Programme 4: Valuing & Governing Ecosystem Services

Section 1. Overview

Research Programme Title	Valuing ecosystem services, forest governance and influencing behaviour
Research Programme Short Title	Valuing and governing ecosystem services
CFS programme number	4
Version	1
Date	26/02/2015
Author	Liz O'Brien
Programme Life (Years)	4
Start date	01/04/2015
Completion date	31/03/2019
Cost of programme (£K)	£2,308 (4 years); £577/yr

1.1 Summary of proposed research

The aim of this programme is to value forest ecosystem services and inform governance and delivery. The specific objectives of the programme are:

1. To develop and apply methods and tools for valuing the range of forest ecosystem services and benefits, and integrating different values.
2. To understand and advise on the development of mechanisms (including governance arrangements) to deliver forest ecosystem services.
3. To analyse changes in values for forest ecosystem services under a range of scenarios to inform management and woodland creation.

The research will provide evidence on:

a) the wide range of ecosystem services provided by trees, woodlands and forests (TWF) in urban and rural locations, it will focus in detail on a number of specific cultural ecosystem services, forest water services and climate regulation services,
b) research the most appropriate tools and methods to assess and integrate values,
c) the types of mechanisms that encourage delivery of a wide range of ecosystem services and,
d) how ecosystem services may change under different scenarios such as woodland creation and different types of woodland management.

In recent years the wide range of values that society has for TWF in Britain has come to the fore through for example the proposal to sell the public forest estate in England and the outbreak of Chalara. This has illustrated the values attached to TWF, particularly cultural ecosystem services derived from human interactions with forest and wooded landscapes, highlighting that these are strong and have an important impact on people's well-being. However recognising, demonstrating and capturing these values and ensuring that they feed into decision making is challenging. The research in this programme will provide a better understanding of these values and, drawing upon behavioural insights and understanding motivations, the mechanisms that might encourage a variety of land managers, owners and investors to manage for a broad range of ecosystem services. It will also explore the roles and responsibilities of different players and which mechanisms might encourage greater community and business/investor engagement with TWF. The research will be undertaken by an interdisciplinary team covering economic, hydrological, social, spatial and physical sciences utilising a range of methods including cost benefit analysis, spatial modelling, interviews, workshops and deliberative approaches. It will include a

multiscale/multiregional approach to using ecosystem services indicators in collaboration with work under programmes 1 and 3 for quantification of a range of ecosystem services – including health benefits of woodlands. Horizon scanning will be used to identify lessons from relevant approaches and initiatives in other sectors.

Section 2. Description of work

2.1 Background

The research brief for this programme makes distinctions between valuing forest ecosystem services (ES), identifying the most appropriate tools and methods to do so; the mechanisms that might deliver the full range of ES and how values might change under different scenarios. The research in this programme is linked to both outcome 2 and 3 of the Forestry Science and Innovation Strategy and will provide evidence to a range of policy makers, stakeholders and publics on increasing the value of the market and non-market benefits of TWF and support their inclusion and consideration in decision making. In terms of the policy and research context, the Millennium Ecosystem Assessment and the UK National Ecosystem Assessment (NEA) and UK NEA Follow On projects all illustrated the value of ecosystem services and outlined concerns that they are not taken into account in decision making. TEEB (The Economics of Ecosystems and Biodiversity) provides a useful framework for recognising, demonstrating and capturing ecosystem values acknowledging that not all of the values people have for ecosystem services can be quantified or monetised. Other frameworks include the development of a Common Classification of Ecosystem Services from the European Environment Agency. There is also a focus on natural capital and the Natural Capital Committee which advises the government on the sustainable use of England's natural capital. The Ecosystem Market Taskforce explores and identifies investment and market approaches for capturing the benefits provided by the environment. There has also been a strong focus in recent years on behavioural research to understand what insights can lead to the creation of interventions or mechanisms that encourage behaviour that might result in, for example, sustainable forest management. A key focus is also on how ES contribute to human wellbeing; the Office for National Statistics has created a national set of indicators for measuring wellbeing including natural environment measures.

