber usage in buildings for architects and designers to help them demonstrate how its use as a primary building material locks up carbon.

Conceptual:

Perhaps an especially widespread and persistent impact has been a conceptual change which research has helped to bring about, as mentioned above, the increasing recognition among forest managers and others of multi-faceted roles of forests in relation to climate change. Beyond climate change, there has been a conceptual change in terms of a keener awareness of forests in other arenas such as environmental protection, landscape values or tourism. Despite being “intangible”, this fundamental change in frame of reference can lead to multiple follow-on effects, some of which may be quite tangible instrumental impacts. For example, climate impact research has helped changed attitudes and practices in industry in relation to the species of trees now best suited for planting.

Again the tree health action plan and increased emphasis on dealing with diseases has led to significant attitude changes in some stakeholders’ approach to biosecurity. Results of tree research have helped Government justify increased expenditure in this area and raise the profile of the challenges facing native species from exotic pests and diseases.

New thinking has developed around ecosystem assessment and the role of trees as carbon sinks. Ecosystems services and water research has promoted the role of trees in terms of their contribution to Government environmental policy (eg carbon targets and clean water).

As a more specific example, research on Acute Oak Decline has led to a complete taxonomic re-evaluation of the associated bacteria.

Capacity building:

In the current context, the recent cutbacks in posts and funding means that, in contrast to capacity-building, there has been a loss of capacity and expertise both within Forest Research and the wider research community. Nevertheless, there have been specific points of capacity building, such as development of the capacity to do rapid PCR diagnostics for Acute Oak Decline. In terms of short courses offered directly by the Forestry Commission, the sense was expressed that these are less frequent, although there is still some training within the Forestry Commission (perhaps not beyond) in new silvicultural techniques, for example in combating tree health problems.

Forestry education at universities could be seen as a “Knowledge Intermediary” between researchers and next-generation individuals involved with forestry, yet in some sense it could also be viewed as a stakeholder engaged in capacity-building. “In terms of training the next generation of foresters, the research Forest Research does is imperative in pushing that forward”. The National School of Forestry offers undergraduate, postgraduate and short courses, and affords graduate stakeholders the opportunity to return as needed to aggregate modules of research-informed learning into further degrees, such as Masters degrees, as they progress in their career.

Enduring Connectivity/ networks:

In funding schemes where impacts are sought for particular projects, it can be useful to identify whether or not researchers and stakeholders continue their dialogue even once a particular project is completed; such “Enduring Connectivity” might enhance the chances that, tangibly or intangibly, research findings would influence stakeholders even if in the longer term. In this context, the close structural inter-relationship between the Forestry Commission and Forest Research might itself be seen as an example of ongoing, institutionalised connectivity. Lasting relationships with stakeholders outside of the Forestry Commission may (or may not) be more dependent upon a particular research project or initiative. There are some indications of lasting relationships, for example: the higher profile

of tree health appears to have led to improved collaboration with Fera (although this may be balanced against some concerns about dilution of Forest Research expertise), as in the Asian Longhorn Beetle outbreak and the *Chalaria* Ash Dieback outbreaks. Also, Forest Research social science researchers are seen as being open to engaging effectively with the wider Defra network of social scientists.

Attitude/Culture Change:

Whereas in many impact studies, it can be illuminating to look for changes in attitude or culture such that university researchers and stakeholders come to think more positively about Knowledge Exchange, the Forestry Commission context is different. There is already a standing expectation that Forest Research researchers will provide helpful and pertinent knowledge to the Forestry Commission, at least. Many Forest Research researchers are oriented toward immediate provision of input into policymaking in real-time, as and when needed. However, there may still be opportunities to enhance positive attitudes toward two-way Knowledge Exchange with other stakeholders beyond the Forestry Commission. Some external stakeholders would appreciate opportunities to take a more ongoing and interactive role in contributing to the prioritisation and scoping of research programmes. Not only might they provide useful insights into the research as it progresses, they accept that it will also help engender a greater sense of co-responsibility and co-ownership of the issues and their solutions.

2e. Dissemination and other Factors in Impact Generation

Effective dissemination/Communication

Certainly a number of efforts take place to disseminate research findings to stakeholders. These include communication via summary bulletins and websites of Forest Research and the Forestry Commission. Perhaps less often, researchers who happen to be good at communication will share findings directly with stakeholders; if the “human factor” is right, this approach is valued.

Some issues have been raised. For example, some efforts are seen as effective (examples cited include tree health days with industry, social research notes and contributions to sector conferences); yet there also appears to be a widespread view that websites and other internet-based communications (webinars, web forums) are not very good (with Forest Research perhaps regarded as a bit better than the Forestry Commission in this respect). Many felt that the communication of outputs was not properly considered at the outset of the research commissioning process – there was no obvious communications plan for the Strategy. Delays and lack of engagement with external partners over timing of publications were seen as significant obstacles with the Forestry Commission not effectively mobilising others to help promote research findings to stakeholders and thus increase their impact. There are some indications that there were differences between scientists and communications specialists within forestry organisations as to whose product was being disseminated and why. Another issue is the perennial one of balance, with praise for academic papers accompanied by concern among some research managers that not enough are being produced, while others express concern that emphasis on academic papers should not prejudice the production of other types of communications more suited to industry and policy stakeholders.

Another dimension of communication lies in education. For example, whether through short information notes or peer-reviewed papers, research carried out by Forest Research feeds into teaching of forestry. When student placements or graduates go on to employment in forestry, they thus take with them learning drawn from research and also develop the habit of referring to such information sources.

Knowledge Exchange/Interaction with Stakeholders

Although there was clearly some significant internal and perhaps more limited external consultation on the original draft of the Strategy, a great many interviewees felt there was not enough real exchange of ideas with a wide enough range of stakeholders. This meant that expectations of outputs and impacts were not well articulated and iterated with stakeholders. In particular many saw this as the point when a consensus on what the key research objectives should be was missed. Other Government interviewees tended to feel that the Strategy would have benefited from greater input from them so that the Strategy could have been linked more effectively into the wider context of Government research and strategy. Even a senior level evidence manager/policymaker who gave high marks to the research strategy for “working backward from outcomes” (rather than starting with “research we want to do”) suggested that the strategy “probably could have benefited from more stakeholder input, as it was relatively internal to the Forestry Commission particularly important when it comes to making hard decisions regarding which research programmes to increase, decrease or do away with”. Most external stakeholders were unclear what influence they had actually had on the final content. None interviewed had been involved in either the refresh or the restructuring following on from the Spending Review and seemed to be unaware as to what impact these had had on the Strategy or the commissioned research. Although most Forest Research and Forestry Commission interviewees had clearly been involved in the drafting of the Strategy, a couple felt that this had been more in the nature of submitting some text or commenting on specific sections rather than real engagement (e.g. through workshops). The refresh and Spending Review exercises were consequently seen very much as senior Forestry Research/Forestry Commission management exercises.

