



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15
FORESTRY COMMISSION
Description of the Research Project or Services

1.	Research Purchasing Manager (C&FS)	Helen Sellars
	Relevant PAG	Sustainable Forest Management

2.	Name of FR Programme Manager (PgM) or Project Manager (PM) and staff	Michael Wall
	Name of Institution/company	FR Technical Development Centre for Forest Resources and Management
	Official address	Forestry Commission Technical Development Ae Village Dumfries DG1 1QB
	Telephone No.	
	e-mail address	Michael1.wall@forestry.gov.uk
	Programme Life (years)	2 Years (£190k in 11/12 & £120k in 12/13. TD requiring to be included in other research programmes or paid direct by countries from FY 13/14 onwards)
	Start Date	1st April 2011
	Completion Date	31st March 2013 (ending 31/3/13)
	Revision Dates	31st March 2012

3. Title of Research Project or Service

Operational efficiency in a sustainable forest industry wood chain (TD)

4. Abstract of proposed research (Summary to be used on website/FRCC etc) (200 words)

The UK Forestry Standard and Country forestry strategies identify the critical role of good operational practice in delivering Sustainable Forest Management. Technical Development investigates operational issues, aiming to increase efficiency and safety, while considering the interaction with wider ergonomic, economic and environmental aspects. The work covers four Work Areas, each of which covers two or more Work Packages;

Establishment & Maintenance

- All stages of operational stand establishment on new planting or restocking.
- Pesticides & Vegetation Management
 - Ground Preparation
 - Regeneration & Maintenance

Integrated Forest Management

Inter-related forestry operations where specifications and outcomes have a downstream impact



Forestry Commission **Proposal for funding Agreement Number CFS 17-2011-15**

on subsequent operations. Includes work that span the major forestry disciplines.

- Safety & Ergonomics
- Integrated Operations
- Direct Support
- Precision Forestry (IT)

Ecosystem Management

Harvesting and silviculture operations within native and low impact woodlands and operational management of open space. Covers issues common to both e.g. the water and fire environments.

- Stand Management
- Ground Management

Harvesting & Transport

Systems and technologies for commercial forestry and timber transport including forest infrastructure and inter-relationship of product specification and system performance.

- Harvesting & Utilisation
- Infrastructure & Transport

TD investigations use various approaches appropriate to the question - work study, literature review, survey and on-site systems observation / analysis. TD's ability to respond to emerging issues quickly is particularly valued by FC field staff.

Results are delivered using internal publications, presentations, workshops and training events and are included in best practice.



5. Aims and objectives (word limit 500)

<p>5.1 Aim of the research</p> <p>To improve the efficiency of the forestry wood chain by: evaluating, improving and publicising safe, efficient and environmentally responsible equipment and methods of work and providing best practice guidance on forestry operations.</p> <p>The programme operates in the following ways:</p> <ul style="list-style-type: none"> • TD works with colleagues in the rest of FR to help deliver the operational components needed to support other research projects; • TD works on stand alone issues in their own right; • TD maintains and provides guidance on safety and best working practices. <p>The programme is guided by the advice of the Technical Development Woodland Operations Steering Group which is chaired by a member of CSF and has representatives from the three Countries, IFOS and FR.</p> <p>All work will be delivered by TD staff</p> <p>Unless otherwise stated work proposals are carried out each year.</p>	
<p>5.2 Work Areas</p> <p>Please list your work Areas as shown in the table below and show how they further sub-divide. Work Areas should be individually costed and be time bound – see 13. below. Please state key desired outcomes from each work area. First two years should be detailed, the next two in outline. See also Note for this Section below.</p>	
Work Area 1	Establishment and Maintenance
<u>1.1 Pesticides and Vegetation Management</u>	Maintaining technical expertise and specialist capability on pesticides, guidance and project work to be supplied to FC, FR and the private sector. Includes availability, efficacy, cost-effectiveness, limitations, application equipment, PPE, regulation and industry developments. Covers understanding of non-chemical control of pests (such as Hylobius) and weeds. Continuing safety and efficiency inspections of FC facilities and chemical stores are funded by IFOS. One-off issues are also covered, with project work action commissioned following scoping of new project suggestions, where appropriate.
<u>1.2 Ground Preparation</u>	Research, development and work study of machinery and methods for non-pesticide elements of restocking and new planting ground preparation. Covers ground preparation systems encompassing all aspects of physical preparation of sites for tree planting from completion of previous crop harvesting and including the fallow period. Considers ground preparation with regard to environmental sensitivities and operation impacts
<u>1.3 Regeneration & Maintenance</u>	Helping to develop new systems for creating and regenerating woodlands by critically examining the possible operation processes and providing the machinery / equipment and system solutions required for cost effective delivery. Includes planting, direct seeding and natural regeneration within low impact systems and native woodlands in addition to commercial and farm forestry. Also covers establishment operations other than weeding, such as fertilisation. This work relies on close support to and from silviculture staff.
<u>1.4 Knowledge Exchange</u>	Writing TD Reports and contributing to FC publications and articles on the current (or recent) research programme; giving presentations on current or recent research at workshops, conferences and seminars; writing material on current or recent research for the FR (and possibly the FC) website; briefing FC on current or recent research (e.g. helping to respond to PQs) and participation in meetings (including prep time etc) at which current and future research needs are discussed.