2.2 Programme-level response to the research challenges

The aim of the programme is to value forest ecosystem services (ES) and inform governance and delivery. The objectives of the overall programme are:

1. To develop and apply methods and tools for valuing [and integrating] the range of forest ecosystem services.
2. To understand and advise on the development of mechanisms to deliver forest ecosystem services.
3. To analyse changes in values for forest ecosystem services under a range of scenarios to inform management and woodland creation.

Although we are using the term forest ES we are including within this a focus on trees and woodlands as well as forests and, where appropriate wider land use. Within this programme we will identify the most useful methods, tools and models for valuing and integrating ES, as well as undertaking further work on valuing biophysical (particularly regulating services) and cultural ecosystem services. We will also identify whose values are being considered and whether there are specific groups whose values are not being taken into account.

This work will contribute to the Woodlands for Wales strategy by being able to provide an assessment a broad range of ecosystem benefits provided by TWF across the urban rural continuum. It will research different types of mechanisms in order that the widest suite of ecosystem services and benefits can be delivered through woodland management and informing new woodland creation. In the same way, this work will contribute to The Scottish Forestry Strategy by providing the underpinning knowledge to develop a culture of forestry 'for and with' people, through a focus on the need for well-planned and managed forests that provide a wide range of benefits to people. The England forestry policy statement argues that we have lost sight

of the value of trees and woodlands and we need to maximise the wellbeing benefits of the resource for all society and this work will help to address this position.

This research programme will be addressing the challenges identified via workshops and consultation after the publication of the Science and Innovation strategy. These challenges include: how should forestry and woodlands benefits be valued (RC3.1), what are the costs and benefits of forest management options (RC3.2), assessing the behavioural barriers to woodland expansion (RC4.1), increasing focus on protection existing woodland and better management of undermanaged woodlands (RC2.5).

The work will involve research on TWF in urban as well as peri-urban and rural contexts. Case studies will be used where appropriate, these could be location or site specific or they could relate to a particular decision making context, for example related to policy development or a specific operational activity. Any case studies used in the research will be identified in discussion with key stakeholders. The programme will work closely with other FR programmes including 1, 3 and 7 (see Figure 1).
The expected outputs of the programme include:

- Provision of a comprehensive categorisation of the services, goods and benefits provided by TWF across the urban rural continuum, illustrating in more detail the social and cultural values to different groups within society.
- Provision of economic values for environmental and social forest services where appropriate.
- Delivery of evidence on the type and mix of mechanisms (including commercial) that can potentially encourage land managers to manage TWF for a broad range of FES and consider woodland creation.
- Provision of evidence on the type and mix of mechanisms that enable communities to better engage with TWF.
- Support for decision making and policy making processes by providing targeted and accessible evidence.

2.3 Business Considerations

Delivering against country research needs

See 'Programme level response' above (Section 2.2) and Table 1 Research programme structure (Section 2.4).

Impacts and constraints

The impacts of the programme will include:

- Contribution to a new 'woodland culture' by identifying the wide range of services and benefits provided by TWF.
- Design of mechanisms for land managers and communities that encourage woodland management or creation and woodland use to deliver ES.
- Informed decision making by land managers and investors of what ecosystem services to manage for and for whom.

However, the programme faces a number of constraints. To report on all the ES provided by TWF in detail will not be possible. We will draw on and build upon existing research carried out at FR and through working with our partners in the ES community (ESCom). We will also liaise with the Forestry Commission which is commissioning a scoping piece of research at present on valuing the social and environmental benefits of trees and woodlands in England, Scotland and Wales. Not all ES will be able to be valued in monetary or quantitative terms and a challenge of the

programme is to test methods that can recognise plural values (including qualitative expressions of value) so that they can be considered in decision making.