As noted above, the dissemination of outputs delivered from the strategy was seen as patchy at best because of the lack of engagement across the sector in how best to communicate them. In terms of communication of emerging findings during the research and interaction with stakeholders, the PAG system was generally seen as expensive and inefficient and in many cases did not involve anyone outside the Forestry Commission or Forest Research. There are no interim or final project reports and the annual summary report for 2011 did not really have any useful information on what the research had actually achieved. Consequently, stakeholders often had little idea about the progress of research and therefore were not engaged in understanding its implications or how to assist in maximising its impacts. Transparency could be improved during the life of the Strategy as to the progress of research (rather than just a list of published papers and meetings attended).

Other Factors

Other investigations into generation of impacts from research have highlighted the role of “Knowledge Intermediaries”, translators moving easily across boundaries between researchers and stakeholders who can thus leverage greater impacts. A variety of organisations can act as Knowledge Intermediaries for Forestry Research work, many times through the efforts of a key individual with responsibilities to connect research and stakeholders. Examples include organisations such as the Institute of Chartered Foresters, Confederation of Forest Industries, the Royal Forestry Society and the Royal Scottish Forestry Society and other bodies, such as the Forestry Commission Wales National Committee and its Woodlands Strategy Advisory Panel, or groupings such as the Woodland Carbon Task Force, or the England Wood and Timber Partnership. Knowledge Intermediary actions vary, from individuals’ participation in key dialogues during which they convey concerns/information between researchers and stakeholders, to publication of findings in accessible magazines or websites for an organisation’s membership, or even convening workshops to help disseminate key messages from research. Of course, given that many Knowledge Intermediaries of necessity cover a wide remit, it is easier for them to disseminate research messages that are provided to them in finished and accessible form.

Although apparently the number of Forest Research Liaison individuals has decreased significantly in recent years, stakeholders spoke very positively about the current Forest Research Liaison Officer in Wales, as someone who can translate and disseminate research and who is sufficiently well-regarded that stakeholders will call with questions as to knowledge that might exist about particular problems. In a variety of settings, some individuals will be well-situated to advise either or both policymakers or practitioners in the field, utilising research outputs, while also helping researchers “to be aware of pressing problems of the day”. Other interviewees mentioned individual scientists, Forestry Commission policy analysts or Forestry Commission country staff as key intermediaries for either disseminating research outcomes and/or as potential conduits for stakeholder views.

One stakeholder expressed the view that, rather than research having a direct influence on commercial foresters, commercial foresters are more likely to be changed by motivational grants in aid which themselves are based in research.

2f. Issues/Obstacles for Impact Generation

Many of the comments about possible missed opportunities for generating impacts referred to the failure to engage with stakeholders about what impacts they were seeking and the subsequent lack of engagement with them over emerging findings and how best to communicate results and to co-generate impacts. One issue raised was what might be seen as a dwindling pathway for exchange between stakeholders and researchers. There was perceived no current forum where research could be brought together and discussed between researchers and stakeholders. If pathways for two-way exchange are not maintained (or grown) opportunities for impact may be missed. For example, in other work on Knowledge Exchange, early involvement of stakeholders, who can thus contribute to the actual framing of research questions, has been seen as a constructive step toward enhancing the likelihood of later impacts. Yet, forestry stakeholders are not always sure of their welcome in this sense. One stakeholder who could represent aspects of the forest sector seeks to become actively involved in consulting toward research and other Forestry Commission strategies, but commented “I would say it is quite difficult to get that to happen in practice”.

There is concern that Forest Research doesn’t have a “proper outreach or extension arm”. Yet, some such efforts would rely on (expensive) time of staff organising seminars or outreach; this is seen by a senior evidence manager/policymaker as “an area to carry on reflecting on and worrying about its effectiveness in (a time of) constrained resources”. A stakeholder comment/recommendation was that Forest Research ;

“produces useful results but I’m not convinced the bridge is there to pass the information properly to the stakeholders ... there needs to be more handholding. It’s almost as if Forest Research produces useful information but the stakeholders have to come and find it, and it should be the other way around. ... other countries (have) extension or outreach A bridge between what the stakeholder problems are and the researchers, a two way process, (is needed) ... (and) a better hands-on transfer of knowledge..... It is crazy that Forest Research produces very useful information but it doesn’t get used as fully as it should.”

This concern also links to another issue that was raised by stakeholders: the tension between (understandable) pressures for Forest Researchers to demonstrate research quality through peer-reviewed scientific articles, and the need for stakeholders to have findings made directly accessible to them. “It is no good publishing and thinking “that is the end of it””. At least one interviewee feels that “there is too narrow a view of what constitutes good research – just numbers of peer-reviewed papers rather than realising other research outputs”. Yet, researchers would not want to move to the opposite extreme, for instance

only writing review papers rather than generating new knowledge. A possible danger was cited as “becoming normative, doing research which has no edge to it”.

A related issue is one of timelag; a stakeholder worries that a stated commitment to knowledge being scientifically validated and published before being transferred (being “very purist”) could delay the information past when it is needed. “That’s bonkers, especially with pests and diseases. It can be a five-year process and by that time it is too late. Advice needs to be more robust; many problems (such as new diseases) cannot wait. There have been seven or eight tree diseases in the last two to three years... That is a major problem....By the time a proposal is prepared and goes through a process, it can be two years and that is too long. It can be too late to eradicate a disease....there needs to be a contingency fund for when one of these problems crops up that needs immediate robust attention”. In this respect stakeholders seemed to assume that all such capabilities should be located within the Forestry Commission although recent examples (*Phytophthora*, Asian Long Horn Beetle and *Chalaria* Ash Dieback) all pointed to a wider co-ordination of contingency response. A related recommendation is that “extension people (could be) in closer contact with stakeholders, so that as soon as a potential problem arises, they would be the focus for getting onto researchers and indicating the problem and what needs to be done, and speed up the whole information transfer process”.

The issue of the time scales needed for forest research was raised as causing a tension between the need for long-term commitment and with what can be a shorter term view of stakeholders including but not limited to government. (Yet, the recent panel led by the Bishop of Liverpool on the future of the forest estate in England was cited as having said that research is fundamentally important.) It was also mentioned that a four year strategy was not really long enough properly to research areas such as tree breeding and the impact of climate change and diseases. This was exacerbated by the fact that the original Strategy had not even survived the whole period but had already been subject to significant change. This would inevitably disrupt the delivery of impacts. A stakeholder painted a picture of a sector without much “slack” for experimentation, so that although money can buy time and act as a lever motivating change, commercial foresters can still be “nervous” about change. Compounding this wariness is the timeframe for forestry: “With trees there is a time lapse of (slightly less than) 50 years or more; by nature you are more cautious.” It was acknowledged from a stakeholder perspective that effective transfer of understanding is “not only a problem of Forest Research; some of the problem is with the stakeholders”.

