How can farmers and landowners be motivated to plant more trees to deliver a wide range of benefits, especially mitigating climate change?

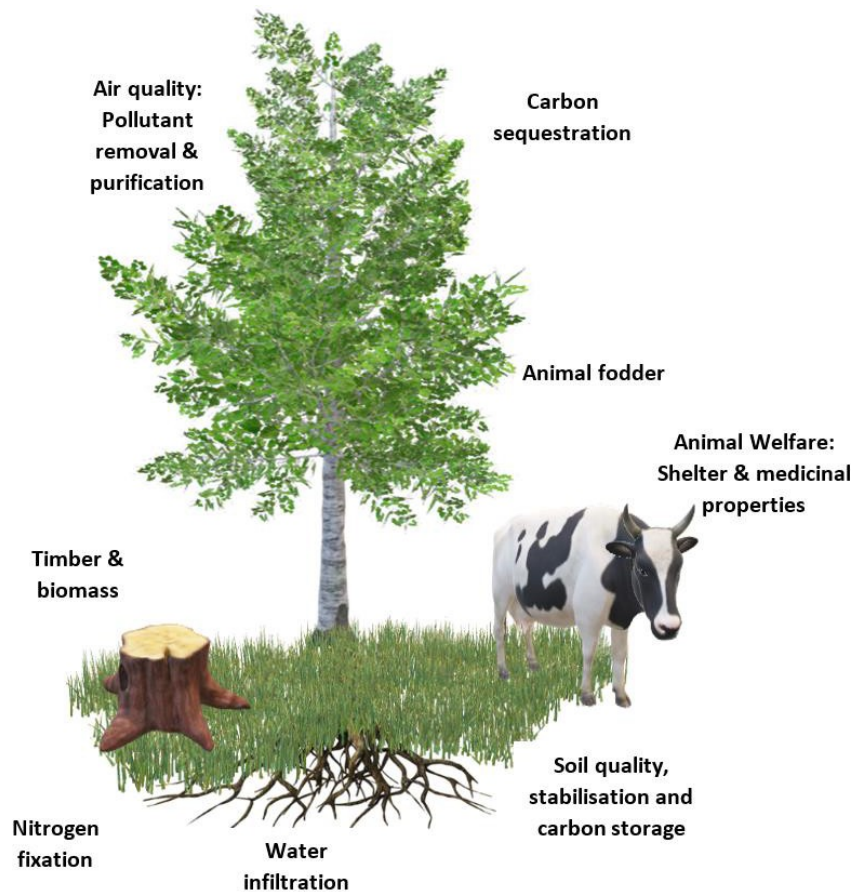## By Jay Williams

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By Jay Williams

The effects of climate change are likely to see a global loss in biodiversity, a reduction in agricultural yields and consequent negative impacts on human health (IPCC 2018). Despite the seemingly unsurmountable issues related to climate change, hope for the future does exist. The International Panel on Climate Change (IPCC) state that achieving and sustaining a net zero global anthropogenic CO_2 emissions and declining non-CO_2 radiative forcing, would succeed in halting anthropogenic global warming on a multi-decadal timescale (IPCC, 2018). Although a net-zero scenario currently seems unlikely, the UK is dedicated to reducing net emissions. The UK has signed up to the Paris agreement (2015) with the central aim of keeping global temperature rise below 2°C of pre-industrial levels. Additionally, the UK has set its own target of ensuring that the net carbon account for 2050 is 80% lower than that of 1990 (Climate Change Act, 2008). Natural processes that remove CO_2 semi-permanently are too slow to counteract rising anthropogenic emissions, meaning anthropogenic Carbon Dioxide removal (CDR) mechanisms are required. The IPCC recognise afforestation as one of the most viable options for CDR (IPCC, 2018).

The land cover of forestry in the UK currently stands at 3.19 million hectares (13% of total land area) (Forest Research, 2019), which is an inadequate proportion of forested land for the UK to play its role successfully. The UK 25 year environment plan identifies the key action areas of carbon sequestration, water management, soil health, landscape, biodiversity and human wellbeing. Defra (2018) recognises the role that trees can play in meeting these key areas but haven't identified the mechanisms required to achieve them. In their assessment of the potential for UK trees and woodlands to mitigate and adapt to climate change, Read *et al.*, (2009) produced a key message of 'Plant now, use sustainably' and so this essay aims to address the mechanisms to encourage farmers and landowners to 'Plant now'.