Innovation potential

There is potential for innovation through this research programme to investigate, test and develop innovative new tools, models and methods such as gravity modelling, conductance/resistance distance modelling, participatory action research, and deliberative multi-criteria decision analysis. Working closely with programme 7 on integrating research for policy and practice will provide opportunities to greater integration, knowledge exchange and impact. Having a greater focus on specific regulating and cultural ecosystem services will contribute to a more comprehensive account of forest ecosystem services. The programme will provide a spatial valuation method for woodland as current methods make it difficult to make a comparison between different ecosystem services. Identifying how new markets for ecosystem services such as payments for ecosystem services can be established will be critical for the economic growth agenda. Drawing on evidence of behavioural insights and understanding the motivations of a range of key actors will be important in developing mechanisms that might encourage woodland management and creation.

2.4 Work packages to address the research challenges

Work package titles

WP1	Valuing ecosystem services and benefits
WP2	Mechanisms for delivering forest ecosystem services and benefits
WP3	Exploring changes in values under varying scenarios and options

Table 1 highlights the overall structure of the research programme including Work Packages and Work Areas.

Indicative costs (£k):

2015-16	2016-17	2017-18	2018-19
577	577	577	577

Table 1: Research Programme Structure

Research challenges that have some link to a Work Package	Work Package	Work Area	Notes
RC 3.1 How should forestry and woodland benefits be valued? Specific Country questions – understanding the value of cultural ecosystem services and their associated valuation and payment (links to WP2 as well). How can assessment tools such as i-tree be adapted to UK and value benefits over time in a manner that allows users to easily undertake valuation exercises at a range of geographic scales?	1. Valuing ecosystem services and benefits	1.1 Methods and models for valuing FES and integrating values 1.2 Valuing biophysical FES 1.3 Valuing cultural ecosystem services and benefits	Implicit in the three work areas is how these values / methods support decision making. Need to understand whose values are being considered.
RC 3.2 How can FES values be delivered RC 4.2 What are the financial and policy interventions required to overcome barriers and exploit expansion opportunities RC 4.1 Assessing the behavioural barriers to woodland expansion Country questions – how do we transfer valuation of benefits into payments to landowners? What innovative mechanisms are there to create/stimulate payments/markets for ecosystem services? What payments methods for ecosystem services are most likely to result in beneficial impacts in the real world and how do we identify the provider of money/service? What is the applicability of international woodland investment / delivery models to advise and promote woodland creation in England?	2. Mechanisms for delivering forest ecosystem service values	2.1 Carrot and stick mechanisms 2.2 Advisory and informal mechanisms	Implicit in the two work areas is a focus on the cultural and behavioural barriers to uptake of different mechanisms. Focus is on mechanisms or mix of mechanisms that deliver the full range of forest ecosystem services
RC 3.3 What are the cost and benefits of forest management RC 2.6 Increasing focus on protecting existing woodland and better management of undermanaged woodland RC 4.3 Facilitating expansion of woodlands through targeting and provision of evidence Country questions – how can the longer term impacts of social interventions within woodlands be evaluated at the individual and community level? How to manage [Scotland's] forests to maximise their contribution to sustaining natural capital and delivering the full range of ecosystem services	3. Exploring changes in values under varying scenarios	3.1 Using scenarios to explore changes in values and management approaches and identify options 3.2 Cost / benefit analysis of different management options	Implicit in the two work areas is how changes in scenarios / options can support decision making for managers

WP Title: WP1. Valuing ecosystem services and benefits

Valuation of ecosystem services and benefits is important to help underpin forest policy on woodland creation and land use change, and forest management. It is also important for pursuit of wider policy agendas including climate change mitigation and adaptation, resilience, natural capital accounting and urban planning.