In specific areas there was criticism of the failure to be more pro-active at engaging external scientists in order to maximise the impact that the research on tree health might have. On the other hand, when there was an attempt to proactively engage with stakeholders over the distribution of Acute Oak Decline, the scientists struggled to cope with the amount of data that then came in. One interviewee felt that there was a lack of distributional analysis to determine the winners and losers in relation to policies and consequently a lack of understanding of the variability of their impact.

2g. Lessons Learned/Insights from Interviewees for Researchers & Stakeholders

Stakeholders offering lessons learned for researchers mentioned the importance of providing opportunities for stakeholders to have more input (for example in forming the research programme) and improving two-way communication (for example offering communication exercises that include face to face interaction). “There is a need for good effective communication, joined-up thinking and maintaining dialogue - prior to commissioning of research, during and upon completion of research.”

However, stakeholder interviewees also recognised the responsibilities of stakeholders: “As well as providing opportunity for stakeholders to have more input, there is also an onus on stakeholders to do more to prepare their own thinking...not just turn up at a meeting. There is an onus on the private sector to reflect on what they see as important for the future of the sector.” Another suggestion was that policymakers need to be clearer about what they are looking to achieve from the research that is being commissioned. Consistent with the multi-directional dynamic implied by “*Knowledge Exchange*” rather than unilinear “*Knowledge Transfer*”, shared responsibilities were noted for enhancing the generation of impacts from research: “For both sides: recognise each others’ needs and try to develop processes that allow research to happen that reflects those needs. (Stakeholders might need answers quickly, for example.) Good communication is everything.” Given the importance of “communication, networking and promulgation”, better use could be made of “knowledge intermediaries” such as trade associations or other organisations, who could help in the two-way communication between researchers and stakeholders. As well as interaction that seeks stakeholder input, dissemination is valuable; particularly in the context of tough financial times, researchers are encouraged to “go out and shout your successes out there”.

Generally, encouragement of interactions in multiple directions is recommended. A suggestion was that researchers need to be more willing to engage with each other and stakeholders about priorities and the creation of impacts. There also needs to be better connectivity and interaction with researchers in other sectors (e.g. agriculture, environmental and ecological valuation, ecosystems services). Stakeholders need to be willing to engage with scientists and policymakers over the framing of research questions and be prepared to support greater innovation by researchers rather than just supporting research that reinforces current practice. Importantly, stakeholders also need to be more willing to engage with each other over issues and how the researchers can help.

2h. Lessons Learned/Insights from Interviewees for the Forestry Commission

Engagement with and input from Stakeholders

In developing its strategy, and related plans for commissioning research, the Forestry Commission is frequently encouraged by stakeholders to engage more closely with prospective users – both policy and private sector. There is a sense that Forest Research is important... but there needs to be “a more robust means of getting a range of stakeholder input into the strategy” ... into a strategic overview of the relative importance of the research to be carried out. Currently, a stakeholder observation is that a “difficulty is that Forest Research is not master of its own destiny; the Forestry Commission comes up with its own assessment of what is necessary. ... Certainly we (stakeholders) would welcome the opportunity to have impact into a strategic overview of research to be carried out”. For example, the point was made that, although there is some involvement, horizon scanning is “something the Forestry Commission could do more of with us”. Multiple comments refer to this point:

“There should be a mechanism by which the Forestry Commission in each of the three countries consults with stakeholders then brings that into the conversation with Forest Research about what the strategy should be.... (there doesn’t seem to be) an effective mechanism by which the private sector can express views to the Forestry Commission in the three countries ... there is an absence of an effective mechanism by which the Forestry Commission determines strategy in each of three countries. ... it would be useful when the three countries first come together with Forest Research to determine strategy, that they involve the private sector. ... (for instance) it would be important for each Research Strategy Board to either formally include someone from the private sector, or at least have a point where there is input from someone in the private sector”.

“I am tempted to suggest that closer working relationships with the sector would be useful—both for commissioners and users of research. Many in the sector would say they have no interaction with the research community and are not aware, but they could offer ideas if asked. ... A frustrating thing might be if someone at a late stage becomes aware and says if only they had been asked early on, they would have suggested something different. So it would pay dividends to ground-truth, early on. You can't assume researchers have a monopoly on wisdom; it is highly desirable to have links outside to keep feet on the ground and so that research has good practical use, in short, medium or long-term, and is not just left on the shelf.”

The Forestry Commission could take an “external view of needs” (seeing the needs for trees, woodlands, forestry as here to serve society, the economy and the environment). A senior evidence manager/policymaker recommended that stakeholders be given opportunities to discuss what the strategy should be, even if often it may be difficult to engage many stakeholders in long-term strategy. Viewing the strategy as “really pretty good overall”, suggestions include “an evolving strategy is making sure we take a wide spectrum of views rather than (being) too internal – and thinking of how forestry fits into integrated land management rather than forestry per se”. One comment in relation to tree health was that there needed to be “a more joined up approach to plant health research between Defra and the Forestry Commission”.

Since the Forestry Commission is both part of government and a key stakeholder of forest research (owning some 20% of the UK forest area), there is inherently a close relationship between needs and the research strategy. Beyond this, improved connectivity between researchers and policymakers could enhance the likelihood and robustness of impacts from Forestry Commission-funded research. “It would be excellent if policymakers could be brought closer to some of the research findings from Forest Research and maybe the Forestry Commission. ... There is a serious gap between understanding of policymakers in government and some of the research findings coming out of Forest Research and universities”.

There is recognition of the importance of communication *early on in framing research problems* - “some way of transmitting needs to researchers and vice versa on an ongoing basis”. Sometimes the actual structure of funding may seem inconsistent with stakeholder needs: “There are lots of good ideas that people have in industry, but no way of funding it. The UK government, rather than saying ‘here is pot of money for forest research’, says it has to be on a particular “theme” - sometimes the themes fit forestry and wood products, sometimes not.”

Later in the cycle, improved communication, including although not limited to post-research dissemination, is another recommendation:

“Develop networks and polish up communication skills. This applies at the early stages of research as well as at the end, when there is a need to promote and promulgate results of research to benefit someone. It (the work) is not done when the report is written up! There is at least one more link in this chain - with the world outside the research community. It is very much in the researchers' interests to become more skilful, so people will talk with them. Communication - (get) good linkages, names to faces and everything else will follow. Talk to more people outside in the stakeholder community, particularly in industry.”

“Practitioners are continually new people, do not take it for granted that they will make use of past knowledge.”

“Never rest on laurels regarding effective communication of research.”

“Though Forest Research does a great job, it has a weak point - they are inclined to hide their light under a bushel; they do excellent work but do not broadcast it. Probably a lot of the sector is blissfully unaware of first class work (making it hard to have impact). Otherwise they might stumble into relevant work, or might, if they are lucky, track down the person with knowledge.”

