

Agroforestry in the UK

Jo Smith

Senior Programme Manager

Agroforestry in the UK

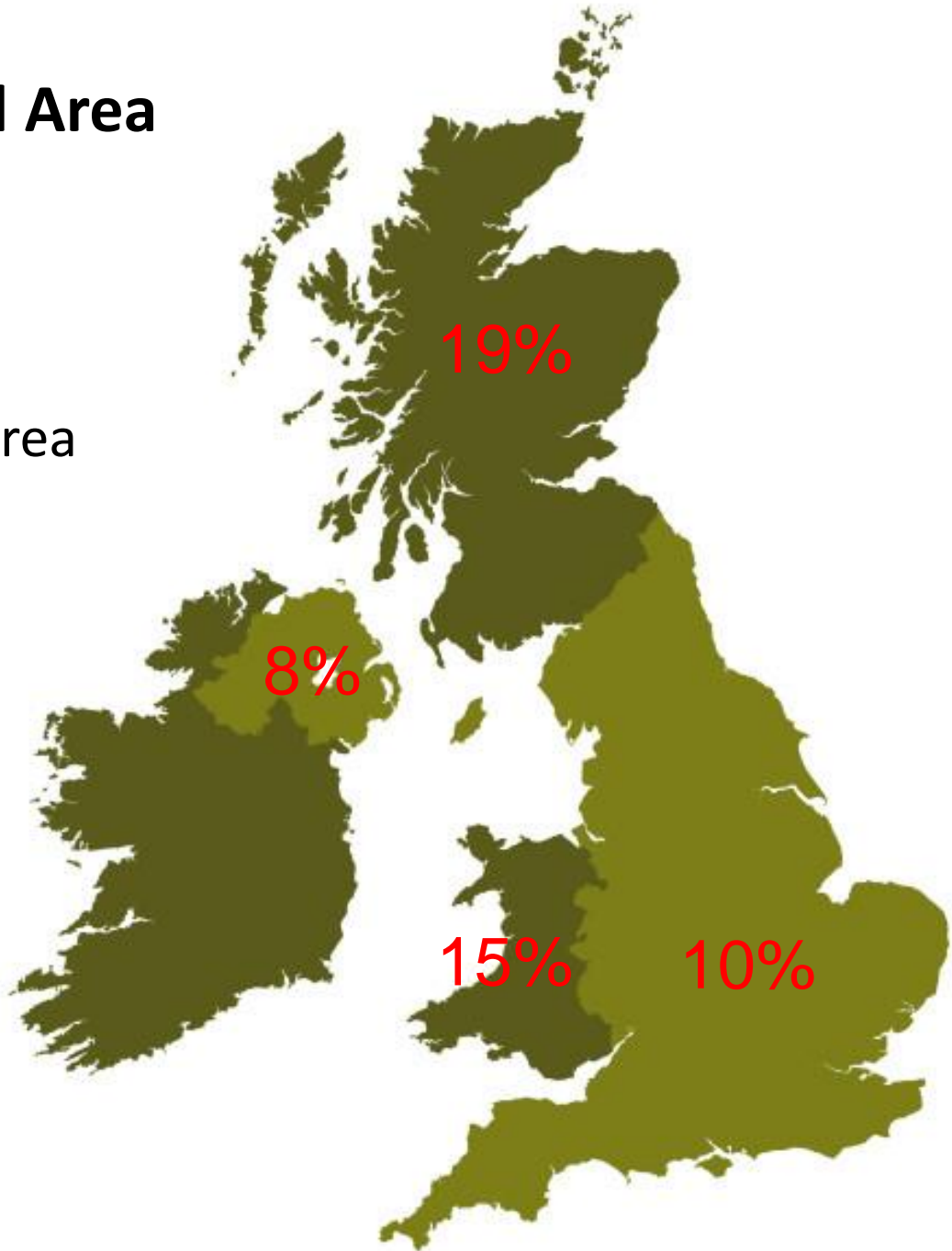
A photograph of a field with a row of tall, green trees in the background and a field of golden-brown grasses in the foreground. The trees are dense and appear to be a species like poplar or willow. The grasses are tall and have a feathery appearance, possibly a type of cereal or grass used in agroforestry. The sky is overcast and grey.

- **Overview of agroforestry systems**
- **Agroforestry research**
- **Knowledge exchange**
- **Agroforestry in UK policy**
- **Agroforestry in action**

UK Woodland Area 2018

www.forestresearch.gov.uk

3.17 million ha
13% total land area



Tree cover outside woodland in Great Britain

National Forest Inventory Report

www.forestresearch.gov.uk

- 742,000 ha of tree cover outside woodlands in Britain
- 74% in rural areas/26% in urban areas
- Total canopy cover of 97,000 ha associated with lone trees
- Total tree cover, including both woodland tree cover and tree cover outside woodland is 16.5% in urban areas and 16.7% in rural areas.

Hedgerows 700,000 km



Grazed orchards 17,600 ha top fruit (7180 ha cider orchards) DEFRA 2012. Proportion grazed is unknown



UK Traditional agroforestry

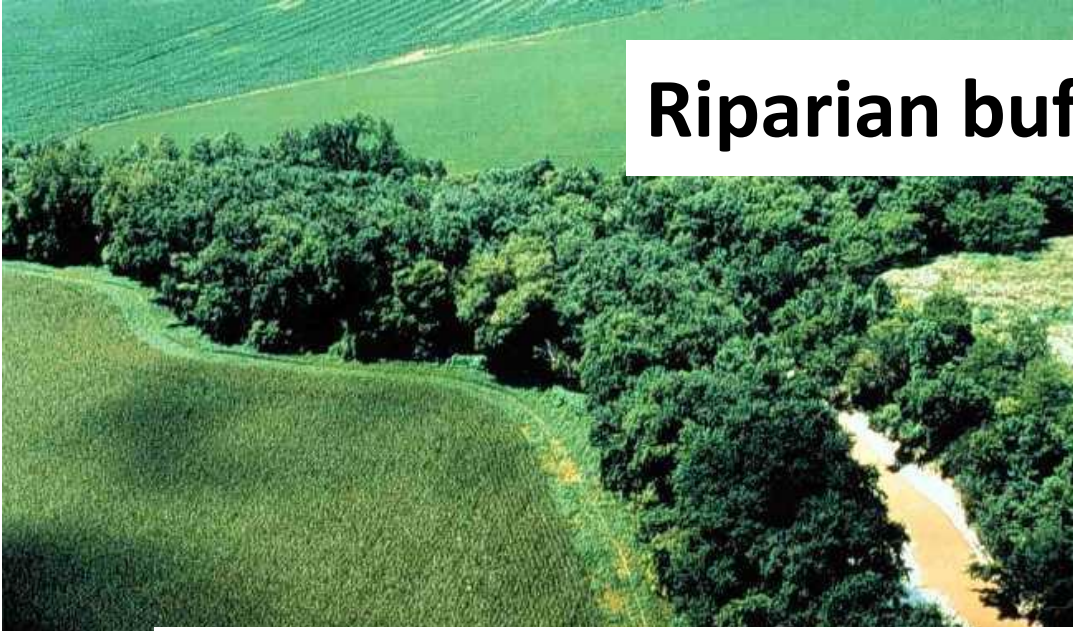
Wood pasture



10-20,000 ha
(Maddock 2011)