The objectives of Work Package (WP) 1 are to collaborate with others to:

1) develop improved methods to value the ecosystem services and natural capital of UK TWF, and provide information on the value of rural and urban ecosystem services to help underpin forestry strategies;
2) develop improved models and tools that incorporate more robust valuation of the ecosystem services and natural capital, and which could underpin development of ecosystem markets;
3) provide advice to policy-makers and practitioners on the benefits of woodland creation to encourage planting 'the right tree in the right place' to maximise benefits and minimise risks;
4) ensure that provision of trees is embedded in urban planning so that people can enjoy access to wooded greenspace in the future.

This WP has three closely related Work Areas:

Work Area 1.1. Cultural ecosystem services
Research in this area will further develop and refine SERG and other Cultural ES frameworks to better understand how they apply across different scales, contexts and groups of people. It will identify whether there are specific groups whose values are not being taken into consideration, review and develop indicators that could be used to track long term change in Cultural ES associated with woodland creation and changes in land use, and explore ethical and moral dimensions of valuing ecosystem services. Research will investigate novel approaches for understanding, quantifying, mapping and valuing cultural ecosystem services, including through potential application of Gravity Modelling and Conductance/Resistance-distance Modelling. Work will include a review of expert-based approaches to amenity tree valuation, with a view to building upon existing external collaborations to update CAVAT's valuation indices - widely used across London and gaining increasing traction elsewhere across the UK, and to strengthening the approach through further development, where required. This aims to provide more robust and comprehensive coverage of valuation of the benefits of urban TWF, complementing tools such as i-Tree Eco that value biophysical ecosystem services. Connections will also be made with COST Action FP1204 on Green Infrastructure and Urban Forestry and the UK NEAFO work on shared values.

Work Area 1.2. Biophysical ecosystem services
This research will focus primarily on valuing flood risk reduction, water quality, and climate change mitigation and adaptation. Work with the new urban catchment steering group, TDAG and Local Authority partners will seek to identify and develop funding opportunities for researching the role of tree planting in urban areas to mitigate flooding. The work will complement the development of forestry strategies for urban areas by demonstrating the relevance of trees to human health and well-being. Advisory work will be undertaken with water regulators and the forest industry in using woodland creation to provide water-related benefits, and improved guidance on managing forestry and flooding produced. Work is expected to contribute to increased woodland creation and urban tree planting. Linked closely to research under Programme 1 on effects and risk to biophysical factors and expected future changes, work will investigate the valuation of the climate change mitigation benefits of forests and woodlands taking account of land surface albedo change, evapotranspiration, and biogenic volatile organic

compounds (BVOCs). Work will include completion for publication of articles currently in draft or in preparation including on the assessment of air temperature reduction afforded by trees within an urban area, and evaluating the shading and evapo-transpiration cooling mechanisms of trees. A research note consolidating research into the role of trees and greenspaces in urban cooling is also proposed. A Doctoral studentship investigating the radiative performance of urban trees will continue until 2017.

Work Area 1.3: Methods & models

Research in this area is expected to link strongly to research on resilience in other programmes, by investigating how the economics of risk and tipping points sheds light on valuing resilience. Methods of valuing ecosystem services and natural capital will be investigated that account for spatial factors such as location, scale and interactions with non-wooded land. This will closely link with work from Programme 1 work package 4: Resilience at multiple scales, as well as work area 2.1, aiming to ensure spatial indicators of ecosystem services and biodiversity developed in that workstream fit well with robust valuation methods. Approaches to accounting for trade-offs and combining various forms of valuation, including social values and valuing cultural ecosystem services, alongside economic values, will be explored, including case study work on public forest estate in Lochaber. Valuation methods used in i-Tree Eco will be reviewed, and an assessment of existing integrative methods and tools for recognising, demonstrating and capturing the value of FES that could be used in a variety of contexts and geographic scales undertaken; it is fully anticipated that this work will draw upon data generated in P1 on developing an urban forest inventory to learn lessons and speed the uptake of i-Tree by third-sector organisations, including the community forests and citizen scientists. Opportunity to use our embryonic national databank of i-Tree Eco results as the basis for a Trees in Towns III will be considered through liaison with relevant stakeholders. I-Tree also offers significant potential for corporate bodies to enact recommendations in the Natural Capital Committee's third report, including the population of Natural Capital Registers, and mechanisms to do this will be investigated. Ways that FR's existing forest carbon models could be developed to apply to urban trees will also be investigated with a view to their potential use to underpin urban tree planting projects if the Woodland Carbon Code were to be extended. Primary science, practical support and advice to underpin confidence in, as well as use of, i-Tree Eco will be provided.