A willingness to learn from others’ approaches is recommended. For example, “Copy the outreach services that there are in other countries.... ‘Extension specialists’ (as in the US) The stakeholder knows that that person is filling that role. They need a friendly face and a known face, not just to phone up a research station and talk to someone they don’t know.” Another source of learning could be client-focused private sector approaches, for example: “In the external world, research is attached to delivery; could we learn something from that?” (For example, computer companies put out products knowing full well they will have a different iteration in several years.... planning ahead for innovation.)

Another key insight on impact generation is that the Strategy should have an associated communications plan which involves all those who can act as knowledge intermediaries, including other Government agencies, NGOs and the private sector. The profile of the research outcomes and their implications need to be raised significantly. There is an appetite amongst external stakeholders to help with this.

Despite issues, it should be noted that positives exist. A researcher with an overview pointed to history, suggesting that the success of the forest sector relates to new practices arising in part from “the close culture of the forest sector and Forest Research. ... A strong tradition of using research, and strong relationships between foresters and researchers A really symbiotic relationship between the private sector and Forest Research” (which has good access to forests across the UK). Networks and relationships are highlighted as key to impacts.

Generally, however, a key message from across multiple interviewees is that there needs to be much more effective engagement of stakeholders throughout the process of creating and delivering the Strategy and its impacts. Whilst there is substantial interaction with policymakers (particularly within the Forestry Commission) the engagement with end users is rather more patchy. Stakeholders could be significantly more involved in co-production, co-design and co-delivery.

The Nature of Research

Issues mentioned for inclusion in research strategies include tree health and disease, both understanding impacts of pest diseases on tree health and understanding how to select tree species and manage them to respond to threats from disease. Also, climate change is often cited. To “be able to protect the resource and make it robust for the future,” there is a range of coverage expected, including but not limited to: How to produce high quality trees of all types for the future; how we can help people manage native woodlands and species as much as commercial products; helping people identify ways to pay for managing woodlands, e.g. selling to markets such as timber, recreation, and non-market benefits or ecosystem services. It was noted that, while difficult, it is crucial to provide help by developing ways in which value can be captured for subjective products so they can be assessed comparatively; this is an example of a timely window for funding. “Sceptical individuals will see ecosystem services bringing in widespread consistent funding in the foreseeable future, though they appreciate there is lots of political interest so it is worth looking at to be sure forestry doesn’t miss opportunities.... Forest Research plays a key part....”

Of course, there is not universal agreement as to emphases. “I do get the impression that people in industry might feel if they take time and look at research and see some wood

properties as useful work, (they might wonder) why is so much research money spent on native broadleaves, or on social and environmental matters - should someone else be doing the touchy-feely stuff? (That work is done) because of the multiple benefits that forests are expected to deliver - everyone in industry recognises that, but have we actually got the balance right? You need to do a bit of all of that, but whether the weighting is currently right - you could have a long debate and consider the Forestry Commission's role. Should it be all things to all men? That's not usually good. It's a question of priorities." There can also be a tension between emphases on different timescales. For example, one stakeholder commented: "Quite possibly research could carry on and spend scarce resources on things that are worthy or significant in the future, but other things get missed. Research by nature is long-term, but managed woodlands need new products (in the short-term)."

Integration of research is needed to match holistic, complex problems. "We have followed a very functional approach ... (and what) can be a silo approach, not the broader setting we are working on. That's where research needs to be broader and more dynamic. Research needs to be much more holistically focused and must have a broader environmental scanning in a holistic scheme (for example, the role of trees and woodlands in a rural context). Trees and woodlands are multi-functional, as we are all finding out, and therefore they can play a variety of roles. ..."

Integrated teamwork is likely to be important: "Research staff are very capable of working in teams; it is more that they don't think of working in teams. But, if they did, they could do a very good job". Decisions have to be made as to resource allocation for research. "When there is competition for money, the thing that counts is the Swiss army knife. Research can constitute a Swiss army knife, as the (integrating) body of it, with each discipline a different blade. Challenges of growing trees should always frame the context. How much do you invest in the body v the blades of the knife..." Complex challenges will require balancing the funding for integrative work versus the maintenance of formal disciplinary excellence.

Support for a Critical Mass of Forest Research

Despite identifying issues and concerns, stakeholders wished to articulate a positive baseline attitude toward Forest Research as an organisation, particularly in a time of constrained resources:

"(There is) strong support in the private sector for Forest Research to function... so we are keen that it have a critical mass to survive and also a number of disciplines (in order) to operate across different areas".

"Another thing that worries me and a lot of foresters is that with government cutbacks Forest Research might get absorbed into Fera or Defra. That would be detrimental. ... We need a critical mass."

"Currently if plant health (issue arises) - I do want my colleagues in Alice Holt and Northern Research Station to be there because their research demonstrates its worth. Some parts of research are 'insurance policies'; some are very long-term fundamental; others - not sure".

A senior evidence manager/policymaker suggests that the next strategy would "ideally help understand priorities and what to continue, partly based on importance and the ease of mothballing", including "dealing with constrained financial circumstances..... (providing) a bit of a steer as to absolute core things where whatever else happens we protect those; there is a danger of salami slicing..... It is partly about skills and experience that (would be) relatively easy to pick up again and others where ten years of experience is irreplaceable".

There is international respect for Forest Research, so that an issue that needs to be thought about is “maintaining that level of reputation with limited resources”.

Enhancing the Research

Of course, stakeholder support is not guaranteed. Awareness of stakeholder needs will matter. “There are tough times ahead financially - and here already - and they will have to really prioritise as to what they spend their time and resources on researching. The private sector probably won't put hands in pockets but if they feel research has value for them, they will be a lot more supportive of the organisation doing it. The Forestry Commission and Forest Research have been under threat, but the private sector has rallied around them to government. Because we felt we were in danger of losing them, we may have over-egged their value and not voiced our criticisms. To ensure their future, they do need to have the support of the rest of the sector.”

A suggestion was that the Strategy has to be realistic in what can be done for the money available and needs to have a greater focus on what it is trying to achieve in terms of outcomes and impacts as opposed to a rather generalised attempt just to maintain a capacity for forest research.

Some issues relevant to stakeholders may arise quite rapidly, so that a level of dynamic responsiveness is recommended:

“I'd rather not that there (would be) one penny less on research; it is not about cutting research budget or people in research, though that is being done, assuming we get the value we need to be...it is *how* we insure a *dynamic* approach.”

“A new challenge for Forest Research is to be responsive to a rapidly changing world, whether global climate change or getting people to change - Forest Research needs to learn to respond quickly. Not sure they've worked out how to do that.”