Parkland





Riparian buffers

15% of channels in England and Wales have riparian trees (defined as vegetation objects greater than 2.5 m high)

Agroforestry for environmental protection



Shelter belts



UK Silvopastoral agroforestry

547,600 ha 2.2% UAA (den Herder et al, 2017)



30.07.2014



More than 3.4% UK market



**UK Silvoarable agroforestry
2000 ha (den Herder et al, 2017)**



UK Research



UK Agroforestry Research Networks

- Silvopastoral National Experimental Network: established late 1980s on 6 sites (3 upland, 3 lowland, sycamore & sheep)
- Silvoarable National Experimental Network: established 1992 on 3 sites (poplar and arable)
- Measured productivity, interactions, economics and environmental impacts
- Some on-going research at N Wyke and Henfaes





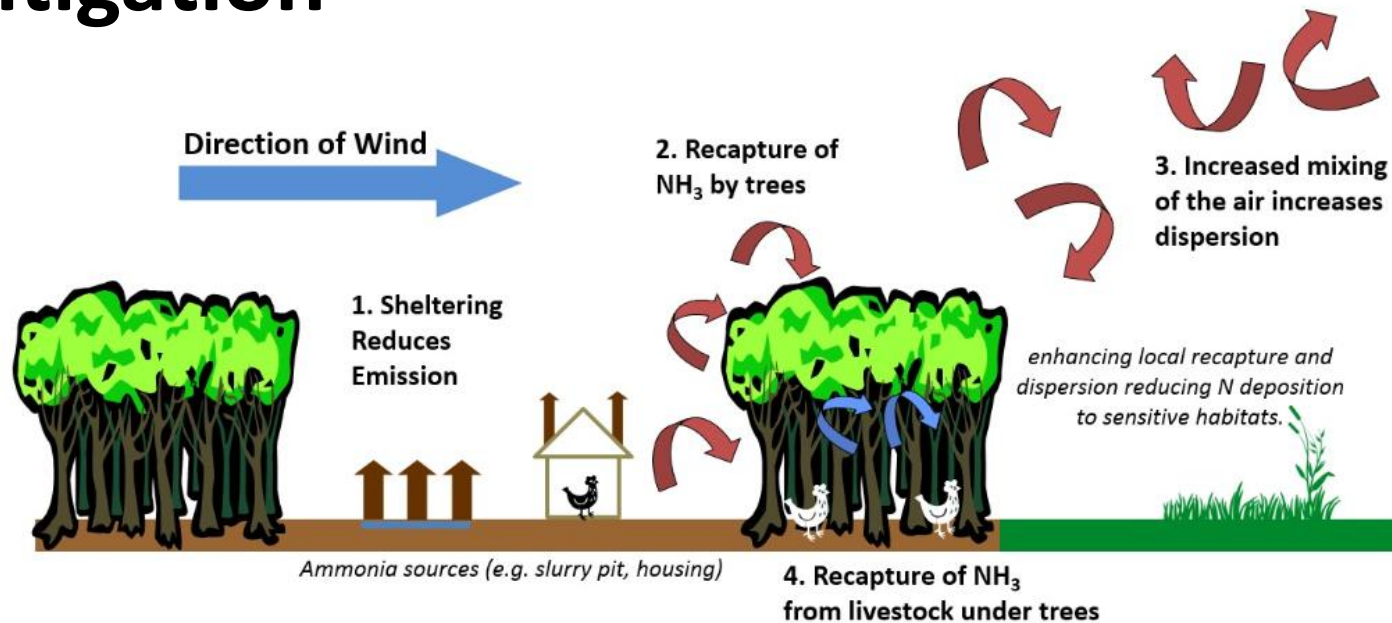
NNE Key Results: Silvopastoral

- **No reduction in agricultural production (sheep) in 9 years post-planting – trees at 400/ha**
- **Increased species diversity of ground insects and birds**
- **Sheep use trees for shelter – but caused compaction around tree**
- **Higher water infiltration in silvopastoral plots**
- **Red alder trees appear to have had a beneficial effect in terms of nitrogen fixation, as the production in the alder plots was as high as in the pasture control plots with 160 kg N ha⁻¹ yr⁻¹ applied**

NNE Key Results: Silvoarable

- 4% reduction in crop yields for the first 3 years, increasing to 10% less between years 4 and 6
- higher insect diversities and natural enemy abundance, and lower abundances of pea and bean weevils (*Sitona* spp.) and pea midge (*Contarinia pisi*) compared to a monoculture of peas
- grain aphids (*Sitobion avenae*) populations in the winter barley crop approximately half that of the arable control
- But increased slug populations

Ammonia (NH₃) mitigation



To assess the potential of the different abatement measures:

a) *Re-capture & increased dispersion* by shelterbelts and similar woodland features: *quantification >> measurements & modelling*

b) *Animals under trees* (silvopasture): demonstrate practical feasibility of ammonia abatement through case studies

- Ammonia concentrations 10-25% lower beyond trees than open transect
- 45% recapture for understorey livestock (modelled) Bealey et al 2012



Tree Shelter Belts for Ammonia Mitigation

www.farmtreestoair.ceh.ac.uk

Trees and woodlands have the potential to recapture ammonia emissions from animal housing units or areas where animals are able to roam free range under the canopy, with associated benefits for animal welfare and the environment. They can also be used to disperse emissions and reduce atmospheric nitrogen deposition reaching sensitive habitats. Existing, established woodland and the planting of new woodland (e.g. as farm tree shelterbelts) can therefore be used to reduce ammonia emissions and the environmental and social impacts associated.

Tree calculator for Ammonia Mitigation : ⚠️ BETA

Enter British National Grid reference (Landranger grid or Easting,Northing)
433653,168415

Select location from map

Choose a soil type:
Podzolic brown earth

Main Canopy
Species are sorted by suitability
Choose the species of your main canopy:
Pedunculate oak

Choose the depth of your main canopy (in metres):
10

Backstop Canopy
Species are sorted by suitability
Choose the species of your backstop canopy:
Scots pine

Choose the depth of your backstop (in metres):
10

Site Characteristics
Eastings: 433653
Northings: 168415
OS Grid reference: SU336684
Soil moisture regime: Fresh
Soil nutrient regime: Poor
Site description: The site has a warm, sheltered and moist climate. The soils are fresh moisture status and poor nutrient status.