WP Title: WP2. Mechanisms for delivering forest ecosystem services and benefits

The objectives of Work Package (WP) 2 are twofold:

1) to better understand how existing ecosystem markets work and the scope for introducing new payments for ecosystem services schemes, as well as understanding other non-market mechanisms
2) to explore how the attitudes and practices of land managers might change with the use of different mechanisms;
3) to explore how insights from behavioural economics and other behavioural theories could be used to develop mechanisms that can be used to encourage woodland resilience and woodland use, and the delivery of a broad range of ES.

There is increasing interest in the role of mechanisms / interventions that enable or encourage land use and land management. Historically, mechanisms for land management have built on legislation, regulation and financial approaches such as taxes or grants. These are so called 'carrot and stick' mechanisms. Evidence suggests that formal advisory services and informal mechanisms such as peer and social networks, knowledge networks, champions etc. also play a role in land manager decision making concerning their own management practices. A focus in recent years has been on utilising behavioural insights to 'nudge' people to manage in specific ways and also on the role of innovative mechanisms to encourage management for ES such as payments for ecosystem services (PES).

A range of mechanisms such as projects, interventions and programmes have been developed to encourage land use by publics and communities so that they can gain a wide range of ES such as health and wellbeing. We consider land managers to include private individuals, private companies, public bodies (such as FC, Local Authorities), NGOs (such as Woodland Trust, Wildlife Trusts, National Trust), social enterprises and community woodland groups.

This WP has two closely related Work Areas:

Work Area 2.1: Carrot and stick mechanisms
Research in this area will focus on mechanisms that are aimed at: 1) land managers/owners and 2) those that are aimed at engaging communities (including where possible businesses/investors) with the TWF resource. We aim to understand better how existing ecosystem markets and non-market mechanisms work and the scope for introducing new payments for ecosystem services schemes, and how insights from behavioural economics could be used to encourage woodland resilience and use.
Our objectives will be to:

- Explore evidence on the effectiveness, advantages and disadvantages of forest-related ecosystem markets and payments for ecosystem services schemes (PES)
- Explore potential for policy nudges to facilitate uptake of forestry resilience best practice.
- Explore how the attitudes and behaviours of land managers might change with the use of different mechanisms
- Identify how carrot mechanisms might encourage communities to engage with woodlands (e.g. BTP)
- Explore how mechanisms operate in relation to different decision contexts, and the governance arrangements that are required
- Identify the factors that could attract investors to invest in a broad range of ES, including developing business cases.

- Work with Work Area 2.2 to identify key recommendations for adapting mechanisms, using specific mixes of mechanisms to encourage management for a broad range of ES values and benefits.

We will review the theoretical underpinning for expecting ecosystem markets to perform more efficiently than regulatory mechanisms, and existing evidence to shed light on the extent to which expected benefits have been achieved, potential perverse incentives avoided and any unanticipated issues arisen. In comparing market mechanisms and regulatory ones we will draw on overseas examples. We will undertake interviews with a range of land managers to explore the role of different mechanisms in their decision making processes. We will review and carry out interviews/focus groups with community groups to identify mechanisms that might enable communities to engage with TWF and the benefits they provide.

We will build on previous work on the potential for policy nudges to encourage woodland creation to scope for a similar approach to resilience 'best practice' and input into interdisciplinary case studies on the potential of PES schemes (e.g. to prevent clear felling potentially resistance trees in diseased stands).

