

# Overview of agroforestry and its benefits

Paul J. Burgess  
School of Energy, Environment and Agrifood  
*Cranfield University, Cranfield, MK43 0AL, UK*

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# Why not multi-functional land use?



Science & Environment

## Trees can help UK farming cut emissions, says study

By Mark Kinver  
Environment reporter, BBC News

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Increasing agricultural yields coupled with tree planting and wetland restoration could help the UK farming industry to cut its carbon footprint

Agroforestry is the integration of farming with trees.

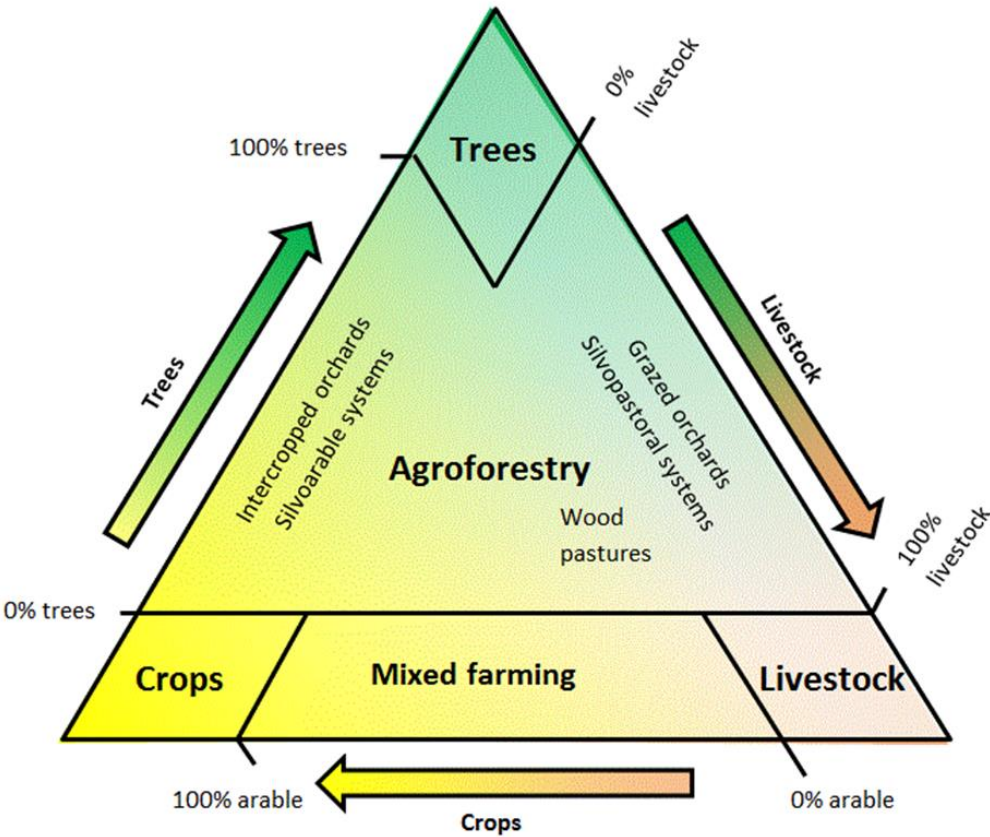
This BBC article from Tuesday 5 Jan 2016 cites a paper (Lamb et al., 2016) that recommends that farmers should be intensifying agricultural production in order to release the land from agriculture to plant trees.

However where are the opportunities to **combine** food production with trees?

Cranfield University is leading a large four year European Union project called AGFORWARD to promote the appropriate integration of trees with farming across Europe.