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15

Work Area 2	Integrated Forest Management
<u>2.1 Safety & Ergonomics</u>	Maintaining technical and legislative knowledge of operational forestry safety issues with particular reference to machinery and equipment operator health and safety. Consequent capability to offer expert advice to HSE and FC. Includes FC representation on ISO / BSI committees and one-off issue investigations. Involves close links with L&D, country and CFS safety officers and external bodies.
<u>2.2 Integrated Operations</u>	Forest systems that span two or more specialist operation type, especially issues common or linked to harvesting and restocking. Views the collective implications of the forestry process, focussing on achieving the best outcome from the system as opposed to the best for each separate operation. This is particularly relevant to forestry operations on steep terrain ('FOST') where method changes designed to optimise cost effectiveness of one element (such as harvesting) can have positive or negative implications for another (such as restocking) and also on the environment (such as ground disturbance, fertility and landslip risk). Covers residue harvesting and also equipment applicable to a range of operation types
<u>2.3 Knowledge Transfer</u>	<p>Communicating the results of TD research and development to all relevant sectors of the forest industry including Forest Districts and Regions / Conservancies, FC policy staff, FR scientists, contractors, landowners, private forestry managers and local authorities. Involves TD publications (internal Work Reports and FC publications), trade articles, seminars, training events and 'outdoor workshops'. Also covers responses to general enquiries about best practice and sources of information.</p> <p>This work also helps staff to maintain links and build networks keeping TD informed and up-to-date. Direct support is also provided to FR staff working on commissioned projects where a free standing TD project is not required. Resource for working up unpublished project reports selected by the TD Woodland Operations Steering Group into published FC Technical Notes is included.</p>
<u>2.4 Precision Forestry</u>	Scoping, identifying, evaluating and operationalising electronic equipment for data capture and IT handling in field operations. Primarily aimed at supplementing or replacing traditional mechanisms to streamline systems in the timber supply chain, but also applicable in silvicultural and wider ecosystem services. Includes associated application of GIS.
<u>2.5 Knowledge Exchange</u>	Writing TD Reports and contributing to FC publications and articles on the current (or recent) research programme; giving presentations on current or recent research at workshops, conferences and seminars; writing material on current or recent research for the FR (and possibly the FC) website; briefing FC on current or recent research (e.g. helping to respond to PQs) and participation in meetings (including prep time etc) at which current and future research needs are discussed.
Work Area 3	Ecosystem Management
<u>3.1 Stand Management</u>	System, machinery, equipment and method research and development relevant to trees (individually or collectively) within native or low impact woodlands. Includes thinning as an alternative to clear felling and covers all aspects from harvesting through to planting / regeneration and establishment.
<u>3.2 Ground Management</u>	System, machinery, equipment and method research and development relevant to the ground within forests (whether stocked or not). Covers the influence and impact of forest management on the non-tree environment, especially soils and water. Relevant to the influence and impact of all field operation processes where they affect the environment beyond the stand and includes wildlife and the 'fire environment'.



