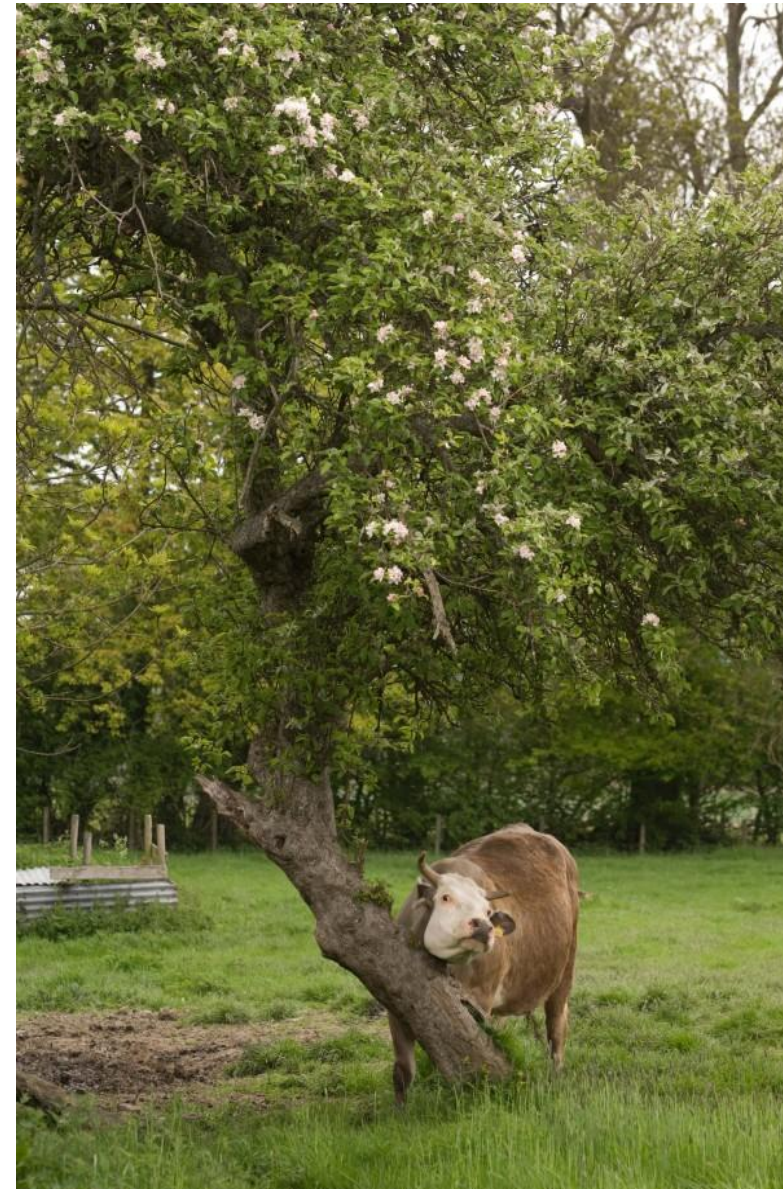




Trees, landowners and landscapes: what we know about decision making and the provision of Ecosystem Services

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FWF May 24th 2012

- Our research in this area
- Our methods for characterising and working with ES around woodlands within SERG/LUES
- The questions set that we will be commenting on are:
 - What ecosystem services do current farm woodland activities deliver?
 - How does this relate to land manager decision making
 - What does this tell us *wrt* policy and other decision makers?



- UK
 - Read Report
 - Low Carbon Transition Plan
- Forestry Commission England and DEFRA
 - Key issue how to increase tree planting activity with reducing levels of support
 - Developing tools such as “Uplift Calculator”
 - Some reference to NEA
- Forestry Commission Scotland
 - Climate change, public benefits from Scottish land, managing ES
 - Targets for increased forest cover
 - National Planning Framework and integrated land use – ES approaches
- FCW/SEB
 - New way of working ES focused – Living Wales
 - Pilots looking at operationalising ES approach
 - Maintaining and increasing tree cover
 - Strong emphasis on distribution of woodland and ES provision for major centres of population and important ‘target areas’ - Glastir