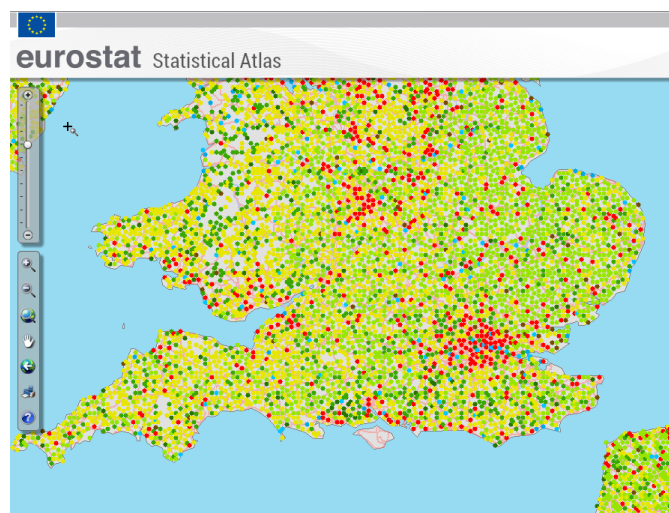
# UK-applicable agroforestry in AGFORWARD ([www.agforward.eu](http://www.agforward.eu))



# Agroforestry is a significant land use



LUCAS is a pan-EU survey that describes land use and land cover. We can use the data to identify areas that combine trees and farming



Area of combined use of trees with farming in the UK (estimated using LUCAS) of 4.3% is similar to average for EU of about 5.7% (den Herder et al. 2016)

Agroforestry practice	Area in UK (hectares)	Proportion of total area (%)
Wood pasture	799,000	3.2
Grazed/intercropped orchards	16,200	0.1
Silvoarable	10,000	0.0
Livestock agroforestry	852,000	3.4
<b>Total</b>	<b>1,075,000</b>	<b>4.3</b>

Agroforestry practice	Area in UK (hectares)	Proportion of total area (%)
Single trees and bushes	35,900	0.2
Hedgerow area	240,000	1.0
(Visibly managed)	146,000	0.6
Avenue trees	39,600	0.2

# Animal welfare benefits



## Woodland eggs



**Injurious feather pecking:** Bright and Joret (2012) report reduced injurious feather pecking by laying hens in a woodland environment

**Egg quality:** Bright and Joret (2012) report that the proportion of eggs with poor quality shells fell by 1% when hens were given access to a woodland.

Price (£ per six eggs) of free range and woodland eggs (source: retailers' websites, April 2014; Burgess et al., 2014)

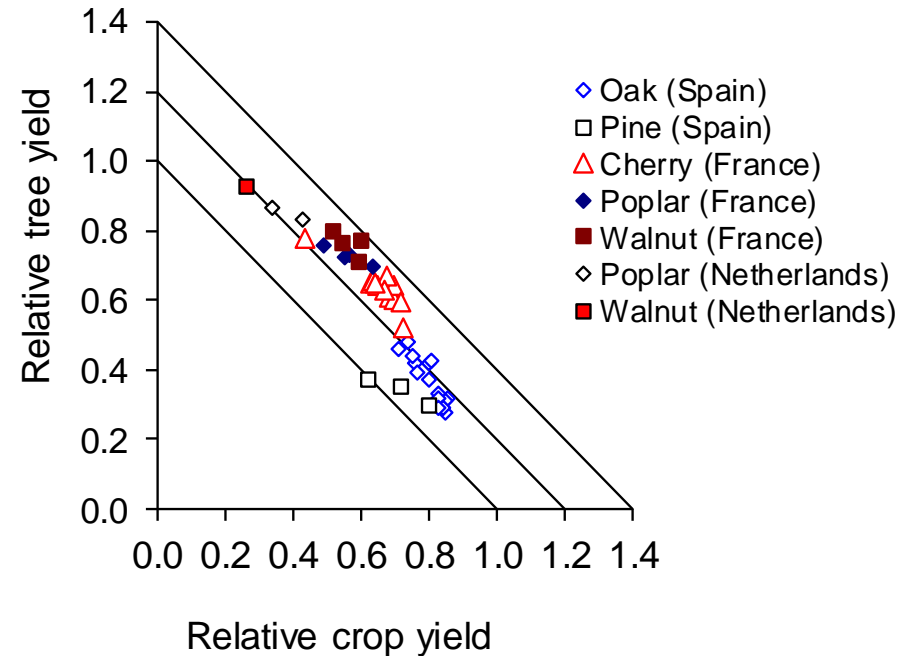
Supermarket	Free-range	Woodland
Aldi	1.00	1.19
Morrisons	1.39	1.59

Some UK consumers are willing to pay a premium of £0.20 for six woodland eggs in two supermarkets