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15

3.3 Knowledge Exchange	Writing TD Reports and contributing to FC publications and articles on the current (or recent) research programme; giving presentations on current or recent research at workshops, conferences and seminars; writing material on current or recent research for the FR (and possibly the FC) website; briefing FC on current or recent research (e.g. helping to respond to PQs) and participation in meetings (including prep time etc) at which current and future research needs are discussed.
Work Area 4	Harvesting & Transport
4.1 Harvesting & Utilisation	System, machinery, equipment and method research and development relevant to harvesting from roading and civil engineering needs through felling, extraction to secondary processing and stacking. Includes timber utilisation in terms of application to markets and product specification. Primary focus on large scale commercial forestry but includes large and quality broadleaves.
4.2 Infrastructure & Transport	Technical investigations and advice concerning timber transport from forest to end user including application of civil engineering and novel haulage equipment within supply systems. Covers interaction roading and the environment and of in-wood harvesting systems with transport. Includes harvesting within windfarms.
4.3 Knowledge Exchange	Writing TD Reports and contributing to FC publications and articles on the current (or recent) research programme; giving presentations on current or recent research at workshops, conferences and seminars; writing material on current or recent research for the FR (and possibly the FC) website; briefing FC on current or recent research (e.g. helping to respond to PQs) and participation in meetings (including prep time etc) at which current and future research needs are discussed.

* Add new work areas and packages as required

6. Please indicate which of the FC's 6 Climate change priority actions this work fits into

Protect what we already have	<input checked="" type="checkbox"/>	Reduce deforestation	<input type="checkbox"/>
Restore the world's forest cover	<input checked="" type="checkbox"/>	Use wood for energy	<input type="checkbox"/>
Replace other materials with wood	<input type="checkbox"/>	Plan to adapt to our changing climate	<input checked="" type="checkbox"/>

7. Comment on how this research will address Country Strategy needs/targets (175 words)

Knowledge and understanding of operational practices and safe working is essential information which underpins the implementation of principles of Sustainable Forest Management as outlined in the UK Forestry Standard (2004). Standard Note 1 on General Forestry Practice identifies several areas where the knowledge provided by this programme makes an important contribution e.g. health and safety, planning for forest operations, cultivation and drainage, and tree harvesting operations. The programme also supports individual elements of the three country forestry strategies:

England

The 'Working Woodlands' theme of the ETWF (2007) recognises the need for a 'healthy woodland and forestry sector...actively engaged in sustainable management and processing...'. Understanding the methods appropriate for effective management of the different phases of the forestry-wood chain and their impacts upon supply of products and ecosystem services will be



Forestry Commission **Proposal for funding Agreement Number CFS 17-2011-15**

provided through the activities of this research programme. The knowledge can also be used to help modernise supply chains and support advice on best practice on silviculture and processing necessary to produce quality timber and other products.

Scotland

Key theme 2 (Timber) of the SFS (2006) includes increasing 'the efficiency of the timber supply chain' as a main purpose. The efficiency and cost-effectiveness of harvesting and establishment will benefit from the knowledge provided by this programme and therefore help support the implementation of the strategy. The knowledge gained on operational aspects of LISS will support the desire to promote the use of LISS on fragile soils or on landscapes sensitive to change (Key theme 6 on Environmental Quality).

Wales

The Woodlands for Wales strategy (2001) includes programmes on woodland management (objectives include promoting best practice in woodland management and greater use of continuous cover systems) and developing Wales as a location for world class forest industries (objectives include developing the wood supply chain). The knowledge provided in all four projects of this programme is relevant to meet these objectives.

