

Forestry Statistics 2020

Sources: Carbon

Release date:

24 September 2020

11.4 Sources: Carbon

Introduction

Forests can help mitigate climate change by reducing the amount of greenhouse gases in the atmosphere. They do this by absorbing carbon dioxide, using the carbon to produce sugars for tree growth and releasing the oxygen back into the air. As trees grow, they store carbon in their leaves, twigs and trunk, and in the soil around them.

Globally, deforestation caused by the unsustainable harvesting of timber and the conversion of forests to other land uses accounts for almost 20 per cent of global carbon dioxide emissions. The amount of carbon stored can be increased by actions to reduce the amount of deforestation and to convert non-forested areas to forest. Forests can be managed as a sustainable source of wood – an alternative energy source to fossil fuels, and a low-energy construction material.

Woodlands can also help society adapt to a changing climate, by reducing the risk of flooding, providing shade for wildlife, reducing soil erosion and helping to cool down towns and cities.

Data sources and methodology

Forest carbon stock

Table 4.1a is adapted from Table 2d in the final UK report submitted in January 2019 to FAO for the Global Forest Resources Assessment (FRA) 2020 (www.fao.org/forest-resources-assessment/en/). Table 4.1b has been compiled using the same approach produce estimates by country within the UK.

Units: These tables are shown in million tonnes carbon dioxide equivalent (MtCO_{2e}) rather than million tonnes carbon (MtC). To convert from CO_{2e} to C multiply by 12/44.

Timescales: Carbon stock is estimated for 1990, 2000, 2010, 2015 and 2020.

Living biomass: Carbon in living biomass is based on data from "NFI report: Carbon in live woodland trees in Britain" (Forestry Commission, May 2014), uprated from GB to UK estimates based on estimated volumes of growing stock. A "root to shoot ratio" (below ground biomass = 0.36 x above ground biomass) is used to estimate the breakdown between above- and below-ground biomass (Levy et al, 2004). Updated estimates of growing stock over time (making use of data from the National Forest Inventory) have been used.

Deadwood: Estimates of deadwood volume per hectare are taken from National Forest Inventory estimates. These are rated up by woodland area estimates for FRA 2020, assuming a density of 0.45 ODT/m³, and an average carbon content of 50% is applied.

Litter: Estimates of the carbon content of the litter layer are available from Morison et al (2012). These are rated up by woodland area estimates for FRA 2020 to provide a consistent time series.

Soil carbon: Estimates of the carbon content of soil 0-100 cm for England, Wales and Scotland are available from Morison et al (2012). An estimate of the carbon content of soil for Northern Ireland is taken from Bradley et al (2005) and rated downward to reflect the generally lower carbon content found in Morison et al (2012). The soil carbon estimates are then rated up by woodland area estimates for FRA 2020 to provide a consistent time series. This soil estimate does not take account of soil carbon accumulation. It also assumes that the soil carbon content of afforested (and previously unwooded) land has the same soil carbon content as woodland soils, whereas in practice this may vary.

Comparison with other data sources: Figures in this updated table are broadly similar to the estimates made in Morison et al (2012).

Future updates: This table will be updated once further information is available from the National Forest Inventory.

Woodland Carbon Code

The Woodland Carbon Code is a voluntary standard, initiated in July 2011, for woodland creation projects that make claims about the carbon they sequester (take out of the atmosphere). All projects must be placed on the UK Woodland Carbon Registry. Their claims about potential carbon sequestration are validated by an independent certification body. Validated projects are then verified on a regular basis to confirm the progress of carbon sequestration.

Information about Woodland Carbon Code projects comes from the UK Woodland Carbon Registry, housed on the Markit Environmental Registry (www.markit.com/product/registry). The register is a live database and summary data are extracted annually.

Further information on the Woodland Carbon Code is available at: www.woodlandcarboncode.org.uk/.

Public opinion on climate change

Public Opinion of Forestry Surveys have been run every 2 years by Forest Research (on behalf of the Forestry Commission, Scottish Forestry, Welsh

Government/ Natural Resources Wales and Northern Ireland Forest Service). The surveys cover public attitudes to forestry and forestry-related issues. The surveys included up to 2 questions on climate change: one asking about ways in which forests and woodlands can impact on climate change and one asking about how UK forests should be managed in response to the threat of climate change (Table 4.3). Further information on the surveys is available in the Sources: Public Opinion of Forestry page.

References

- Bradley, R.I., Milne, R., Bell, J., Lilly, A., Jordan, C., Higgins, A. (2005) "A soil carbon and landuse database for the UK", *Soil Use and Management* 21 (363-369), DOI: 10.1079/SUM2005351 (<https://onlinelibrary.wiley.com/doi/abs/10.1079/SUM2005351>).
- Broadmeadow, M., Matthews, R. (2003) "Forests, Carbon and Climate Change: the UK Contribution", Forestry Commission, Edinburgh (www.forestresearch.gov.uk/research/archive-forests-carbon-and-climate-change-the-uk-contribution-2/).
- Jenkins, T.A.R., Mackie, E.D., Matthews, R.W., Miller, G., Randle, T.J., White, M.E., FC (2011) "Woodland Carbon Code: Carbon Assessment Protocol", Forest Research (www.woodlandcarboncode.org.uk/images/PDFs/WCC_CarbonAssessmentProtocol_V2.0_March2018.pdf).
- Levy, P.E., Hale, S.E., Nicoll, B.C. (2004) "Biomass expansion factors and root: shoot ratios for coniferous tree species in Great Britain", *Forestry*, Vol 77, No 5, DOI: 10.1093/forestry/77.5.421 (<https://academic.oup.com/forestry/article/77/5/421/664592>).
- Morison, J. et al (2012) "Understanding the Carbon and GHG balance of UK Forests", Forest Research (www.forestresearch.gov.uk/research/understanding-the-carbon-and-greenhouse-gas-balance-of-forests-in-britain/).
- National Forest Inventory (www.forestresearch.gov.uk/tools-and-resources/national-forest-inventory/)

Quality

All of the statistics in this chapter are outside the scope of National Statistics, but are included here to give a broad indication of the role of UK forests in climate change.

Revisions

Most of the statistics in this chapter have been previously released. Data have not been revised from previous releases.

Our revisions policy sets out how revisions and errors to these statistics are dealt with, and can be found at:

www.forestresearch.gov.uk/documents/4355/FCrevisions.pdf.

Further information

Data on historical UK greenhouse gas emissions (including carbon sequestration by woodlands) is available in statistics published by the Department for Business, Energy and Industrial Strategy at

<https://www.gov.uk/government/collections/uk-greenhouse-gas-emissions-statistics>.

Release schedule

Woodland Carbon Code Statistics for the year ending March 2021 will be released in "Provisional Woodland Statistics: 2021 Edition" on 17 June 2021.

"Forestry Statistics 2021" and "Forestry Facts & Figures 2021" will be released on 30 September 2021.

The next Public Opinion of Forestry Survey is expected to run in early 2021, with results available in summer 2021.