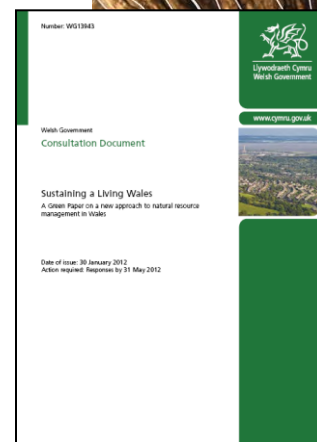
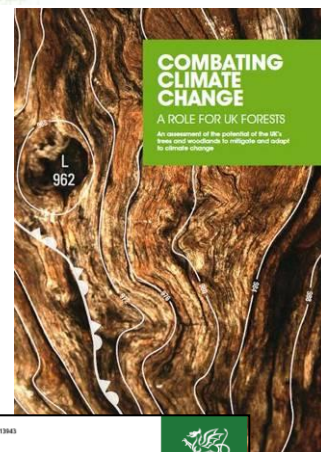


Table 8.5 New woodland creation ('000 ha); five year totals. Source: Forestry Commission (2009a).

		Five year period ending 31 March							
		1976	1981	1986	1991	1996	2001	2006	2009*
England	Conifer	18.3	7.0	5.3	3.9	3.2	3.2	13.0	5.7
	Broadleaves	2.4	1.5	2.3	9.2	21.5	21.2	27.8	11.6
	Total	20.7	8.5	7.5	13.1	24.7	24.4	40.8	17.3
Scotland	Conifer	148.6	90.9	100.1	94.6	38.3	27.1	11.5	3.9
	Broadleaves	0.6	0.8	0.9	9.2	21.0	28.5	19.7	10.3
	Total	149.3	91.7	100.9	103.8	59.3	55.6	31.2	14.2
Wales	Conifer	12.9	6.8	5.6	3	0.5	0.7	0.0	0.0
	Broadleaves	0.1	0.2	0.3	1.1	2.0	2.1	1.9	0.7
	Total	12.9	6.9	5.9	4.1	2.5	2.7	1.9	0.7
Northern Ireland	Conifer	5.0	4.3	3.4	4.4	3.9	2.1	0.5	0.1
	Broadleaves	0.1	0.3	0.4	1.0	1.4	1.5	2.2	1.3
	Total	5.1	4.6	3.8	5.4	5.3	3.6	2.7	1.4
UK	Conifer	184.7	108.9	114.3	105.8	45.9	33.0	25.0	9.7
	Broadleaves	3.2	2.7	3.8	20.4	45.9	53.3	51.6	23.9
	Total	188.0	111.7	118.2	126.3	91.8	86.4	76.6	33.6

* Three year total to and including 2009.

- Research about:
 - Tree planting and support mechanisms
 - Woodland owner and managers decision making
 - Landscape level partnerships between owners and managers
- Including:
 - 2010-12. Evaluation of grant schemes and programmes, e.g. BWW, WIAT, Glastir
 - 2010. Landowner attitudes to woodland creation and management
 - 2008-11. Private landowners and farmers engagement with woodfuel production
 - 2011. Sustainable behaviours landowners and managers in the forestry sector
 - 2008-12. Community Forestry and woodlands impacts
 - 2010-12. Landscape partnerships
 - 2011-12. LUES/SERG review of ES *wrt* TWF
 - 2009-12. ES mapping and spatial analysis work using 10 years of empirical data across variety of research projects

- Review work by SERG/LUES and specific part played by TWF
- Headlines
 - Complexity
 - ES provided by different woodland types and silvicultural regimes not understood or mapped
 - ES provided by woodland WITHIN a landscape – most pertinent for on-farm TWF - even less well understood
 - Temporal scenarios and trends?
 - Measures? Public goods present particular problems