“Necessarily those in the field are short-term, in a utilitarian sense - ‘I need something to get me going’... could be medium or long term...that sort of dynamism doesn't seem to be something I recognise in the Forestry Commission”.

One stakeholder recommendation is to facilitate flexibility and dynamic responsiveness, for example by reserving some funding as incentives for researchers to address research issues arising:

“The Forestry Commission now is more dynamic (than in the past). Research too needs to be more dynamic and flexible... to bring in dynamic research from outside or (address) a gap between research and what is wanted in the future ... We need new incentives, not just the grants system.... You could do with hypothecating (ring-fencing) a significant chunk of your research monies and using that to fund annual contingency research needed for day to day, month to month needs. If the grant in aid is £10-12M, maybe ten percent could be ring-fenced.”

Relevant research is not conducted solely by Forest Research. “Quite a lot of industry gets its research done in universities, why is it we have a bespoke Forest Research? One answer: the universities that do pure forest development are thin on the ground Conversely, trees, woodlands and forests could fit into land use, green infrastructure, ecosystem - research is done all the time on those.” In addition to making use of universities, another suggestion is to draw on relevant international research. “(ask) are we doing things others are doing and are they doing things relevant to us.... Why not just bring in answers from other places”. However, international work may be factored in naturally, as

the work of Forest Research and Forestry Commission is noted as being held in high esteem by forestry researchers internationally.

Sometimes, helpful when resources are limited, research giving rise to impacts is conducted with external monies and/or in partnership, as with funding from the Rural Economy and Land Use programme to conduct work on Lyme disease relevant to the Royal Parks and others. Forest Research's social research team is sufficiently distinctive, with access to policymakers, that it is often included in European projects. A general insight is that the Strategy needs to be clearer as to how it relates to the research strategies and activities of others – Defra, EU, Research Councils, industry. Where does it sit in the greater scheme of things? Are the different research programmes complementary or are there duplications or gaps?

Impact Evaluation Issues

Reflecting that stakeholders generally “seem comfortable with research and anxious that it not disappear, but they might struggle to explain specifics”, a senior evidence manager/policymaker recognised that there are challenges in actually seeing the impacts of research. Even stakeholders themselves can appreciate that impacts of research can be difficult to identify:

“Research might tend to be the seminal cause of something or other, but it gets lost in translation. ... Quite a lot of stuff that goes on can be easily lost, like social (research) work or valuations”.

“The general perception of FC research is that it is less relevant than it actually is. There have been things that have been influential, that people do not know the origins of. ... One could easily axe a research programme that is very relevant to the future but you wouldn't know that the tap had been turned off until at some level you see that the research is no more. ... (it is important to) maintain continuity in the things that are relevant.”

At least one stakeholder hopes that stakeholders will be able to see the results of this review.

3. CASE STUDIES

CASE STUDY 1

CARBON ACCOUNTING AND WOODLAND CARBON LOOKUP TABLES

Research Summary

Research leading to improved carbon accounting and the development of widely useful woodland carbon lookup tables is part of the Managing Forest Carbon and Greenhouse Gas Balances Programme which sits within the Climate Change Theme of the Forestry Commission (FC) Science and Innovation Strategy.

The Programme as a whole provides the scientific evidence to enable the Forestry Commission to report on UK forestry stocks reliably, to understand the impacts of climate change on those stocks and to recommend appropriate management and policy for the UK forestry sector. It quantifies the Greenhouse Gas (GHG) balance and economic consequences of different management practices, the role of woodland creation and the contribution of forest products and bioenergy. It also supports the national and international calculation and reporting of carbon stocks and the setting of carbon assessment methods. As well as contributing to forest carbon and climate change science, it aims to disseminate information to and develop tools on carbon and GHG balances for the forestry sector including policy makers, forest managers and other stakeholders.

Specifically Objective 7 of the Programme is to produce integrated GHG balance calculation 'tools', up-to-date knowledge resources and information for stakeholders. These contributions are meant in particular to inform reporting requirements, to assist meeting emissions reductions targets and other national, country and sector GHG management objectives and initiatives (e.g. The Woodland Carbon Code) and to support the development of the UK Forestry Standard.

Although the current work programme runs from 1 April 2011 to 31 March 2015, it follows on from previously funded work in this area. The Programme is primarily funded by the Forestry Commission but the project proposal documentation indicates there are also contributions from the Energy Technology Institute, UK Energy Research Centre (UKERC) and the Scottish Forestry Alliance. In 2010-11 the Programme cost the FC £757,000 and the research was entirely undertaken by Forest Research. The FR Programme Manager is Dr James Morison, the FR Project Manager for the carbon accounting and assessment work is Dr Robert Matthews.

This case study focuses on impacts of the research into carbon accounting models and the development and use of the carbon look up tables that are available on the Forestry Commission website.

Principal Users/Stakeholders

Policy Users: FC GB, FC countries, Defra, DECC, European Commission, Forestry Scientific Community (e.g. Universities, CEH).

Forestry management consultants/advisors and woodland owners.

Highlighted impacts on Policy

Modelling of carbon stocks and stock changes for DECC was used by the UK to broker an agreed negotiating position within the EU and then during international negotiations on the inclusion of forestry as a mandatory commitment under the Kyoto Protocol. That commitment was a major achievement as previously the forestry component was only voluntary.

As a result of a Defra/DECC contract to CEH the data on forestry carbon that is submitted through the Land Use, Land-use Change and Forestry (LULUCF) mechanism to the UN Framework Convention on Climate Change (UNFCCC) now uses the higher quality FC models.

Highlighted Impacts on Practice/Private Sector

The development and wider availability of the carbon lookup tables in support of the Woodland Carbon Code now offers a variety of external users the opportunity to access credible carbon accounting tools; not only in support of grant applications for the creation of new woodlands (the original intended use) but for other purposes.

Forest Research collaboration with a private consultancy on the carbon impact of biomass production allowed them to clarify the real impact and when there was or was not the creation of a carbon debt. It also exposed some of the scientists to the needs of such commercial clients and how they differed from those of public policymakers.

The development of a sophisticated woodland carbon calculator allowed its integration into the existing Country Land & Business Association (CLA) model for the carbon modelling of agricultural holdings, Carbon Accounting for Land Managers (CALM), which previously only had a basic woodland calculator in it. Landowners can now take a more holistic and accurate perspective on the carbon budgets of their land.

Woodland owners and their advisors are now considering the carbon income potential of their woodland and not just the timber production income. In response to this some are now taking a much more informed view of the impact of different management strategies on carbon sequestration. In doing so, they can (and do) provide feedback on the need for revisions to the models to take greater account of management practices (e.g. different thinning options, the retention of roots and stumps).

Enabling Research with Potential for Additional Impacts

Economists within the FC are now using the woodland carbon accounting tools to investigate other issues such as the carbon foregone when creating a wind farm, the development of Marginal Abatement Cost Curves for forestry, economic impact modelling of the impact on carbon sequestration of the loss of trees due to Ash dieback disease, the benefits of different rotation regimes.