Work Area 2.2. Advisory and informal mechanisms

This research will focus on different advisory (advisory, guidelines, toolkits, partnership working) and informal (social and peer networks, knowledge networks, champions) mechanisms that can and are being used to encourage managers to manage for a full range of ecosystem services, to understand the impact on motivations, attitudes and behaviours. The price of advice will be a key factor to explore. The aim is to understand the role of these types of mechanisms and their influence on the delivery of a broad range of forest ecosystem values and benefits.

The objectives are to:

- Identify what factors and mechanisms encourage greater community engagement with TWF (community interventions, targeting of specific groups, campaigns). Linked to 2.1
- Identify land manager attitudes and motivations, barriers to utilising advisory and informal mechanisms to deliver a range of ES

We will review evidence related to existing formal advisory mechanisms and more informal networks and champions that might encourage land managers to deliver FES. We will interview a range of land managers to explore the role different mechanisms play in their decision making process. This will be undertaken in close collaboration with Prog 3, WP2 which is looking at governance structures related to resilience. We will work with a number of community groups to identify what factors and specific mechanisms might enable them to engage with TWF and gain FES. Close links will be made with Work Area 2.1 to identify key recommendations for adapting mechanisms, using specific mixes of mechanisms to encourage management for a broad range of ES.

Both Work Areas will use a range of methods including literature reviews, rapid evidence assessments, interviews, focus groups and workshops with land managers and community land users. The research will draw on the latest theory and evidence on behavioural insights and behaviour change.

WP Title: WP3. Exploring changes in values under varying scenarios and options

Land use change has been one of the major influences on UK forests and wooded landscapes over the last 50 years, with the future likely to be affected through changes in climate and by population pressure. Scenario analysis has become an increasing area of interest to explore potential future change and elements of uncertainty, providing a valuable analytical device for within a spatial context. Scenario analysis allows exploration of potential future change and elements of uncertainty within a spatial context to support decision- and policy-making processes. When combined with participatory modelling, it provides a means of engaging stakeholders to increase identification of management interventions and sustainable outcomes.

The objectives of Work Package 3 (WP3) focus on two elements: 1) exploration of the resilience of woodlands to future change by assessing how ecosystem service values and natural capital stocks of woodlands may be affected by a) direct and indirect drivers through the application of the UK National Ecosystem Assessment (UK NEA) scenarios, b) different management approaches, e.g. forest diversification through the application of forest management alternatives; 2) an exploration of the cost / benefits of different management options with a focus on climate change cost effectiveness, optimal rotation length and multi-objective natural capital.

WP3 has two Work Areas to explore changes:

Work Area 3.1: Using scenarios to explore existing values and management approaches and identify options

This research will downscale the UK NEA scenarios to undertake regional assessments of the likely changes to UK woodlands under six explorative storylines. Initially this will focus on six ecosystem service indicators (carbon, timber, water quality, flood mitigation, biodiversity and recreation) developed by FR and will expand as more indicators are developed through Prog 1. Valuation of these indicators within WP1 will enable comparison of the magnitude to be made across the different regions and at different scales. The WA will also strongly link to the analysis of alternative climate change adaptation management trajectories in Prog 3 (WP1, WA1) which enables an analysis of the likely effects of moving to particular management types or forest management alternatives (FMAs). This WA involves co- design with Forest Districts and GB country agencies and policy staff to better understand the impact of management systems on natural capital, both spatially and temporally. WA3.1 will be applied through downscaling the broad, explorative UK NEA scenarios in regional analyses (incorporating the regional climate change adaptation management trajectories) and local scales (incorporating participatory stakeholder methods and exploring anticipatory scenarios that address questions relating to maximising ecosystem service delivery).