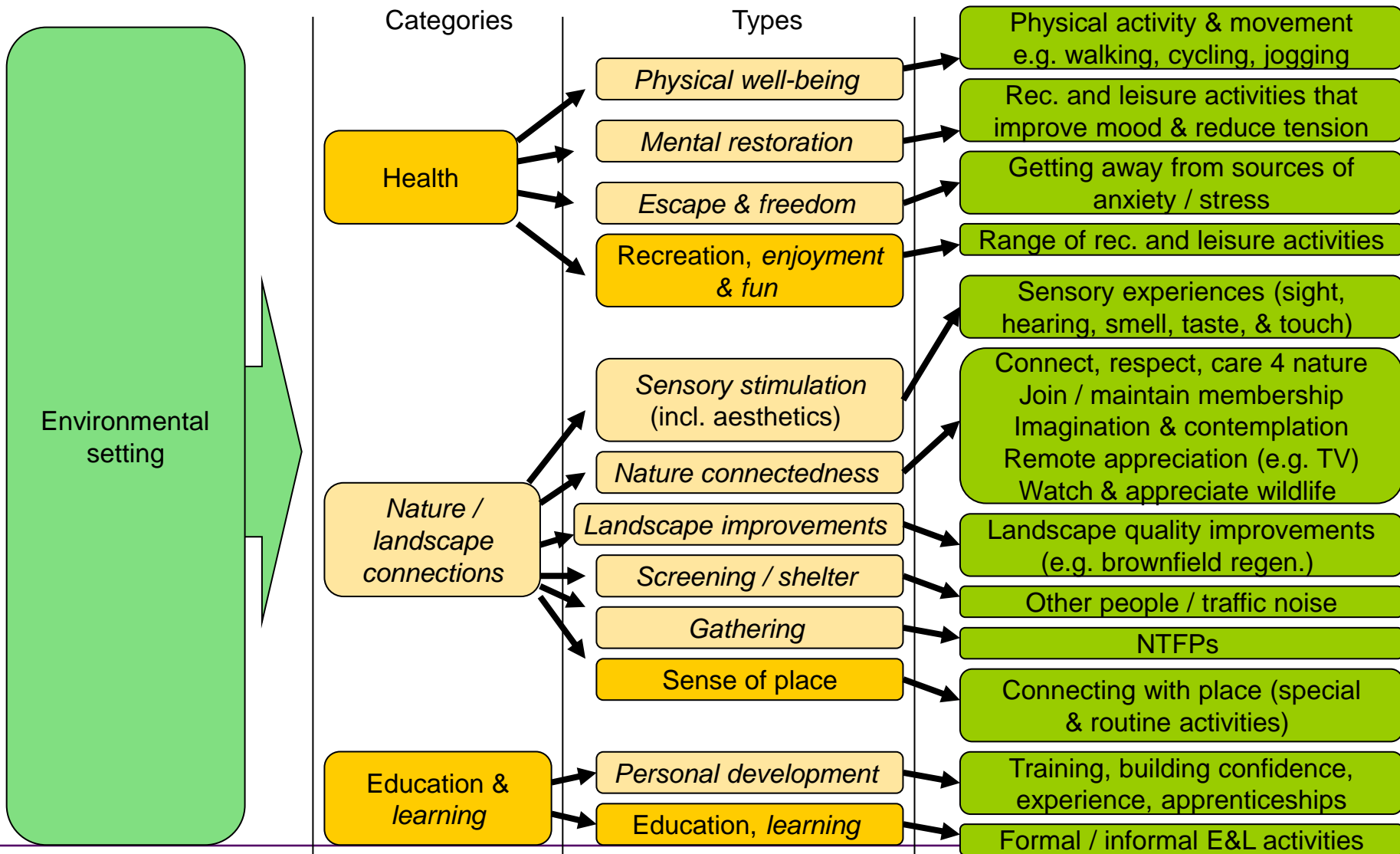
Ecosystem service provided by woodlands	Examples of goods and benefits in the UK	Key references
Provisioning services		
Crops, livestock and fisheries	Little tradition of agro-forestry other than grazing particularly as part of wood-pasture systems; non-timber forest products (NTFPs) for commercial and domestic use, e.g. meat (including from culled deer), berries, honey, fungi, medicinal derivatives and drugs.	Martin <i>et al.</i> (2006); Emery <i>et al.</i> (2006); Kirby <i>et al.</i> (1995)
Trees for timber	Provision of raw timber materials for use in commercial and domestic enterprises; provision of wood chips for boards and pulp for paper. Use of timber as an alternative for other building materials such as steel and concrete in order to reduce use of fossil fuels and enhance building standards.	Forestry Commission (2003a) Suttle <i>et al.</i> (2009)
Trees for bio/woodfuel	Timber products (e.g. harvesting residues, stumps and roots, recycled wood) as fuel for heat and power plants, as domestic firewood, for biochar and as raw material for processed hydrocarbon fuels.	Chapter 14 Ireland <i>et al.</i> (2004)
Woodlands and water supply	Wooded catchments especially in the uplands provide important water supplies for major urban areas (e.g. Thirlmere and Manchester).	Ritvo (2009)
Regulating services		
Climate	Avoidance of climate stress. Tree cover can help dampen the climatic effects experienced in the open, thus protecting soils, animals and humans from extremes of temperature, strong winds and UV light. Carbon sequestration. Woodlands and their soils are important reserves of terrestrial carbon, and timber products can also be considered.	Mason <i>et al.</i> (2009) Morton <i>et al.</i> (2009); Lorenz & Lal (2010)
Hazard	Soil protection. Tree cover can offer protection from soil erosion and slope failure. Forest management will reduce exposure to chemicals and pesticides and likelihood of soil compaction compared to agriculture. Flood and water protection. Woodlands moderate rainfall events and river and stream hydrographs, delaying and reducing flood events.	Moffat (1991); Nisbet <i>et al.</i> (2008) Nisbet <i>et al.</i> (in press)
Disease and pests	Woodland dwelling organisms can help in regulating the incidence and spread of insect pests of crops and pathogens of importance to humans, livestock, crops and ecosystems.	Chapter 14