8. Identify and comment on any associated business risk of undertaking/not undertaking the research and how that will be managed

The risks of not undertaking the research in this programme are that unsafe and/or inefficient working practices are used within forest management which ultimately have a negative impact on the profitability and the reputation of British forestry. The funding supports the maintenance of a cadre of skilled and experienced forest technicians with work study/systems skills and knowledge of the operational environment within which sustainable forest management has to be delivered. These specialists can provide objective and independent advice to the sector throughout Great Britain and to relevant statutory authorities such as the HSE. They are also able to help colleagues elsewhere in FR work out practical methods to implement the results of their research. Through their international links they are able to provide information on practices being developed in other countries which may be helpful for British forestry.

Risks associated with doing the research relate primarily to the work being disconnected from the range of associated research being undertaken elsewhere within FR or in other institutes within GB and other countries. This problem is addressed through the IFOS/CFS/Country 'steering group' that meets twice yearly and an annual round of country visits.

9. Research impact (economic, social, or biodiversity)

Who will benefit from this research?

FC field staff in Forest Districts and Regions / Conservancies, FC policy staff in central services and Countries, FR scientists, and private sector forest managers, landowners and contractors

How will they benefit from this research?

- Access to forest operations experts in harvesting, ground prep, steep ground working, pesticide application etc.
- FC-forest industry representation on BSI / CEN pesticide applicators and equipment / machinery standards committees, representation on 'Basis' agricultural chemicals advisory body, specialist back-up for SHE / HSE in safety issues and accident investigations
- Public Sector / FC staff - Work Reports giving results of investigations (hard copy and FC Intranet), seminars, outdoor workshops, training events, awareness days and telephone contact
- Private Sector - as above except that Work Reports are only available as on-line



summaries
<p>What will be done to ensure that they have the opportunity to benefit from this research?</p> <ul style="list-style-type: none"> • TD will maintain its profile and links with Countries through the TD Woodland Ops Steering Group, field visits and annual Programme development days • Maintenance of the TD FC web page and FC Intranet site giving access to all available published information and contact details for TD specialists • Involvement in seminars, contractor days, training events and outdoor workshops etc
<p>Potential for innovation and new markets? The potential for marketing TD forestry skills is included within the scoping of an FR Windfarm Advisory Service, funded in 10/11 by the INM fund</p>

10. Communication Strategy

Publications:
Reports: 32 Work Reports (24 11/12, 8 12/13)
Seminars/conferences: 3 (2 11/12, 1 12/13)
Decision support systems:
Website: Maintenance & updating of TD webpages on FR Internet and Intranet
Peer review papers:

11. Under government survey control procedures, Ministerial approval must be sought before statistical surveys of businesses or local authorities can proceed. Please indicate any intention to carry out a survey.

Yes No

- If yes please give brief details

12. Details of support agreed or to be sought from funding bodies for project (including in-kind support)

13. Resources (times and fees) requested from the Forestry Commission



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15

14. Deliverables and associated costs to Forestry Commission

Work Area number	Output	Year 1				Year 2				Year 3				Year 4				Output Unique Identifier	Total Cost (£k)
		Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4		
1	Establishment & Maintenance																		
	Expert representation & guidance				X				X										
	Seminar / workshop			X															
	Work Reports				7				1										
2	Integrated Forest Management																		
	Expert representation & guidance				X				X										
	Seminar / workshop			X				X											
	Work Reports			1	7				3										
	TD Web pages				X				X										
3	Environment Management																		
	Expert guidance				X				X										
	Work Reports				4				3										
4	Harvesting & Transport																		
	Expert guidance				X				X										
	Work Reports				5				1										
All Work Areas	Provide a report on advisory work to CFS				X				X										



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15

Signed.....Research Provider/HOD
Date.....vMW13/4/11v9/5/11.....

Signed.....C&FS Advisor
Date.....

Proposal Approved

CFS

Date 31st August 2011



Forestry Commission Proposal for funding Agreement Number CFS 17-2011-15

15. Agreed Changes

Description of change:		
Signed.....	Research Provider	Date.....
Signed.....	C&FS	Date.....
Signed.....	Research Provider	Date.....
Signed.....	C&FS	Date.....
Signed.....	Research Provider	Date.....
Signed.....	C&FS	Date.....



16. Detailed communications plan:
Year 1
Year 2
Year 3
Year 4