Percentage Ammonia recapture
As main canopy species you have selected: Pedunculate oak
As backstop species you have selected: Scots pine

Year	Main Canopy Depth (m)	Backstop Depth (m)	Main Canopy Height (m)	Backstop Height (m)	Main Canopy % Recapture	Backstop % Recapture	Total % Recapture
5	10	10	1.55	1.61	0.05	4.62	4.67
10	10	10	3.43	3.83	0.81	5.8	6.61
15	10	10	5.32	6.17	1.62	7.04	8.63

Agency (FR) have developed a calculator and guidance for farmers, planners and tree Use of Shelterbelt Trees to Mitigate Ammonia

Designs for Tree Shelterbelts

There are two important considerations when designing tree systems for ammonia recapture:

- to get the ammonia into the woodland and through the main canopy, a reasonably open understorey would be necessary to prevent the ammonia passing over the top of the woodland and acting as a block to the airflow.
- prevention of the loss of ammonia out of the downwind edge of the woodland. To stop this happening, a region of dense vegetation should be planted at the downwind edge (and sides if possible) to act as a backstop and force the ammonia up through the canopy.





Pont Bren: landscape scale agroforestry

- Farmer-led initiative to achieving more sustainable upland land management
- Increased 'canopy cover' from 1.5% to 5%

Water infiltration in shelter belts was 60 times that of neighbouring grassland

Peak stream flows reduced by 40%

Also.....

- Increase in farm net income
- Improved efficiency of livestock enterprises
- Future proofing
- Reducing the risk of water pollution and biosecurity



Multi-Land

Enhancing Agricultural Productivity and Ecosystem Service Resilience in Multifunctional Landscapes

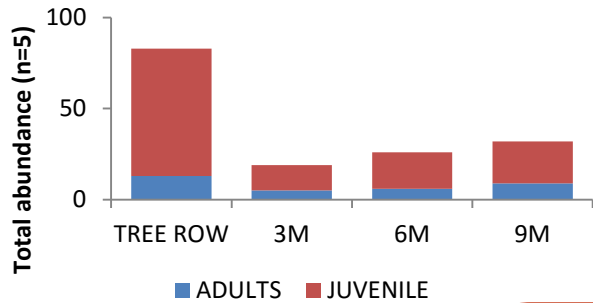
Cluster Leader: Dr. Andy Smith, Bangor University



Key findings:

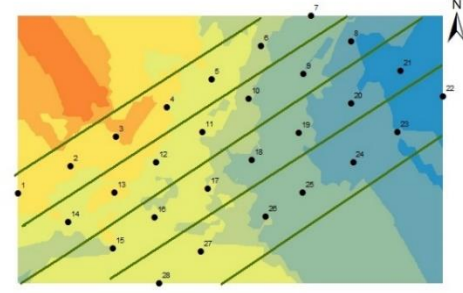
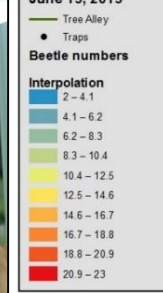
- Strategic integration of trees and hedgerows into farming systems and the wider landscape **increases ecological complexity, multi-functionality and resilience.**
- Tree and hedgerow shelter **improves animal energy balance**, with the potential to improve farm production efficiency and animal welfare.
- Hedgerows **reduce compaction and enhance soil organic carbon storage** in livestock grazed pastures, with the potential for climate change mitigation.
- Tree species-specific differences in root morphology substantially alter **soil water infiltration**. The fastest infiltration rate was found with ash (*Fraxinus excelsior*). The loss of ash to disease is likely, therefore, to have an effect on landscape hydrology and flooding.
- Tree fodder can **reduce ruminant methane production** compared to hay; highlighting the potential to use trees as browse material to mitigate greenhouse gas emissions from grazed pasture.

Earthworm abundance Oct 2016

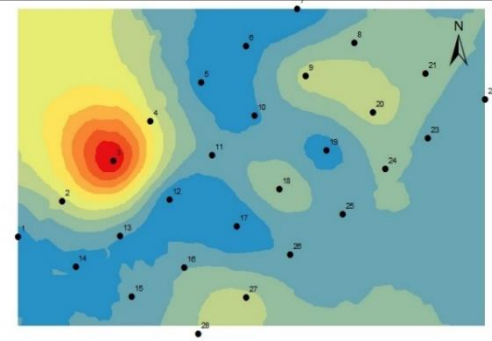


→ Ecosystem service delivery: pollination, pest control and impact on yields

Silvoarable System June 15, 2015

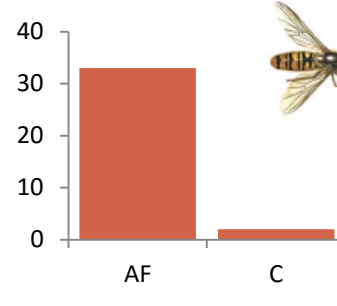
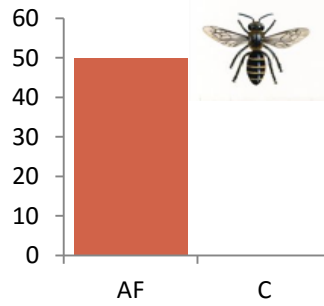
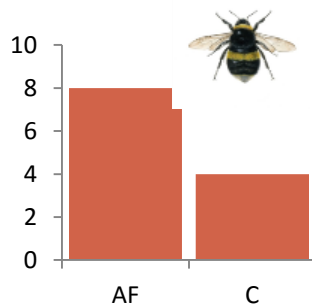


Arable System June 15, 2015



Ground Beetle distributions
Jenny Sharman, MSc

Pollinators Varah et al, 2015



The Organic Research Centre



MAKING BETTER USE OF EXISTING WOODY RESOURCES



DESIGNING AND EVALUATING NEW SYSTEMS



What are the **positive** and **negative** aspects of agroforestry?



Production and management

Crop diversification :

- Reduces risk,
- Diversifies income,
- Higher productivity,
- Lower pests/diseases

Production and management

- Lower crop yield
- Weed migration from tree row,
- Higher labour costs
- Mechanical challenges

Environment

- Carbon storage
- Increased biodiversity
- Microclimate regulation
- Nutrient recycling

Environmental

- Impact of climate change on crops and trees unknown

Socio-economic

More jobs
Community engagement
Human health
Opportunity for new farmers

Socio-economic

- Farmer attitudes
- Lack of information
- Land tenure
- Lack of policy support

Silvoarable
benefits and
management
challenges



Knowledge Exchange...for farmers, land managers



Knowledge Exchange



Agroforestry 2017:

improving productivity for farmers and foresters

Held on Thursday 22 June at Cranfield University and organised by Woodland Trust, Royal Forestry Society and Soil Association.