Detoxification and Purification	Water quality. Because of minimal use of pesticides and fertilisers, woodlands managed under sustainable principles also offer benefits of water quality. Soil quality. Woodland cover can stabilise contaminated brownfield land and hinder the pathways between source and receptors. Air quality. Capture of atmospheric pollutants in tree canopies can lead to consequent reduced exposure for humans, crops, buildings etc. Noise reduction. Belts of trees between residences and transport routes can absorb sound.	Nisbet <i>et al.</i> (in press) Moffat & Hutchings (2007) NEGAP (2001)
Pollination	Woodlands likely provide habitat for diverse wild pollinator communities of importance to trees, crops and other plants.	Huddart (1990) Devoto <i>et al.</i> (2011)
Cultural services		
Wild species diversity	Biodiversity. UK forests, including plantations, provide habitat for a wide range of fauna and flora but a limited genetic resource (e.g. compared to tropical forests).	Edwards <i>et al.</i> (2009) Humphrey <i>et al.</i> (2003)
Environmental settings	Trees and woodlands are valuable for personal enlightenment and as places or catalysts for social activity and cohesion. Forests are increasingly acknowledged for their educational value. Trees have been perpetual motifs in fine art, and influenced many other art forms. Many forests are open to the public for the enjoyment of outdoor pursuits and recreational activities. Their access facilitates exercise and benefits human health and longevity. Trees and woodlands increase the diversity of landscape character; their existence provides a link with the past when man's existence was more closely linked to woodlands and their products; woodlands reduce the rate of, or eliminate the need for, cultivation, a significant cause of archaeological destruction.	O'Brien (2006); Lawrence <i>et al.</i> (2009) O'Brien & Murray (2007) Phythian (1907); Hohl (1998) Woodland Trust (2004); O'Brien & Morris (2009) Rackham (1976); Smout (2002); Crow (2004)
Supporting services		
Soil formation, nutrient cycling, water cycling, oxygen production	Forests facilitate soil formation and other biogeochemical processes essential to life.	Fisher & Binkley (2000)
Biodiversity	Little in way of unique species (endemism) at least amongst the well-know groups, but locally adapted provenances and distinctive assemblages associated with some species being at the edge of their range in Britain; a distinctive maritime climate; and historical differences. These include 'Atlantic' elements such as the abundance of bluebells, rich bryophyte communities in western oak woods, ash-hazel dominated woods (beyond range of beech), abundance of veteran trees with associated lichen and saproxylic associated species.	Rodwell (1991); Peterken (1996); Kirby <i>et al.</i> (2005)

