Natural Environment Framework: Woodland case study

The Government of Wales has set a target of creating 100,000 hectares of new woodland over a 20 year period. Commissioned by Forestry Commission Wales (FCW), this study provides tentative estimates of the expected net economic benefits of meeting this target.

The results show that woodland creation is a very cost-effective climate change mitigation measure over a 100-year time frame.

Background

In 2010 the Government of Wales announced a target of creating 100,000 ha of new woodland over a 20 year period. It is envisaged that this will be achieved through a mixture of grant funding, such as the Glastir scheme that superseded the earlier 'Better Woodlands for Wales' scheme during 2011, and other sources, including carbon finance and corporate social responsibility programmes undertaken by the private sector.

Objectives

The aim of the study is to provide indicative economic estimates of the expected net benefits of meeting the new woodland creation target in Wales. In discussion with FCW, it was decided to focus upon the following five categories:

- Carbon sequestration
- Wood production
- Amenity
- Health
- Agricultural production

Methods

The study focuses upon a 100 year time horizon with the pre-Glastir rate of 200 hectares per year chosen to represent baseline woodland creation. Planting 100,000 ha of new woodland was taken to mean creating an additional 86,000 ha of new woodland over the 20 year period above this baseline level. A variety of estimation methods were used. These include GIS analysis based upon linking estimates of the health and amenity benefits of woodlands made as part of the UK National Ecosystem Assessment with spatial information on the location of woodlands created during 2011 in Wales (assumed to be typical of the areas where woodlands would be created in future). Due to a lack of existing studies that separate out amenity and health benefits, a simple approach was used based upon ranging the extent of overlap in their aggregation. The study focuses upon two broadleaf woodland planting measures, with corresponding carbon estimates obtained from FR's C-SORT model. Climate change mitigation cost-effectiveness analysis was based upon current government guidelines for policy appraisal.

Findings

Tentative estimates of the value of different ecosystem service impacts associated with meeting the afforestation target in Wales are shown below.

Indicative present values of net ecosystem service impacts (£m at 2012 prices)

	Low (£m)	Central (£m)	High (£m)
Climate regulation	**901**	**2,899**	**5,736**
Wood production	**0.03**	**0.07**	**0.13**
Amenity	339	363	369
Health	402	1,421	2,559
Amenity and Health	**402**	**1,603**	**2,928**
Agricultural production	**-718**	**-90**	**90**
Forestry costs	**-286**	**-260**	**-169**
Net Present Value	**299**	**4,152**	**8,585**

Sensitive to a range of underlying assumptions and sources of uncertainty (e.g. concerning the level of agricultural opportunity costs), the estimates cover a wide range. The estimated net present value ranges from £300m to approaching £8,600m, with a central estimate of around £4,200m. Climate regulation (i.e. carbon sequestration) is by far the largest benefit, followed by health and amenity benefits.

Total carbon sequestration was estimated to range between 44 $MtCO_2$ and 82 $MtCO_2$ over the 100 year period. Associated climate change mitigation cost-effectiveness estimates range from -£37/tCO_2 (high estimate) to £13/tCO_2 (low estimate), with a central estimate of -£21/tCO_2 at 2012 prices. (Negative values for the low and central estimates imply that woodland creation is cost-effective even without considering the carbon saved). The estimates are substantially lower than associated cost-effectiveness comparators, which range from £22/tCO_2 to £76/tCO_2, with a central estimate of £49/tCO_2 (based upon social values of carbon at 2012 prices). Woodland creation is therefore judged very cost-effective as a climate change mitigation measure.

Recommendation

- To provide greater precision and narrow the range of estimates, new primary research is needed on agricultural opportunity costs, and aggregate health and amenity benefits.

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Reports and Publications:

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