250 farmers, foresters, landowners and researchers





THE AGROFORESTRY HANDBOOK

Agroforestry for the UK

Published summer 2019

Chapter 1 What is Agroforestry?

Dr. Paul Burgess, Cranfield University

It has not been treated as separate and distinct in previous handbooks on farm management. Farmers manage land that combines trees and crops that stand individually or in groups too. In 2017, the Forestry Commission estimated that there are 1.5 million hectares (ha) of trees that weren't in agricultural fields (in other words less than 0.1 ha). That is similar to the area of barley

Chapter 2 Agroforestry systems design

Prof. Steven M Newman, BioDiversity International Ltd

This chapter is to provide a special working with trees; provide different starting points in operation.

Agroforestry systems can produce high yields per unit area and have a negative environmental effects. The UK can offer productivity, climate diversity and landscape, and welfare benefits.

Appropriately placed trees can help to minimise the leaching of nitrate.

Chapter 3 Silvopasture

Dr. Tim Pagella, Bangor University

What is silvopasture?

Silvopasture is a management practice where the same unit of land as livestock (i.e. rural) where there is interaction results in direct effect to the farming system.

Trees can provide economic benefits if they are used on farm to reduce costs. Trees also produce benefits that can contribute indirectly to the farm along a field boundary can alter their microclimate. Access to shade reduces heat stress and increases their productivity at a minor cost. In addition, the same trees can help dry out soil and improve the farm biodiversity. They are more resilient by reducing soil loss and building soil.

The ideas associated with silvopasture can be used on land use systems across the UK. It is the most common with one third of tree cover in Great Britain. As such, many farms have existing silvopasture realising it. Silvopasture can involve different types of forage systems (pasture or hay) and can be similarly integrating livestock into woodland and the animals and is also considered a form of agroforestry.

In this chapter we will first identify the various types of livestock systems, and then either integrating or expanding tree cover.

Photograph ©Organic Research Centre 45

Chapter 4 Silvoarable

Dr. Paul Burgess, Cranfield University

What is silvoarable?

Silvoarable agroforestry is the use of the same field (See Chapters 1 and 2). It involves the same field management, the tree and the crops are grown together. This is also used for silvoarable systems. Typical objectives for silvoarable systems are to increase the productivity of the land and to reduce the risk of crop failure. Methods of silvoarable systems include:

landscape across Europe, silvoarable has been shown to increase the productivity of the land, and there is evidence that many people use silvoarable systems.

reduced temperature and a greater variety of crop species.

Chapter 5 Hedges, windbreaks, and riparian buffers

Dr. Jo Smith and Sally Westaway, The Organic Research Centre

Agroforestry systems such as hedgerows, windbreaks and riparian buffers are widespread landscape features in the UK, providing a range of benefits for the farming system as well as the wider environment. In addition to discussing the main considerations for planning, planting and management, this chapter also presents options for managing these features as a productive part of the farming enterprise.

Although historically hedgerows, windbreaks and riparian buffers may have been planted for different reasons, they provide similar services to the farm and the environment, depending on their location and management. Boundary hedgerows are usually established to mark property or field boundaries, to improve the husbandry of livestock, and to prevent damage to arable crops. In the past they were also managed as a source of food, materials and firewood. Windbreaks, or shelterbelts, are strategically planted strips of trees that aim to reduce wind speeds in the protected area. The main function of riparian buffers is to protect water courses by capturing sediment and nutrients from adjacent fields, buffering water courses from pesticide spray drift as well as providing shade, and buffering water temperatures to the benefit of river wildlife.

When positioned correctly all three features can reduce wind speeds in an area up to 30 times their height¹. This reduction can have multiple benefits including increased crop growth rates and quality, protection from windblown soil, moisture management and soil protection. Higher air and soil temperatures in the lee of a windbreak or hedge can extend the crop growing season, with earlier germination and more growth at the start of the season. Fruit and vegetable crops are particularly sensitive to wind stress and suffer reduced yields and poorer quality at lower wind speeds than combinable crops. For livestock, reduced wind speeds and chill factors can increase live weight gain and milk production, reduce feed costs and young stock mortality. During the summer, by providing shade, trees can reduce the energy needed for regulating body temperatures, and so also result in higher feed conversion and



©The Organic Research Centre
▲Silvoarable at Whitehall
▲Dairy youngstock with:
©Ben Raskin

AGROFORESTRY INNOVATION NETWORKS



ending from
on 2020
gramme
27872.





We all change, AFINET as well.

We are now at www.eurafagroforestry.eu/afinet

AFINET

Agroforestry (AF) is a type of climate-smart agriculture (CSA) practice of deliberately combining vegetation (trees or shrubs) with crop and/or animal systems to resulting ecological and economic interactions.

Recognizing the economic and environmental relevance of this activity, a consortium of 13 European countries, launch AFINET (AgroForestry Innovation Networks) a thematic network aimed to foster the exchange and the knowledge



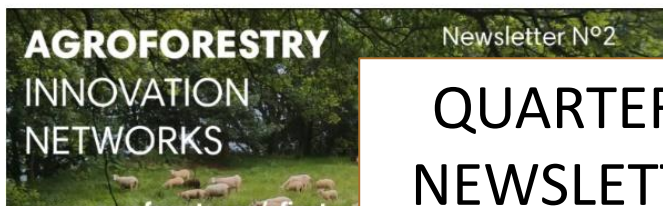
01-02-2019

Spanish RAIN meet to present and promote innovative agroforestry initiatives



31-01-2019

II Polish Agroforestry Conference: "Perspectives



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AGROFORESTRY INNOVATION NETWORKS

13 **CULTIVATING KNOWLEDGE**

TREES FOR SHADE, SHELTER, SURVIVAL AND BODY MAINTENANCE

How offering access to trees can improve the welfare of domestic animals



THE WHAT AND WHY

Why offer animals access to trees?

The benefits of silvopasture to domestic animals include access to shelter in the winter and shade in the summer, as well as providing scratching posts to maintain coat condition. The behaviour of domestic animals can be grouped into the categories of locomotion, nutritional, nutritional, behavioural

when an animal is hungry it will seek and eat food. Similarly, when hot or cold, it seeks shade or shelter and trees, shrubs and shelterbelts can offer effective protection. Cool conditions is important in maintaining animal health and tree trunks and branches are readily used as scratching posts. The newborn offspring of farm animals are either hiders (e.g. cattle) or followers (e.g. sheep) but mothers of all species, seek out available shelter when giving birth.