Cultural Services (1)

Service (NEA)

Goods / Benefits (**NEA** / **SERG**)

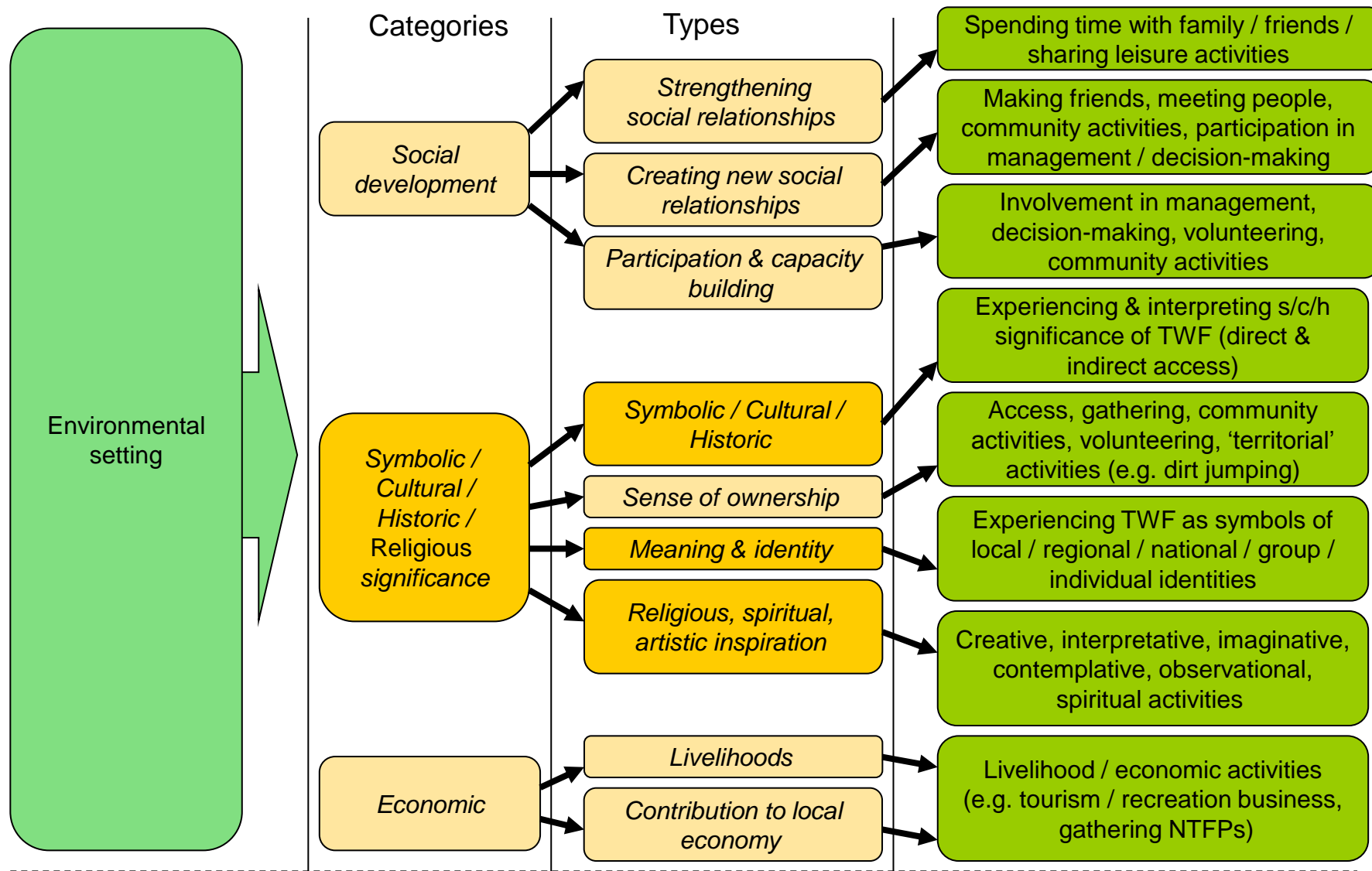
Interactions with TWF



Service (NEA)