Work Area 3.2: Cost / benefit analysis of different management options

Objectives

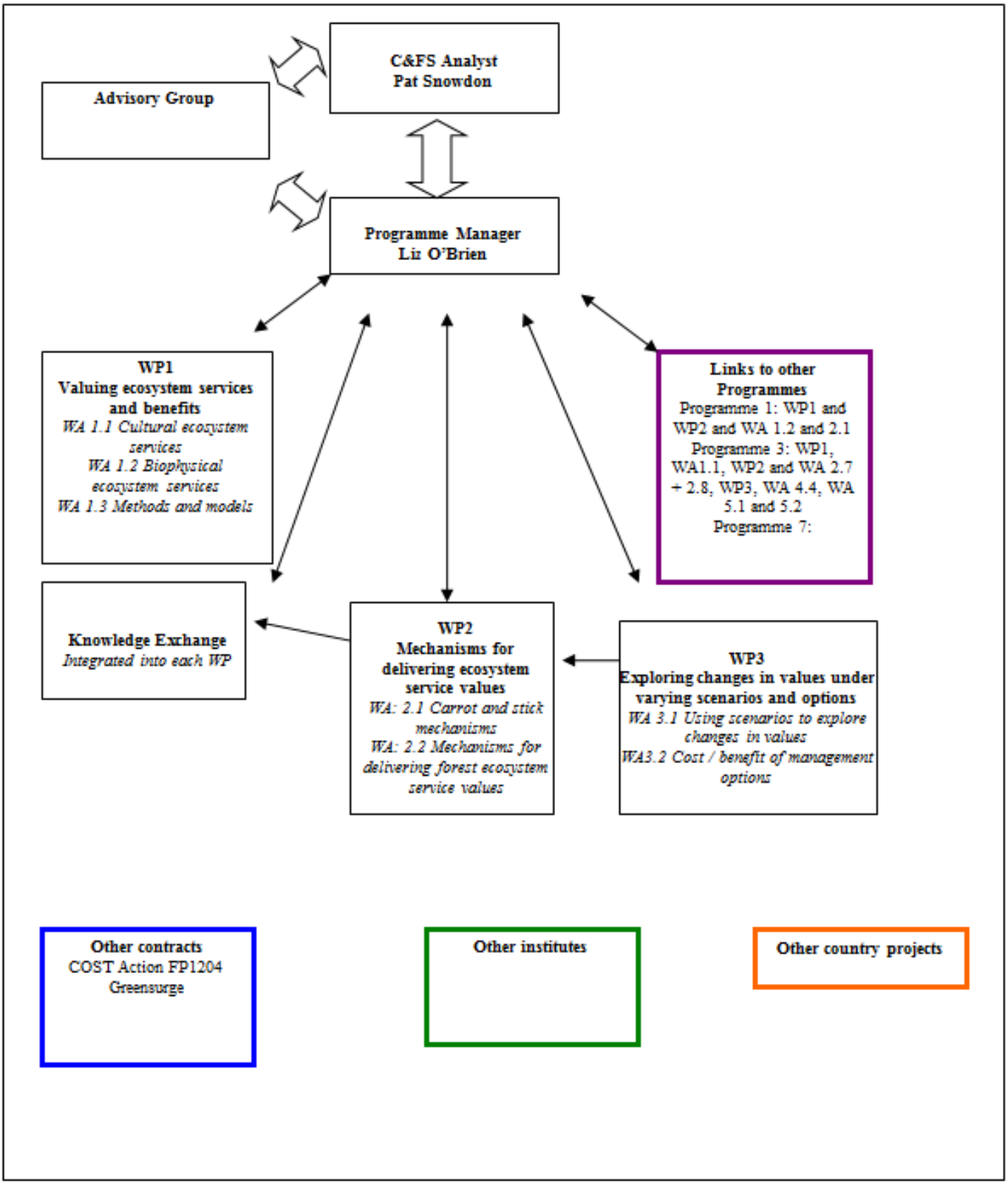
- to contribute to interdisciplinary case studies requiring economic appraisal
- to further develop climate change cost effectiveness estimates for forestry
- to further develop optimal rotation length and forest management models
- to develop a prototype natural capital multi-objective optimisation model in collaboration with staff from other interested groups (e.g. LUES)