UK egg packers are willing to give a price premium of £0.01 for six woodland eggs compared to “free-range” (IGD, 2008)



# Production and financial benefits



Whilst agroforestry rarely results in a higher tree yield than forestry or a greater crop yield than arable systems, Graves et al (2007) showed that intercropping widely-spaced high-value walnut trees in France can increase production and profitability (assuming no increase in management costs)

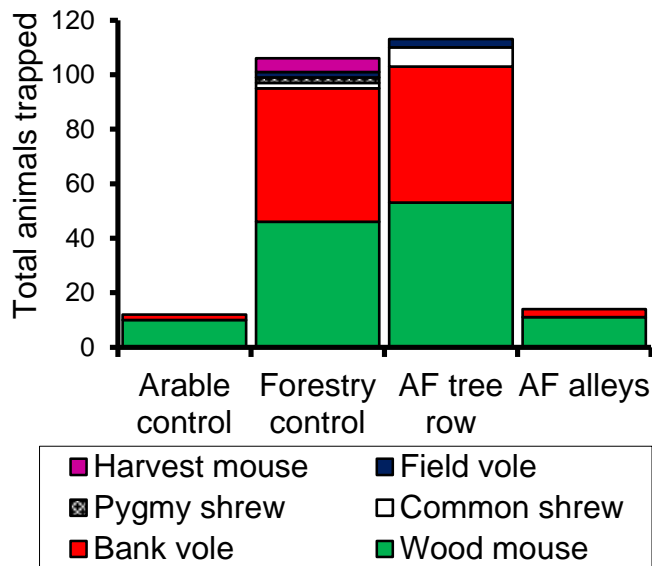
	Equivalent annual value (Euros per ha) without grants
Arable	91
Forestry	227
Silvoarable	296

# Environmental benefits



## Increased biodiversity

At Leeds, silvoarable agroforestry (AF) with a grass understorey increased the number of small mammals compared to an arable control (Wright, 1994, reported by Burgess, 1999)



## Carbon sequestration, water and air quality

Estimated equivalent annual value (EAV) of environmental benefits of a walnut silvoarable systems relative to arable monoculture, assuming discount rate of 4% (after Andreola, 2014) in France.

	Walnut (€ ha <sup>-1</sup> a <sup>-1</sup> )
Carbon sequestration <sup>1</sup>	99
Improved water quality <sup>2</sup>	42
Improved air quality <sup>3</sup>	3
Sub-total	144

<sup>1</sup> Assuming Carbon price increasing from 0 in 2020 to €30 per t C from 2050.

<sup>2</sup> Assuming reduction in nitrogen leaching

<sup>3</sup> Assuming reduction of pollution due to NO<sub>2</sub>, SO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>

A recent meta-analysis of 53 European studies showed that compared to woodlands, agroforestry increased **soil fertility, biodiversity** and helped to **control soil erosion** (Torralba et al., submitted)

# What do farmers think?



**In the initial stages of the AGFORWARD project, we asked 344 farmers and other stakeholders in the EU to identify the key positive and negative aspects of agroforestry against 45 criteria.**

**We are still analysing the results, but:**

**The initial results show that stakeholders clearly recognise the positive production and environmental aspects of agroforestry i.e. improved animal welfare, biodiversity, and soil conservation. The key areas of negativity include administrative burden and management complexity**



# Conclusions



- Experimental and modelled results, and the perception of surveyed farmers and advisers highlight there can be positive **production** and **environmental** benefits of integrating trees with farming.
- The key negative aspects include the **complexity** of work and the **administrative burden**.
- The paper by Lamb et al (2016) suggests that agricultural production could be intensified so that agricultural land can be released for woodland planting. Agroforestry offers an alternative way for farmers to maintain food production, to maintain basic payments (subject to national policies), and to provide environment benefits.
- Can we not develop a greener Common Land Use Policy that allows and promotes such multi-functional land use?

# Action



- If you are interested to know more about agroforestry in Europe:
- Visit our website: [www.agforward.eu](http://www.agforward.eu)
- Join our facebook page:  
<https://www.facebook.com/AgforwardProject>

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Thank you



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