Routes towards impacts

Much of the impact of the carbon accounting research on the Government and international policy development has been through key researchers acting directly as scientific policy advisors to senior policymakers. In these ongoing relationships, key researchers have in a sense been "on call" to advise and help as needed. As just one example, a modelling researcher provided technical support to UK and EU negotiators at the Cancun (2010) and Durban (2011) Kyoto Protocol COP meetings. Prior to the meetings, he developed key technical briefings iteratively with the customer so that they provided underpinning evidence and argumentation which assisted the negotiators in meeting key objectives related to enduring forest management becoming a mandatory activity and the use of reference level accounting for forestry management. During the negotiations, he was available to support negotiators by telephone, when necessary. During the Cancun meeting, he provided data on the contribution to emissions levels by Harvested Wood Products which helped the negotiator obtain EU agreement on accounting for HWP. In another activity, this individual with other Forest Research staff have been key partners in a consortium that produced background material and a synthesis report as a basis for policy discussions on a potential EU Decision on LULUCF accounting, as part of the EU Emissions Reduction Commitment. A draft report is being prepared for DECC in relation to obtaining a better understanding of

the impact that potential changes in LULUCF rules might have on GHG emissions and removals in developed countries. All of this draws on the ongoing research and expertise that has gone into the carbon accounting work carried out under the Forestry Commission Strategy, demonstrating the critical role of supplying data and technical advice to support the formulation of evidence-based policy.

FC GB and country policy analysts often act as “Knowledge Intermediaries” – for example helping end users to understand and effectively utilise the lookup tables whilst feeding back to the researchers their suggestions for refinements of the models.

Of course, the ready accessibility of the lookup tables on the Forestry Commission’s website has enhanced their use, and thus the impact of the research that developed them. (For example, between 22 August and 22 October 2012, “/carboncode” has had 1,393 page views with 694 unique visitors to this page. The page housing the carbon lookup tables has been visited by 93 people in these three months.) There are now nearly 90 projects in the WCC Registry all of which have used the tables, and many more are “thinking about it”.

The key route to academic impacts of this research is through peer-reviewed publications and academic conferences but there are indications that the applied and policy driven nature of FR might be restricting impacts through this route to a certain extent.

Lessons for Researchers

Academic impacts, through peer-reviewed papers or presentations at scientific conferences, and non-academic impacts, for example through policy advice and making user-friendly carbon accounting tools, are both important. The trick is to get the balance right between them.

Involvement with external stakeholders (non-academic or academic) can lead to impacts not originally envisaged by those commissioning and carrying out the research.

Lessons for stakeholders

Understand that there are not limitless resources for public-funded research and that any research programme is a compromise between conflicting demands. Be prepared, and indeed require, to be involved in making the hard decisions on research priorities.

Make an effort to understand what the research community contributes to effective woodland creation and management and do not take them for granted. Engage with them, being both supportive and constructively critical as appropriate.

Lessons for Funders/Strategy-setters

Consider the potential wider impacts of the funded research (both academic and non-academic) rather than just the immediate policy requirements. Engage earlier and more comprehensively with stakeholders in order to understand how they might reap additional benefits from the research. Keep them engaged throughout. Identify and involve effective “Knowledge Intermediaries” who can provide connection and translation between researchers and stakeholders.

Create a properly resourced communication strategy for the research programme from the start and be proactive in engaging external parties in helping to spread the outcomes of the research.

CASE STUDY 2

FORESTS AND WATER

Research Summary

Research investigating the relationships between forests and water resources is undertaken as part of the Protecting Soils and Water Resource Programme which sits within the Ecosystems and Biodiversity Theme of the Forestry Commission (FC) Science and Innovation Strategy.

The Programme as a whole aims to evaluate the impacts of forests, woodlands and their associated management practices on soil and water resources under a changing climate and changing pollutant emissions. It also aims to quantify the benefits of woodland creation for soil, water and flood management and its role in integrated water catchment management. The evidence from this programme has begun to and will be used in the future to develop practices and guide future policy to secure the soil and water services that underpin the multiple benefits provided by forests and woodlands.

In terms of hydrology, Work Area 2 looks into the effects of semi-natural woodland, new plantings and riparian plantings on flood flows, the latter including a contribution to the Slow the Flow project at Pickering. Work Area 3 investigates mitigating diffuse pollution including longer term monitoring of acidification impacts of forestry and the impacts on water quality of forestry practices such as tree removal and peatland restoration and stump harvesting. Work Area 4 is about sustaining water resources including the investigation on hydrology of upland afforestation, short rotation forestry and riparian shade whilst Work Area 5 supports the hydrology component of work on Transnational Forestry Management Strategies in Response to Regional Climate Change Impacts.

Although the current work programme runs from 1 April 2011 to 31 March 2015, it follows on from the merging of previously funded separate soil and hydrology projects. The Programme is primarily funded by the Forestry Commission and the project proposal documentation does not indicate any funding from other sources. However, the SIS Annual Report (2011) indicates that whilst in 2010-11 the Hydrology Programme cost the FC £337,000 there was also £100,000 of external leverage. The FR Programme Manager is Dr Thomas Nisbet, the FR Project Manager for Mitigating Diffuse Pollution work area is Dr Nadeem Shah.

This case study focuses on impacts of the research into water resources aspects of the programme. In addition we considered Opportunity Mapping work done for the Environment Agency (EA) by FR which led from original work done under the SIS in this area.

Principal Users/Stakeholders

Policy Users: FC GB, FC countries, Water Regulators (EA and SEPA), Defra, Scottish Government, SNH, Local Authorities (flood management), Forestry Scientific Community (e.g. Universities, CEH) and National Parks authorities.

Forestry management consultants/advisors and woodland owners but also fishery groups and conservation NGOs (eg RSPB) over acidification issues and local communities in relation to flood management issues.

The work done for the EA Midlands area was of immediate use to them and FC but would then also be used to engage other partners (NE and the Woodland Trust) as well as Local Authorities, Rivers Trust, National Trust, Wildlife Trusts and woodlander owners and managers.

Highlighted impacts on Policy

Overall the programme has moved from one which used to be entirely about the detrimental

effects of forestry on water quantity and quality and how to mitigate these to one where the potential positive impacts of woodland planting for flood management and biodiversity are better understood and taken into account. This has led to policy makers, particularly in EA and SEPA and Local Flood Defence Committees, actively considering the role of land use change, and woodlands in particular, when designing and implementing flood management plans and meeting objectives set by the EU Water Frameworks Directive. As just one example, input from FR staff into SEPA is leading to inclusion of forestry within a desk-based GIS Section 20 Assessment Tool for a range of flood management measures. As another example, an FR researcher wrote some sections for the Scottish Government's Freshwater Science strategy, e.g. on the role of forestry and catchment management.