Twelve-year plantation of a living beam providing shade and shelter for dairy cattle, 2011 in Chen Viskum, Denmark. L. Whitmore

10 **INNOVATION**

MANAGING THE TREE ROW UNDERSTOREY IN AGROFORESTRY SYSTEMS

A range of possibilities



THE WHAT AND WHY

The tree understorey – challenges and opportunities

In a silvopasture agroforestry field, there is always a certain area under the tree canopy (e.g. strips of land under the tree rows in alley cropping systems, where it is difficult to cultivate the main crop. We call that the tree row understorey here. However, these areas can have several important functions. (i) tree protection against possible damage through e.g. agricultural activities. (ii) animal access to the tree row for tree maintenance aspects like habitat biodiversity. The tree

row understorey can also be part of the AF production system itself, although the management of this area seems often to be a challenge where following questions need to be addressed: (i) What is the optimal width of the tree row understorey? (ii) What is the best way to manage this area? Managing the tree row understorey in silvopasture practices can be done in many ways, and will depend on the main objective of the trees, the type of understorey vegetation, the available machinery and the amount of time one can or wants to spend.



How to manage the tree row planted in between the tree rows: Short rotation coppice (SILVOPAST) at an agroforestry field at Wolsburg farm, Victoria, Australia - Consortium Agroforestry Victoria

the benefit of animals

offers protection against insects, since pine species have insect repellent properties. The positioning of trees is important in their effectiveness as protection against the weather. Shelterbelts offer good protection when perpendicular to the prevailing wind and porous shelterbelts slow down wind, offering better shelter than dense barriers that cause high levels of turbulence. Access to tree trunks and low branches enable animals to use them as scratching posts.

01 **INNOVATION**

MANAGING THE TREE UNDERSTOREY

Opportunities for crop diversification




Assessment of Walsley Agroforestry, Suffolk UK, shows how 25% of the land area is occupied by the tree rows. Ref: Permaculture Association, UK

THE WHAT AND WHY

The tree understorey – a waste of space?

Planting trees into arable or vegetable fields means that land is taken out of annual production, depending on the design of the system, this could be up to 25% of the cropping area. There may be no return from the trees for many years after planting; this varies from approximately five years for fruiting species or short rotation coppice systems, to several decades for timber species.

In many agroforestry systems, the area between the trees and under the tree canopy is an overlooked and underutilised space and, unmanaged, this can create problems with weed control. Rather than being viewed as a wasted space, the understorey area could provide new opportunities for introducing new crops, therefore increasing production and diversifying the range of marketable products from the system.



Rhubarb grown understorey crop at Salsford Organic, UK. Ref: Organic Research Centre

THE WHAT AND WHY

Why offer animals access to browse or tree fodder?

In general, browse (i.e. fresh tree leaves and small branches) and tree fodder (preserved browse) are good sources of nutrition and compare favourably with grasses grown in the same environment. Trees are also a good source of micronutrients including vitamins and particularly minerals. Where animals have access to trees or hedgerows, they will readily browse indicating its attractiveness as a feed. Browse can range from 12-55 %, 20-36 % and 60-93 % for cattle, sheep and goats respectively. Goats tolerate high levels of browse in the diet due to their saliva that can bind tannins and a large liver that actively processes tannins. Although the gastrointestinal tract or cattle is well adapted to a grass diet, it does not inhibit efficient digestion of browse. Browse is accessible up to a height of 3 m for cattle and 1.7 m for sheep. Goats are termed vertical browsers, having no meaningful browse height, given their physical agility.

Sheep and goats respectively. Goats tolerate high levels of browse in the diet due to their saliva that can bind tannins and a large liver that actively processes tannins. Although the gastrointestinal tract or cattle is well adapted to a grass diet, it does not inhibit efficient digestion of browse. Browse is accessible up to a height of 3 m for cattle and 1.7 m for sheep. Goats are termed vertical browsers, having no meaningful browse height, given their physical agility.



Trees with a clear browse line from cattle in 2017 Stonehenge, UK. L. Whitmore



Hedgerow cattle browsing in a mixed-species hedgerow in 2014, Hereford, UK. L. Whitmore

HOW IS THE CHALLENGE ADDRESSED

The benefits of feeding browse and tree fodder

Sourcing good protein for animal feed is a global issue. Crude and degradable protein levels in tree leaves, particularly in ash, lime and mulberry, compare well with levels found in alfalfa and ryegrass. Additionally, although condensed tannins in browse inhibit normal digestion of protein in the rumen, the stomach enzymes binding the proteins are themselves broken down in the abomasum, effectively delivering a good-quality rumen

bypass protein to the small intestine. Mineral content in browse can also be high. Zinc plays a role in important biological functions and promotes the efficient metabolism of protein and carbohydrates. Selenium deficiency is common in natural grazing systems. Selenium and zinc are abundant in willow. Browse can also be an important source of vitamin E, particularly in dry conditions.

HOW IS THE CHALLENGE ADDRESSED

Herbs, flowers, fruit, vegetables..... take your pick!

One option is to plant new crops in the tree rows to provide an income in the years following tree establishment, or longer term if shade tolerant species are used. Ideally, the new crop will complement what you are already producing (e.g. new trees of fruit or vegetables in a horticultural enterprise) but you may need to find a new market or generate interest for the new crop within your existing

could be established underneath the trees include herbs, flowering bulbs or cut flowers, perennial fruit and vegetables such as globe artichokes or rhubarb, mushrooms and berry bushes. Within the different crop types, some species and varieties will be better suited to the conditions found in tree rows (particularly levels of tolerance to shade) and it may be worth trialling varieties or species on a small scale first to

 This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101019719.

Keywords: Tree fodder; Browse; Protein; Mineral; Selective feeding; Learning; Silvopastoral systems.

euroagroforestry.eu/afnet



Options for managing the tree understorey

Generally, a width of at least 2 m is recommended (1 m on each side of the trees). However, if you want to manage the strip mechanically, a width of 2 m on each side of the trees is better. The width can be adjusted as the trees grow older, but reducing the width by e.g. ploughing just a meter closer to the trees after 5 years, would damage tree roots, with negative future consequences for tree growth and health. Conversely, it is advisable to broaden the strip after a couple of years, for instance to harvest mulch more easily.

Keywords: Soilworking; productivity; efficiency; alley cropping; silvopastoral

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ash, Shillies, Grazing, monoculture, Silvopastoral forest

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AGROFORESTRY INNOVATION NETWORKS

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Results

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Authors	Title
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Stewart Hendry	Managing Cattle in Woodlands
Mike Strachan	Trees and Livestock
Peter Aspin	Shropshire Agroforestry Project
Sokratis Stergiadis Irene Mueller-Harvey	Benefits of plant tannins on ruminant nutrition, health and environment
	Tree fodder: food for thought?