The Eskdalemuir report (Confor, 2014) and to a lesser extent the Upland forestry WALES study (Confor, 2015) highlight many of the economic advantages of forestry over upland agriculture, yet these reports do not consider the benefits to food security and biodiversity that UK farmland can provide. In a sense, both of these reports reinforce the traditional conflict between forestry and farming and no similar report of such calibre highlights the advantages of a mixed land use system, where forestry and farming work together. Indeed, the last Forestry Commission bulletin to address agroforestry was published 19 years ago, and so it is unsurprising that agroforestry in the UK lacks the enthusiasm seen abroad. The benefits of woodland integrated agriculture are shown in Figure 1.

Air quality: Pollutant removal & purification

Carbon sequestration

Animal fodder

Animal Welfare: Shelter & medicinal properties

Timber & biomass

Nitrogen fixation

Water infiltration

Soil quality, stabilisation and carbon storage
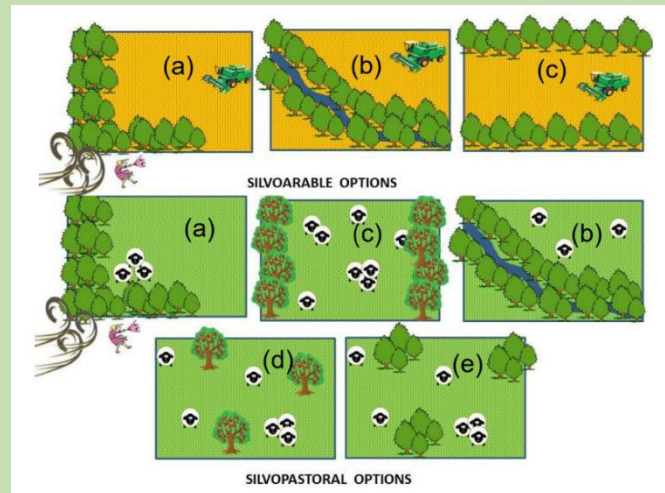
(Source: Author's own)

Figure 1. Benefits of agroforestry.

Agroforestry systems (See Box 1) can increase productivity in some areas by up to 40%, tackle climate change by sequestering carbon in both trees and soil, aid water management through a reduction in lag phases, improve landscape and biodiversity value and improve animal welfare (Soil Association, 2018). The benefits of all these elements at a UK level are exemplified through the Pontbren project – a farmer-led project that adopted an innovative approach to woodland management and tree planting that saw an increase in farm woodland from 1.5% to 5%. The shelter belts that were installed negated the need for additional winter animal housing and reduced livestock energy expenditure. This, combined with the improved soil structure and resultant increase in pasture quality, saw an increase in yields and profits. The biomass harvested from hedge cutting and thinning was also used for energy generation and as an alternative animal bedding (Keenleyside, 2013). Many farms already possess the required machinery and infrastructure to produce biomass yet don't maximise upon this potential. Grain drying floors in particular are redundant most of the year and lend themselves perfectly to the drying of woodchip. This can be used to generate year round income.

Box 1.

Agroforestry Systems:

-   **Silvopasture**

-   **Alley cropping**

-   **Forest farming**
    (or multi-storey cropping)

-   **Buffer strips and windbreaks**

-   **Riparian forest buffers**

a) windbreaks, b) riparian buffer strips, c) rows, d) single tree, e) tree clusters.

(Source: Perks *et al.,* 2018)