In the Forestry Commission the potential role of woodlands in terms of water resources is now reflected in the woodland creation grant scheme whereby additional £2000 per hectare is available for woodland planting in specific locations to support water benefits.

Highlighted Impacts on Practice/Private Sector

Research into the mitigation of the acidification impacts of forestry has led to proposals to change Woodlands and Water Guidance which are now out for public consultation. Whilst there is still some scepticism amongst fishing interests, changes to the guidelines should lead to the adoption of better woodland management practice as well as laying to rest some of the mythology around the acidification impacts of woodland planting and forestry.

FC, EA and the Woodland Trust are currently discussing the joint appointment of a Woodlands Officer who will be focussed on using the Opportunity Mapping data to deliver woodland planting for water management priorities.

Enabling Research with Potential for Additional Impacts

One of the potentially most powerful impacts of this research is where further work can build upon the broader understanding of the benefits of woodlands on water resources by creating data sets which can help Regional EA managers, other organisations such as the Woodland Trust and local communities design specific woodland planting plans for dealing with local water catchment issues. EA Midlands have co-funded FR to carry out Opportunity Mapping which allows them to prioritise those areas where woodland planting will have greatest benefit in relation to water flows. The Slow the Flow project brought together EA and FR/FC in a Defra funded project to look at alternative ways of dealing with local flooding in Pickering. Both of these projects were only possible because of the research carried out previously by FR and the hydrology expertise their staff have developed over the years which was available to contribute to further work.

Routes towards impacts

Some of the impacts have been through the FR scientists directly advising FC and other Government policy staff, frequently supporting them at workshops by presenting the technical aspects of the evidence base as well as effectively responding to requests for rapid policy advice. However, there has also been a lot of partnership working with EA and SEPA in particular. Although time-consuming, regular participation by FR researchers acting as "knowledge intermediaries" on various working groups or steering committees –at national level but also with local Councils--has enabled an ongoing diffusion of research understanding into decision-making. In terms of implementation, FR scientists and FC local managers were seen as being crucial to "getting things done" on the ground in the Slow the Flow project, using their technical expertise to create practical and innovative solutions to very specific problems.

The usual tension between spending time on peer-reviewed publications and dissemination of results through other forms of literature, workshops etc. was observed but the feeling from interviewees that the balance was about right.

Lessons for Researchers

Be prepared to get involved with practitioners on the ground (often from other governmental or non-governmental organisations) to help design and implement follow-on projects that move the basic understanding generated by the research into practical applications (such as pilot projects).

Involvement with external stakeholders, particularly non-academic ones, can be rewarding and enhance impacts but can require different communication skills and engagement approaches which sometimes others may be better equipped to deliver.

Involvement in steering committees including stakeholders can help researchers see the bigger picture of why they are doing the research.

Lessons for stakeholders

Be prepared to temper your enthusiasm for getting things done on the ground with a willingness to understand the key findings from the research in terms of both how they can help achieve local aims and needs but also their limitations. Be prepared to consider alternative approaches to solving problems.

Lessons for Funders/Strategy-setters

Many environmental, countryside management and conservation issues cut across the responsibilities of multiple government agencies and non-government organisations. Consider how evidence requirements (both research and monitoring) might be met by more strategic evidence programmes that are co-funded and co-managed by partners who all have an interest in the area and which can take basic research findings through to testing new applications in the field.

Better consideration of a dissemination strategy at an earlier stage in the programme might allow better engagement that will ultimate end users and more effective pick up of impacts.

4. RECOMMENDATIONS

4a. General Comments

Overall, the Forestry Commission Strategy was identified with Forest Research and relatively little knowledge was shown of the current involvement of other researchers or the further potential for it.

Forest Research was highly regarded by stakeholders, many of whom were keen to get across the need for Government to retain it with a critical mass for the good of society and industry. Almost everyone mentioned worries about the reduction in resources for forestry research at Forest Research and the lack of much forestry expertise outside of it. However, there was a lack of awareness of what others in the wider research community might have to offer in terms of innovation and experience from other areas.

A number of internal and external stakeholders commented on the increasing fragmentation of the Government forestry organisations as a result of devolution with a likely dilution of research impacts. Concerns were expressed about the ability of stakeholders to have a coherent direct interaction with researchers rather than have their views being filtered through others in the system.

4b. Key Recommendations

Recommendation 1

Genuinely involve a range of stakeholders in Knowledge Exchange:

- early on in the strategy-setting/problem-framing stage and investigate the impacts they are looking for;
- throughout the research process in ongoing dialogues with greater transparency about ongoing research progress;
- later in dissemination of findings.

Recommendation 2

Improve awareness among researchers, research managers and also stakeholders of Knowledge Exchange processes that can lead toward impacts so that they are enabled both to improve processes and to identify diverse impacts and impacts-in-progress on policy and practice. This should include consideration of a more informative annual report on the Strategy and better access to research project proposals and reports, as well as qualitative descriptions of even subtle impacts or impacts-in-progress, perhaps as they fall under categories of Instrumental, Conceptual, Capacity-building, Enduring Connectivity or Attitude Change. (Developing a habit of capturing impacts in an ongoing fashion will facilitate future impact evaluations and increase organisational learning.)

Recommendation 3

Consider who within the Forestry Commission as a whole (including Forest Research) and who in the wider forestry sector (either individuals or organisations) are best placed to act as “Knowledge Intermediaries”. Seek to engage with them and enhance research impacts by leveraging their capabilities and networks in order to reach multiple stakeholders.

Recommendation 4

Develop a Communications Plan to help disseminate impacts. Take advice from stakeholders early on as to how communication mechanisms (such as events, websites, guides) and the timing of communications can be used to optimise the impact of research outputs.

Recommendation 5

Take a strategic view of where the Forestry Commission Science & Innovation Strategy fits into the wider research agenda and how to create the dynamic and flexible capability and capacity required to deliver it. This should include determining the role and critical mass of Forest Research but also how connectivity with others in the research community can enhance the evidence base and its impacts. Consider whether co-funded and co-managed research and monitoring might increase the value of the research and monitoring and enhance impacts.

Recommendation 6

Consider how genuine interdisciplinary research can be encouraged by the Strategy so that complex problems can be addressed and the socio-economic dimensions of the solutions fully explored.

Recommendation 7

Consider whether the Strategy needs to be more transparent as to how much resource is allocated to scientists for research and how much to them for providing advice to policymakers and the forestry sector at large.