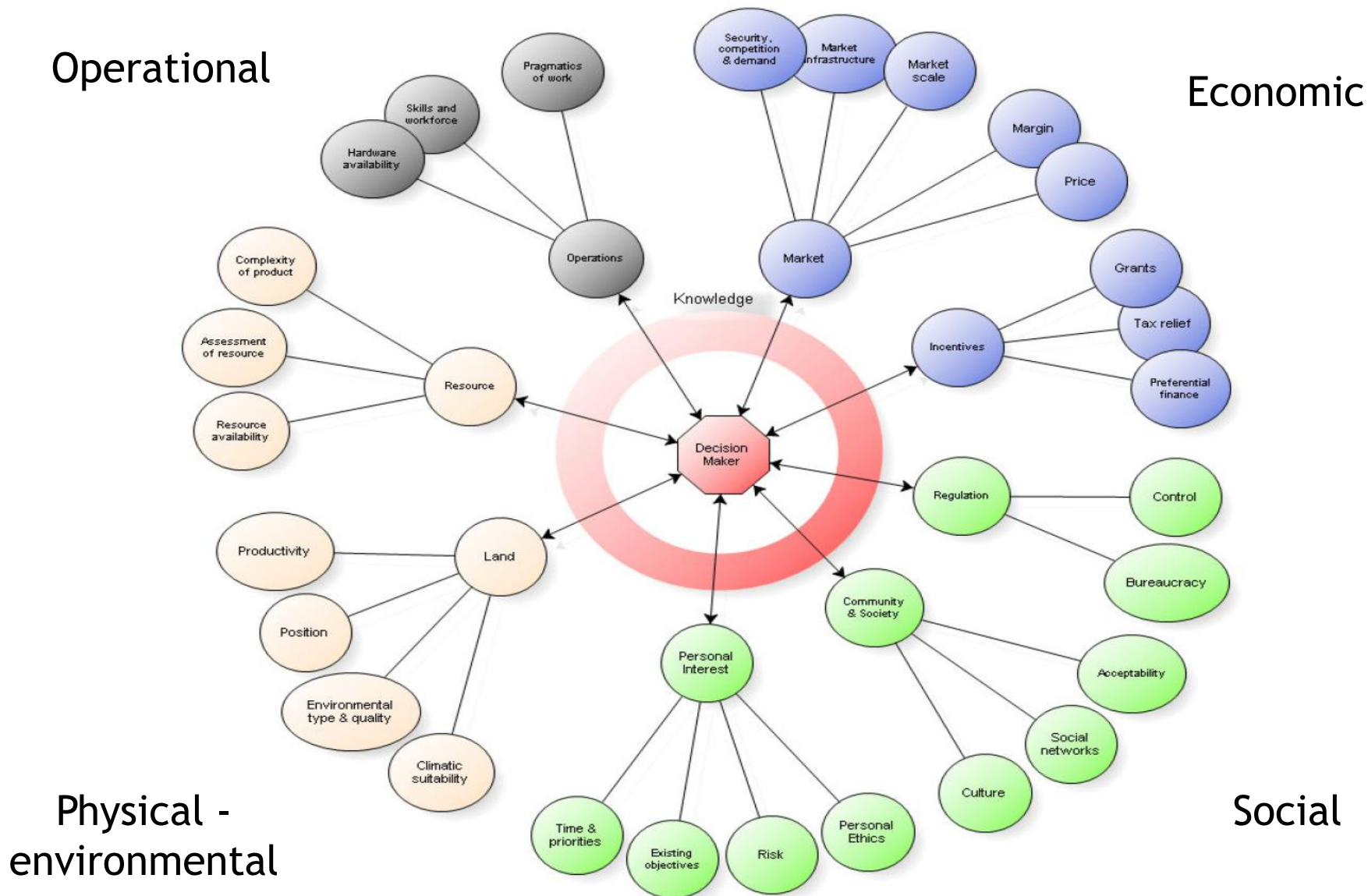
Goods / Benefits (**NEA** / **SERG**)

Interactions with TWF



- Carter et al (2009) shows public benefits greater from public versus private woodland – cultural ES in particular
- Trees and woodland on farms
 - Conscious or sub-conscious delivery?
 - Farmers as food producers or countryside stewards?
 - Profit maximisers to utility maximisers?
 - Tension to convert rather than preserve or plant woodlands
 - Government intervention to promote provision of public goods – links ES and woodlands very strongly





- Conscious consideration of range of ES's evident
- Decisions not made outwith social institutions – rules may limit ES provision
- Decisions not made alone
- Different mix of priorities depending on 'segment'
- Energy increasingly important as good or service
- Softer 'ES' as important as others
- Measuring output?

"I'm digging up my land so you've got to have something, you need to cover your costs because I wouldn't do it if it was coming it out of my own pocket because the cost is too high. It's about planting and giving up my land, to get all those benefits from mother nature."

'Most farmers when they were just following their land or setting -aside would top it once a year just because they can't handle the look of it. But we weren't fussed by that and we'd rather not have spent the money on the diesel! If you just leave that unchecked then you have a tremendous boom of vegetation growth and interest ... the single payment rules said you had to cut your scrub after 5 years, but after 3 or 4 years we thought, "oh my god there's butterflies everywhere, birds everywhere!".'