KNOWLEDGE CLOUD

September 15, 2017

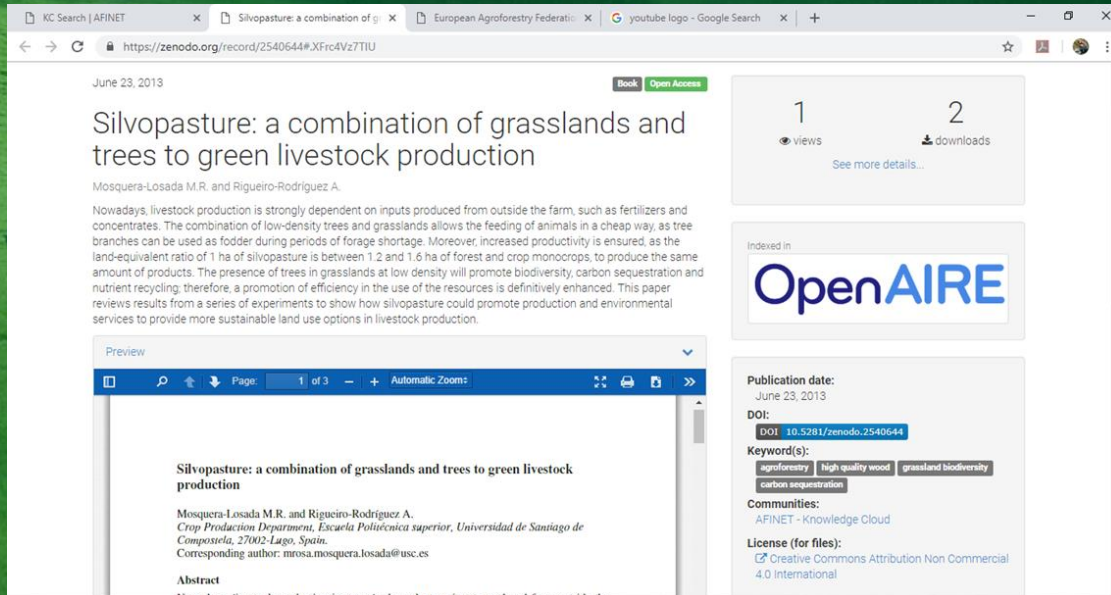
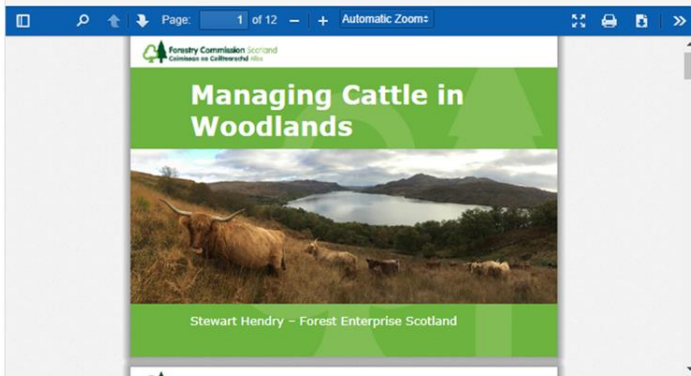
Presentation Open Access

Managing Cattle in Woodlands

Stewart Hendry

Stewart Hendry of Forest Enterprise Scotland shares his experiences of balancing livestock production with conservation of biodiversity in the Scottish Highlands as part of the UK RAIN meeting held on 15 September 2017.

Preview



June 23, 2013

Book Open Access

Silvopasture: a combination of grasslands and trees to green livestock production

Mosquera-Losada M.R. and Rigueiro-Rodríguez A.

Nowadays, livestock production is strongly dependent on inputs produced from outside the farm, such as fertilizers and concentrates. The combination of low-density trees and grasslands allows the feeding of animals in a cheap way, as tree branches can be used as fodder during periods of forage shortage. Moreover, increased productivity is ensured, as the land-equivalent ratio of 1 ha of silvopasture is between 1.2 and 1.6 ha of forest and crop monocrops, to produce the same amount of products. The presence of trees in grasslands at low density will promote biodiversity, carbon sequestration and nutrient recycling; therefore, a promotion of efficiency in the use of the resources is definitively enhanced. This paper reviews results from a series of experiments to show how silvopasture could promote production and environmental services to provide more sustainable land use options in livestock production.

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Publication date: June 23, 2013

DOI: 10.5281/zenodo.2540644

Keyword(s): agroforestry, high quality wood, grassland biodiversity, carbon sequestration

Communities: AFINET - Knowledge Cloud

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AGROFORESTRY INNOVATION NETWORKS

TRAINING SESSIONS



For policy makers....



Agroforestry in England

Benefits, Barriers
& Opportunities



Biodiversity International Ltd



RPS Draft 1-10 June 2016
ROYAL FORESTRY SOCIETY Chartered Foresters



sustain
The Alliance for Better Food and Farming



Sainsbury's
Live well for less





Farm Woodland Forum

www.agroforestry.ac.uk

- UK agroforestry association
- Aims to facilitate the generation and exchange of information that supports best practice in and improves opportunities for farming with trees
- Formed in 1986 to agree structure of the Silvopastoral National Network Experiment and later, Silvoarable National Network
- Active JISCmail internet group
- Annual meetings:

5-6 June 2019, Battleby, Perth



Agroforestry in UK policies

Policies to encourage trees on farms in the UK and Ireland:
June 2017 update



Cross-compliance, Pillar I and Pillar II

Gerry Lawson (Centre for Ecology and Hydrology, Edinburgh), Eugene Curran (Forest Service, Skibbereen), Jim McAdam (Agri-Food and Biosciences Institute, Belfast), Mike Strachan (Forestry Commission, Perth), Tim Pagella (University of Wales, Bangor), Jo Smith (Organic Research Centre, Newbury)

Farm Woodland Forum, Annual Meeting, Cranfield, Bedfordshire 23/6/2017

Full presentation available:

<http://www.agroforestry.ac.uk/sites/www.agroforestry.ac.uk/files/Lawson%20et%20al.%202017%20Agroforestry%20Policy%20Cranfield%202017.pdf>

Agroforestry in UK Policy

Pillar 1 2014-2020

Interpretation of tree densities thresholds for eligibility for direct payments varies between countries:

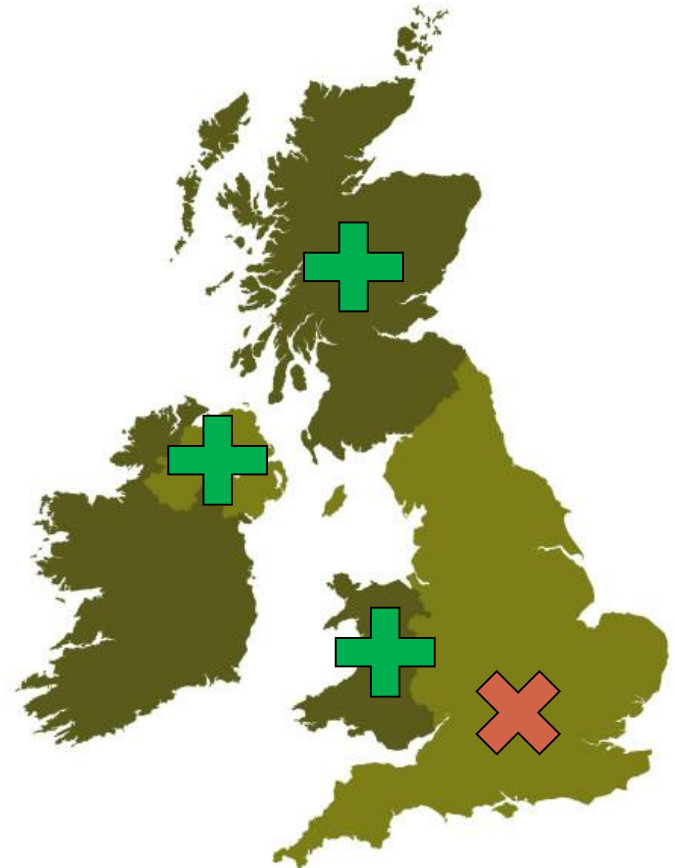
- **Scotland** – grazed woodlands >100 trees/ha **eligible** if evidence of previous grazing and grazing not damaging ecological value (30,300 ha of open grazed woodland (govt. statistic))
- **Wales** - Groups of trees (three or more trees growing very close together and creating a canopy of branches that form an area of cover above the ground equal to or over 100m² (0.01ha) are **ineligible** for BPS along with large individual trees with a canopy area more than 100m². Parcels with more than 100 trees/ha are **ineligible**.
- **England** – no density threshold applied. Trees **eligible** if area underneath canopy is used for agricultural activity

Agroforestry measure in Pillar 2

2007-2013



2014-2020



Agroforestry in UK Policy

Pillar 2

Sub-measure 8.2 Establishment of agroforestry systems – activated in Northern Ireland, Wales, Scotland, but not in England

- **Scotland** – focus on **silvopastoral systems**, on permanent pasture, sheep grazing must be available for 20 years, productive broadleaf species. *Planned area = 300ha @ €4,000/ha*
- **Wales** – 80 trees/ha on **permanent grassland** grazed at typical stocking rates. *Planned area = 147ha @ €3,346/ha*
- **Northern Ireland** - AF is available as an option in the Environmental Farming Scheme (EFS), planting at 400 trees/ha, can be **silvoarable or silvopastoral**. *Planned area = 52ha @ €2,345/ha*
- **England** – no agroforestry measure, but various opportunities for supporting tree and hedge establishment management in Countryside Stewardship scheme



Rural Payments and Services

Agroforestry (Forestry Grant Scheme)

- Minimum eligible area = 0.25ha
- Land must be **permanent pasture** (class 3.1 to 4.2 inclusive)
- Land can only be used for grazing sheep and must be **available for grazing for 20 years**
- Species should be **productive broadleaf species** suitable for the site (e.g. oak, sycamore, cherry, beech)
- **Must maintain the initial tree density for 20 years** and trees must be evenly distributed
- Rate per ha set to cover trees, stakes, protection, planning, site assessment, supervision, ground preparation, planting, beating up, weeding



Planting density	Initial Payment	Annual Maintenance
400 trees/ha	£3,600/ha	£84/ha/yr
200 trees/ha	£1860/ha	£48/ha/yr

Uptake very low – feedback from farmers is that it is too prescriptive, needs to be more flexible to suit varying site conditions and farmers' objectives

Wales

Glastir is the Welsh Government's sustainable land management scheme, through which financial support is offered to farmers and land managers.

It pays for the delivery of specific environmental goods and services aimed at:

- combating climate change
- improving water management
- maintaining and enhancing biodiversity

Agroforestry Grant is within the **Woodland Creation Scheme:**

Agroforestry Grant

- Agroforestry can be described as an integrated approach to land management, where trees and agriculture co-exist to provide multiple benefits.
- Welsh Government is committed to providing a flexible range of options for farm woodlands. GWC makes a start by providing greater flexibility for woodland design to allow shelterbelts and small groups of trees down to 0.1ha in an individual block. We are complementing this by offering a single agroforestry option in this expression of interest. This will provide for establishing 80 scattered trees per hectare on permanent grassland which is also grazed at least at typical stocking levels for the land in question throughout the period of the contract. The stocking levels will be defined within your contract.
- If you are applying for an Agroforestry grant you will need to demonstrate through the woodland creation plan that your proposal is sound, and that it is integrated into your agricultural business in the long term.



TABLE 1 WOODLAND CATEGORY, SPECIFICATIONS AND GRANT RATES FOR GLASTIR WOODLAND CREATION

Woodland Category	Glastir Capital Works No.	Specification	New planting payment £ per ha	Annual Maintenance payment £ per ha	Annual Premium Payment £ per ha
Enhanced Mixed Woodland	803	<ul style="list-style-type: none"> Minimum of 5 major species (at least 10% of each) Minimum of 25% broadleaves inclusive of woody shrub element Maximum 10% woody shrub element No more than 50% of a single species Stocking density 2,500/ha 	3,600	60 (12 Years)	350
Native Woodland - Carbon	802	<ul style="list-style-type: none"> Native species mixture Suitable provenance planting stock* Maximum 20% woody shrubs allowed Stocking density 2,500/ha <p>It is a requirement you register your new planting scheme with the Woodland Carbon code.</p>	4,500	60 (12 Years)	350
Native Woodland - Biodiversity	801	<ul style="list-style-type: none"> Native species - mix should be site native and largely conform to Habit Action Plan types (for example upland oak, lowland mixed deciduous woods) however local conditions may necessitate some variation from these. Suitable provenance planting stock* Maximum 20% woody shrubs allowed Clumped distribution of species with variable spacing Stocking density 1,600/ha 	3,000	60 (12 Years)	350
Agroforestry - scattered trees	804	<ul style="list-style-type: none"> 80 trees per hectare Not eligible for fencing grant Not eligible for Premium payment 	1,600	30 (5 Years)	N/A
Fencing	595	Post and wire fencing and stock netting	3.48/metre		

Uptake very low (1.5ha in first round) – not eligible for fencing grant so planting payment not attractive to farmers. More interest in farm woodlands and shelterbelts.....