ANNEX A: FRAMEWORK OF CORE QUESTIONS

| |
|--|
| Question |
| I. OVERVIEW OF STRATEGY & IMPACTS |
| I.1 Did having this Strategy make a difference? Have policymaking and/or innovation in the forestry sector been influenced? If so, how? If not, why not? |
| I.2 Does the Strategy offer sufficient scope and/or flexibility to deal with opportunities or issues arising, new developments or emerging stakeholder needs? |
| |
| II. IMPACTS: |
| II.1 What are stakeholders doing (or thinking or planning to do) differently as a result of the research undertaken? |
| |
| II.2 What sorts of impacts did projects have? (Conceptual, Instrumental, Capacity-building, Enduring Connectivity, Attitude/Culture Change) |
| II.3 Can some “impacts-in-progress” be identified? |
| II.4 Are there missed opportunities where research has been done but not had sufficient impact?” If not, why not? |
| |
| III. IMPACT-GENERATING PROCESSES |
| III.1 Through what sort of process(es) did the Strategy lead via commissioned work/projects to any sorts of impacts? |
| III.2 What obstacles or enabling/facilitating factors have made/could make a difference? |
| III.3 Can “Inflection” points be identified that could enhance likelihood of impact generation? (e.g. framing of research needs, commissioning/selecting projects, conduct of research, engagement with stakeholders, interaction with Knowledge Intermediaries, networking, dissemination to various sorts of stakeholders, etc.) What is or isn’t working? |
| III.4 Adequacy of Communication—are we getting messages across? |
| III.5 At what stage/process do stakeholders feel they should have been involved? |
| III.3 What roles if any have been played by “Knowledge Intermediaries”? |
| |
| IV.LESSONS LEARNED/INSIGHTS FOR THE FUTURE |
| IV.1 How can the Forestry Commission refine and/or implement its strategy to make it more likely that impacts will be generated in the future? (What lessons learned are commended to the Forestry Commission?) |
| IV.2 What lessons learned would benefit future researchers and/or stakeholders in the generation of impacts? |
| IV.3 What mechanisms would be helpful in picking up impacts (or impacts-in-progress) and/or developing a useful baseline for future evaluations? |

ANNEX B: SEMI-STRUCTURED INTERVIEW TEMPLATE

- 1. What relationship did you have to research funded under the Forestry Commission's strategy?**
- 2. Are stakeholders doing/thinking/planning anything differently as a result of the research? If so, what?**
- 3. Different sorts of impacts can arise from research (defining, for example, Conceptual, Instrumental, Capacity-building, Enduring Connectivity, Attitude/Culture Change) --- What sorts of impacts if any arose from the Forestry Commission-funded research? To what extent have they been developed/are they in progress?**
- 4. What factors (e.g. Communication, Knowledge Intermediaries, etc.) have played roles in the generation of impacts? Are there critical "inflection points" at which interaction with stakeholders is particularly important?**
- 5. Have any opportunities for impacts been missed? What obstacles have stood/can stand in the way of impacts being generated?**
- 6. What lessons learned or insights would you offer to the Forestry Commission as it refines its Research Strategy and funds research in the future, in the hopes of generating impacts? Do you have any thoughts on how impacts could be identified?**
- 7. What lessons learned or insights would you offer to researchers or stakeholders to enhance the generation of impacts?**

ANNEX C: BIBLIOGRAPHY

- Abreu, M., Grinevich, V., Hughes, A. and Kitson, M. (2009), Knowledge Exchange between Academics and the Business, Public and Third Sectors, Centre for Business Research, University of Cambridge, Cambridge.
www.cbr.cam.ac.uk/pdf/AcademicSurveyReport.pdf (accessed 30 March 2011)
- ESRC (2011), Branching Out: New Directions in Impact Evaluation from the ESRC's Evaluation Committee http://www.esrc.ac.uk/images/Branching%20Out_tcm8-14881.pdf (accessed 2 Sept 2011)
- Meagher, L. and Kettle, A. (2009), Briefing Note: Knowledge Exchange in Public Policy & Practice. http://www.sfc.ac.uk/web/FILES/Our_Priorities_Knowledge_Exchange/KE_Public_Policy_Practice_-_Briefing_Note.pdf
- Forestry Commission (2012), Forestry Commission response to the report of the Independent Review Group on science quality at Forest Research.
[http://www.forestry.gov.uk/pdf/FR_science_review.pdf/\\$FILE/FR_science_review.pdf](http://www.forestry.gov.uk/pdf/FR_science_review.pdf/$FILE/FR_science_review.pdf)
- Forestry Commission (2011), Science and Innovation Strategy for British Forestry, Annual Report 2011. [http://www.forestry.gov.uk/pdf/FCFC002-reports-2011.pdf/\\$FILE/FCFC002-reports-2011.pdf](http://www.forestry.gov.uk/pdf/FCFC002-reports-2011.pdf/$FILE/FCFC002-reports-2011.pdf)
- Forestry Commission (2010), The Forestry Commission Science and Innovation Strategy for British forestry 2010-2013. [http://www.forestry.gov.uk/pdf/SIS_final_2010-2013.pdf/\\$FILE/SIS_final_2010-2013.pdf](http://www.forestry.gov.uk/pdf/SIS_final_2010-2013.pdf/$FILE/SIS_final_2010-2013.pdf)
- Independent Panel on Forestry (2012), Final Report.
- Meagher, Laura, Jarron, Stevie, Kind, Vanessa, Staines, Andrew, Lyall, Catherine. 2010. A Review of the Impact of SNIFFER and SEPA Projects, Summary Report
<http://www.sniffer.org.uk/news/4118/SNIFFER-and-SEPA-Review-the-Impact-of-our-Research.aspx> (Report to the Scottish Funding Council, October 2009).
http://www.sfc.ac.uk/web/FILES/Our_Priorities_Knowledge_Exchange/KE_Public_Policy_Practice_-_Briefing_Note.pdf (accessed 30 March 2011)
- Meagher, L.M., Lyall, C. and Nutley, S. (2008), Flows of knowledge, expertise and influence: a method for assessing policy and practice impacts from social science research. *Research Evaluation* Volume 17, Number 3, September 2008, pages 163-173.
- Nutley, S., Walter, I. and Davies, H. (2007), *Using Evidence. How Research can Inform Public Services* (Policy Press, Bristol).
- PA Consulting/SQW Consulting (2007), Research Councils UK. Study on the Economic Impact of the Research Councils, October 2007.
- Read, D.J., Freer-Smith, P.H., Morison, J.I.L., Hanley, N., West, C.C. and Snowdon, P. (eds.) (2009) Combating climate change – a role for UK forests. An assessment of the potential for the UK's trees and woodlands to mitigate and adapt to climate change. The Synthesis Report. (The Stationery Office, Edinburgh)
- Research Councils UK (2007) Excellence with Impact: Progress in implementing the recommendations of the Worry Report on the economic impact of the Research Councils (RCUK, Swindon) and Economic Impact Study- PA Consulting & SQW.
<http://www.rcuk.ac.uk/documents/economicimpact/excellenceimpact.pdf> (accessed 30 March 2011)