The work will address *RC 3.2 What are the costs and benefits of forest management options to improve resilience and expand our woodland resource?*

Methods to be adopted include cost benefit analysis, cost-effectiveness analysis, and economic modelling - possibly applying stochastic dynamic programming and option approaches to

incorporating uncertainty. The work will draw upon valuation evidence from WP1, approaches to quantifying resilience developed in programmes 1 and 2, and involve collaboration with other programmes and research groups on interdisciplinary case studies.

Figure 1: Structure of the programme



Section 3. Communication Strategy

Communication objectives include identifying the key audiences for which this research will be relevant and applicable, identifying the types of communication that would reach these audiences and evaluating the impact of this. Knowledge exchange and integration will be an important focus of this programme and will be undertaken by:

- **Working collaboratively with others**, for example to develop and carry out research.
- **Embedding and integrating research into policy and practice**, for example by understanding the needs of policy makers and practitioners, by working closely with them to develop appropriate knowledge exchange activities.
- **Producing appropriate outputs**, for example combining academic papers, grey literature, with short accessible briefing notes, workshops, seminars and webpages.

We will work closely with Programme 7 which is aiming to integrate science policy and practice. Activities within Programme 4 will act as case studies for Programme 7 to test integrative approaches. In the early days of this research programme we will develop a targeted communication plan in collaboration with FR research liaison officers and communications team. We will develop key messages that will be adapted throughout the life of the programme. Early messages will be focused on outlining the research that is being undertaken through the programme; and later in the programme messages will focus on the results of the research. The audiences for this research are likely to include private, public and civil society landowners and managers, publics, stakeholders, forestry policy makers. Opportunities to engage with non-forest sector networks, such as in insurance, finance and the wider private sector will be explored. The aim will be to build up knowledge across a broad spectrum of stakeholders and provide a range of targeted evidence that supports decision making for the identified audiences. Scientists will work with FR Research Liaison Officers to develop disseminations plans for research outputs. The outputs from this programme will be diverse and include: academic papers, reports, published research or briefing notes, short easily accessible project summaries, web pages, workshop events, presentations website information, national and international conferences, and indicators. (Note only principal outputs are listed individually, with synopses of the research undertaken produced for a range of audiences).

Section 4. Collaboration and networking

Collaboration and networking will be a key aspect of the programme. Researchers will engage and participate in a range of relevant networks such as the Ecosystem Knowledge Network, Ecosystem Services Community Scotland, Defra Social Research Network, Government Economics Research, IUFRO divisions, Nexus Network community, National Outdoors for All Strategic Research Group, Arboricultural Association, Green Infrastructure Partnership (GIP), Tree and Design Action Group (TDAG), Alter-Net (Europe's ecosystem research network) and IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services). Active participation and development of networks will also occur through COST Actions such as the FP1204 Green Infrastructure and Urban Forestry, and the Payments for Ecosystem services action if funding is obtained. Researchers in the programme will actively collaborate with a range of partners and organisations to seek further funding for research that is relevant to this programme. Programme researchers will also work with a number MSc and PhD students in projects that can help assist with the programme.

Section 5. Ethical and other considerations

5.1 Ethical considerations

The programme will be cognisant of any distributional issues related to its research, for example whose values are being taken into account, who benefits from specific mechanisms and interventions and who gains ecosystem services and benefits. The Social and Economic Research Group has produced an ethical statement that outlines issues we need to take note of such as data protection, freedom of information, equality and diversity and our ethical responsibilities when researching individuals, groups and communities. We work on a basis of informed consent with the potential for those involved to withdraw their consent at any time if they are not comfortable.

5.2 Government survey control procedures

Ministerial approval must be sought before statistical surveys of businesses or local authorities can proceed so please describe briefly any relevant planned surveys.

None planned at present.