"It's changed the landscape, your farming routine is a bit different and you're appreciating the wildlife which has come along with the, as the trees mature, the diversity of the birds and things, which previously weren't present, yeah"



"I think when we planted it [the wood] we thought that would reduce our carbon, because obviously it's taking in carbon, we'd reduce our carbon"

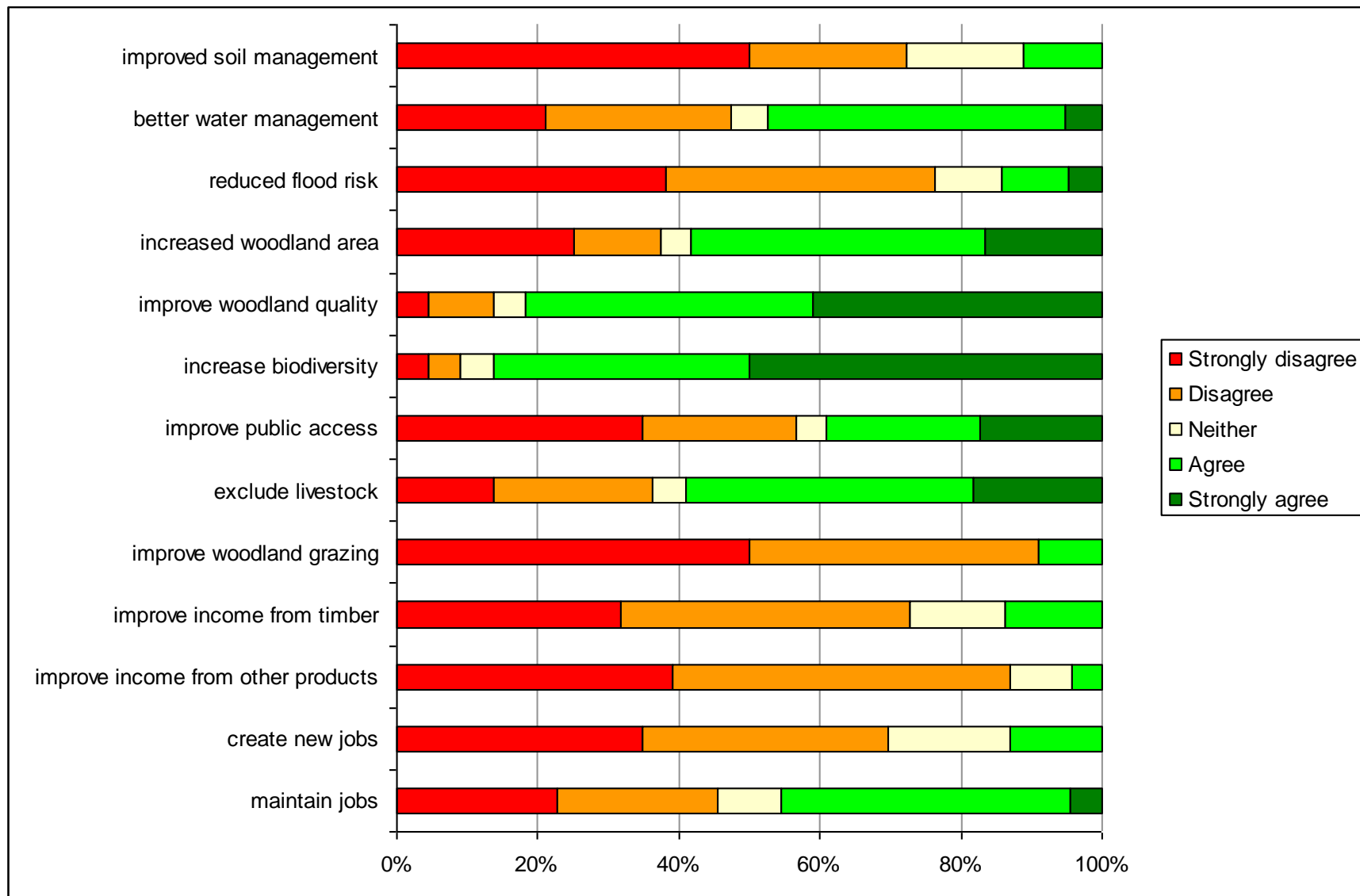
'We have a long term goal, a 10 year goal to make the property self-sustaining in energy, water and food. Biomass will be one of the technologies we use for heating and possibly power production, so we will be looking to develop biomass production [from the land].'