At Pontbren, the direct action of a small group of farmers has had wider reaching benefits, yet it was achieved through their own realisation that tree planting was an economically beneficial move when performed in collaboration. On an individual farmer basis, it is difficult for English and Welsh farmers to fund large scale tree planting within their existing agricultural systems. The two governments fail to support agroforestry in their grant systems which contrasts with the Scottish government who recognise the potential of agroforestry in increasing farm resilience to climate change. They give greater flexibility to farmers through allowing low density tree planting in agricultural systems (Table 1). The restrictions that apply to the Woodland Creation Grant in England and Wales determine that once a woodland creation scheme begins, the land is classified as set-aside and no agricultural practice can occur upon it. This presents a barrier to tree planting and reduces motivation to adopt silvopastoral systems, yet the benefits of such systems have been clearly illustrated through the Pontbren project amongst others, such as the Dartington Estate, Devon, where a three tiered agroforestry contract exists between landowner, farm tenant and a local business that grows top-fruit (Soil Association, 2018). These examples serve to illustrate the multiple business streams that can emerge through tree planting, where business collaboration and skill sharing can create a year-round income. Additionally, the woodland creation planning grant currently only applies to woodlands of 10 hectares or more, and so betrays motivation to plan small scale projects. The competitive nature and eligibility thresholds (Table 2) present a further barrier to increased tree planting on farms where a minimum area of 3 hectares per application applies. Many landowners within the UK do not have such available land to take out of production and dedicate to pure woodland. If this requirement were lowered to 1 hectare or allow for the incorporation of agroforestry as seen in Scotland, it would open the eligibility to a greater number of people. The Woodland Trust offer assistance and funding within their Trees for your farm project (2019) allowing a minimum of 500 trees and a whole farm assessment. This was oversubscribed for the 2019 planting season, highlighting the interest in small scale, reduced restriction planting schemes.

Table 1. Scottish Woodland Grant, allowing for agroforestry systems.

Planting Density	Initial Payment	Annual Maintenance
400 trees/hectare	£3,600/hectare	£84/hectare/year
200 trees/hectare	£1860/hectare	£48/hectare/year

(Source: Scottish Government, 2018)

Table 2. Woodland Creation Grant eligibility thresholds.

Eligibility Threshold	General	Planting as part of measures for water quality or flood protection. These lower thresholds are only applicable in exceptional and fully justified cases.
Minimum area per application	3 hectares	1 hectare
Minimum block size	0.5 hectares	0.1 hectares
Minimum width	20 metres	10 metres

(Source: Natural England, 2017)

Some landowners and farmers may feel that they lack the skills or knowledge to diversify into agroforestry and may see woodland planting as taking land out of production, rather than seeing the potential to increase production and income potential. A study by Quick *et al.,* (2013) identified that farmer attitude to tree planting varied widely, with pig and dairy farmers least likely to plant trees. This may stem from a lack of understanding of the benefits that trees can bring, both in terms of welfare and finance. For example, the medicinal qualities of forage trees can encourage livestock to self-medicate, an example of which is salicylic acid, an anti-inflammatory derived from Willow and Poplar trees which can reduce artificial medicine costs and veterinary bills (Country smallholding, 2019).

Despite the predominance of tree planting in the uplands, most farms have the capacity to accommodate greater numbers of trees, yet landowners may lack the ability to identify the most suitable areas for planting. Many farms have areas of unproductive land that either lack fertility or where it is difficult or impractical to operate large machinery. Help in identifying and mapping these areas is necessary to formulate sustainable planting programmes, as recognised by the Woodland Trust (2019). It is therefore suggested that grants be made available for farmers and landowners to gain this information through consultancy and advisors.

Once identified, farmers should be encouraged to sell the carbon potential of planting schemes to companies wishing to offset their carbon footprint. Although the UK Woodland Carbon Code exists to regulate the delivery of carbon offsetting projects, there is a lack of mainstream commercial carbon trading at the small, local level. The increased accessibility of carbon trading to farmers and landowners may see increased allocation of tree planting in the least agriculturally productive areas.

This essay identifies the clear need to promote agroforestry systems and overcome the barriers currently preventing its uptake in the UK. The key message of this essay is '**Trees FOR farming, NOT trees OR farming'.** The following is a list of recommendations to motivate farmers and landowners to plant more trees:

- A reduction in scale of land required to apply for woodland creation grants to enable a higher proportion of landowners and small holders to access funding.

- A lowering of eligibility thresholds to allow application of grant aid for agroforestry systems in England and Wales, in line with Scottish Rural Payments.
- The publication of a high calibre report that illustrates the benefits of an integrated woodland and farming approach that is disseminated amongst the farming community. This could be achieved through conferences, networking events and agricultural shows.
- The increased commerciality of carbon trading at the local level with supported assurance of the Woodland Carbon Code.
- Grants for land mapping to aid farmers in the identification of the least productive areas they own, alongside associated tree planting schemes.

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