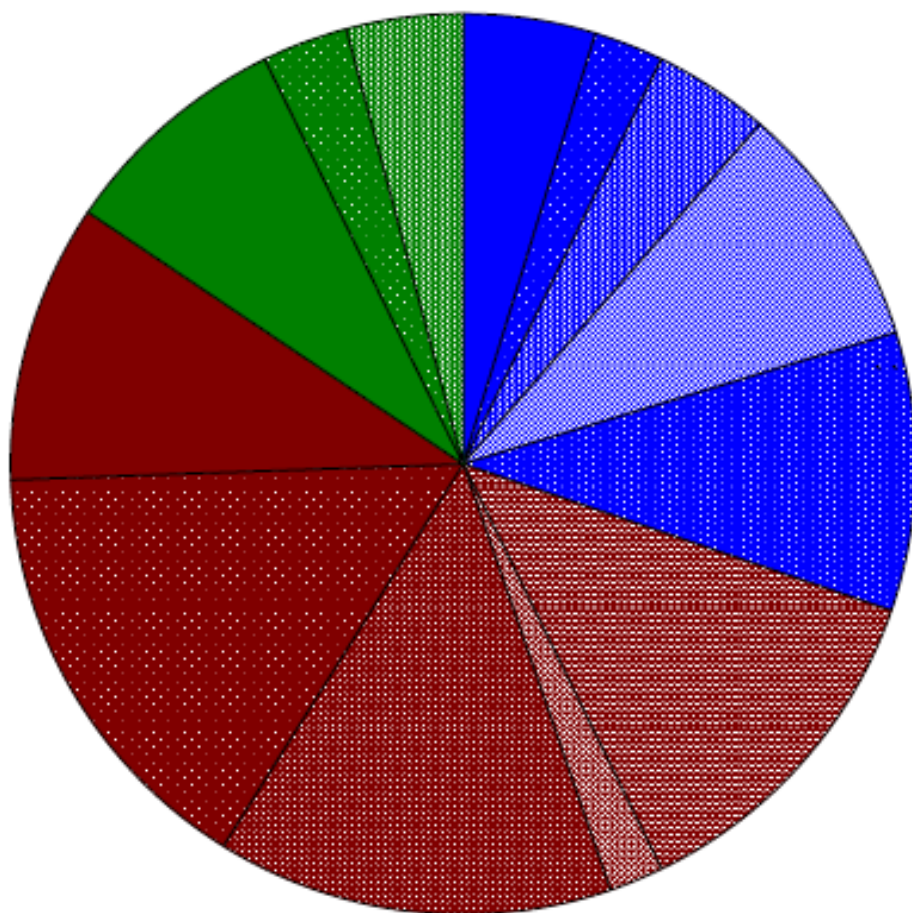
"So what I'm hoping it will do as a side, as an aside, it will actually obviously uptake water which will reduce the amount of, yeah, it will drain the land. Well, not drain it, but it will uptake the water off the land better"

BWW grant

- 71% business occupiers (10% farmers) said grant critical to decision making, motivated by business objectives
 - Improving the tree crop
 - Reducing extraction costs
 - Securing future income stream
- 77% of personal occupiers (50% farmers) did not see grant as critical and were motivated by personal values to:
 - Restore habitat diversity
 - Increase woodland cover in their local landscape
 - Preserve or improve cultural heritage.







-  Cultural create new jobs
-  Cultural improve income from other products
-  Cultural improve income from timber
-  Cultural improve public access
-  Cultural maintain jobs
-  Provisioning exclude livestock
-  Provisioning improve woodland grazing
-  Provisioning improve woodland quality
-  Provisioning increase biodiversity
-  Provisioning increased woodland area
-  Regulating better water management
-  Regulating improved soil management
-  Regulating reduced flood risk

- Is ES understanding being taken up?
- Is ES provision an innovation or fit with what managers already do?
- Policy and others
 - Political as well as technical constraints to embedding an ecosystem approach into landscape governance
 - Measuring and Mapping
 - Criteria
 - Scales
 - Weighting
 - Prioritisation
 - Flows and impacts
- What is our research agenda in this area going forward?
 - Segmentation and networks
 - Mapping and policy prioritisation
 - Interventions and impacts



<http://www.forestry.gov.uk/fr/peopleandtrees>