Northern Ireland

2007-2013

An **Agroforestry** option was available within the Woodland Grant Scheme administered by the Forest Service

The Woodland Grant Scheme aimed to support the creation and sustainable management of woodlands and forests and to improve the local economy and provide an alternative land use to agriculture

Establishment grants were available for agroforestry systems, as long as the aims of the Woodland Grant Scheme were met. Payments were calculated **pro rata up to 400 stems/ha**

Very limited uptake

*“There was virtually no uptake in the previous scheme. It was probably because there was **little knowledge of or exposure to agroforestry by both Department and farmers**. There was no real appetite in DAERA policy to promote it. The previous agroforestry option was **‘hidden’ in the woodland/forestry schemes as a pro rata system that just wasn’t attractive in terms of support payments, wasn’t really understood by the foresters delivering the scheme and the benefits to farming not really explained or promoted.**”*

Prof Jim McAdam, QUB

Northern Ireland

2014-2020

The **Environmental Farming Scheme (EFS)** is a voluntary scheme that will support farmers and land managers to carry out environmentally beneficial farming practices on agricultural land.

The aims of the Scheme are to:

- restore, preserve and enhance biodiversity;
- improve water management and water quality;
- reduce soil erosion and improve soil management;
- foster carbon conservation and sequestration in agriculture; and
- reduce greenhouse gas and ammonia emissions from agriculture.

Agroforestry Option

“Agroforestry will integrate trees with crops and/or livestock on the same plot of land”

Costs are estimated for trees established at **400/ha** (planting the trees at approximately 5 metre spacing) and protecting with 1.5m tubular net-guard and stake
Agroforestry **should not** be established on Permanent Grassland Sensitive fields or breeding wader sites
Minimum area permitted is 0.1 ha



Species: oak, birch, alder, rowan, wild cherry, crab apple, scots pine, aspen, wych elm, willow, sycamore, ash (not at present) whitebeam, apple, walnut, other species where appropriately justified.

Where **fruit trees** are planted, they must be combined with forest tree species and the forest species should be in majority (more than 50%).

AFBI recommends that trees are initially planted at **400 stems/ha**, with first thinning when pasture forage levels are reducing, second thinning at years 15-20, to leave a final stocking of 120-150 /ha

After planting keep a 1m diameter weed-free zone around each tree. Plant a **mixture of species** - for example it is desirable to use at least 3 species, with no species exceeding 70% of the mix.

Prune bottom side branches from the trees during the first 5 years. Use wider net-guards for protection rather than rigid tree shelters.

In silvopastoral systems graze with sheep for the first 7 years at a stocking rate of **15 ewes/ha**. Once the tree guards are removed cattle should be introduced at a stocking of **5 cattle/ha**.



Silvopasture at Loughgall. Ash trees are planted at 5 x 5m spacing into ryegrass which is fertilized at 160 kg N/ha and grazed from March to November



Round 1: 23 applicants on 32ha
Round 2: 21 applicants on ~ same
Round 3: opens summer 2019

*“The agroforestry scheme sits within a **well promoted agri-environment measure** and applicants are being supported by **in-house training delivered by enthusiastic people** who are versed in what agroforestry is about. The current emphasis on the problem of ammonia emissions and how agroforestry can help address that is being heavily promoted by DAERA, who are now funding a major research project in that area.” **Prof. Jim McAdam, QUB***

England – support for traditional agroforestry

Countryside Stewardship supports Defra’s Strategic Objective of ‘a cleaner, healthier environment, benefiting people and the economy’.

Mid Tier – Farmers and land managers can choose from all available multi-year options and capital items to form an agreement which delivers local environmental benefits



Protection of in-field trees on arable land (BE1)

£420 per ha

Where to use this option
Part parcel
Only on:

- arable land
- temporary
- trees (diameter)

How this option works
If successful, trees will be planted to create a grass buffer. Unc

Management of hedgerows (BE3)

£8 per 100m for 1 side of a hedge

Where to use this option

- On planted boundary lines of shrubs, which are:
- composed of woody plants with less than 2m between the ground and the base of the leafy layer
 - over 20m long
 - less than 5m wide between major

Where this option cannot be used

- on features that are trees for most of their length
- lengths of hedge managed under this option are not eligible for the capital item BN7 - Hedgerow gapping-up but are eligible for other capital item payments

Capital Item	Name	Payment rate	Unit
BN1	Stone-faced bank repair	£31.00	m
BN2	Stone-faced bank restoration	£86.00	m
BN3	Earth bank creation	£13.50	m
BN4	Earth bank restoration	£7.00	m
BN5	Hedgerow laying	£9.40	m
BN6	Hedgerow coppicing	£4.00	m
BN7	Hedgerow gapping-up	£9.50	m
BN8	Hedgerow supplement – casting up	£3.00	m
BN10	Hedgerow supplement - top binding and staking	£3.40	m
BN11	Planting new hedges	£11.60	m
BN12	Stone wall restoration	£25.00	m

England – support for traditional agroforestry

Higher Tier – Applicants managing more complex land in environmentally significant sites, commons or woodlands which requires support from Natural England or the Forestry Commission

Creation of traditional orchards (BE5) Higher Tier

£281 per ha

How long this option lasts
This option lasts for 10 years, instead of the standard 5 years for the grant scheme.

Creation of wood pasture (WD6) Higher Tier

£409 per ha

How long this option lasts

This option lasts for 10 years, instead of the standard 5 years for the grant scheme.

Where to use this option

Code	Item title	Payment rate
SB6	Rhododendron control	Various
TE2	Planting standard parkland trees	£24.50 per tree
TE4	Supply and plant a tree	£1.28 per tree
TE5	Supplement for use of individual tree-shelters	£1.60 per unit
TE9	Parkland tree guard - welded steel	£170 per tree
TE12	Stump grinding	£24 per stump
TE13	Creation of deadwood habitat on trees	£175 per tree
TE14	Identification of orchard fruit tree varieties	£29 per variety



Filling the policy support gap in England

A partnership between a woodland charity and a hotel chain

Funded by Accor Hotels plant for the planet programme



WOODLAND
TRUST



ACCOR HOTELS
Feel Welcome

The Woodland Trust provides:

- free advice and support for farmers.
- a tree planting assessment for the whole farm
- tailored planting schemes to support business objectives.

Since 2014 they have planted **98,000 trees across 66 farms**

Most popular are silvoarable fruit systems and planting for shelter and shade

Increasing interest in tree fodder

European Agroforestry Federation

www.eurafagroforestry.eu



- Federation of national agroforestry associations. Formed in Paris in 2011
- Aims to promote the use of trees on farms throughout the different environmental regions of Europe.
 - ◆ *Lobbying for agroforestry adapted policies at the European scale.*
 - ◆ *Organizing a bi-annual conference (Sardinia May 2020)*
 - ◆ *Quarterly e-newsletter to all members.*
 - ◆ *Website to share information, scientific results and policy issues on agroforestry.*

Information



www.agroforward.eu



www.agrofe.eu/



Agroforestry
research trust

www.agroforestry.co.uk/



www.agroforestry.ac.uk/



www.eurafagroforestry.eu/afinet



www.eurafagroforestry.eu

A photograph of a person lying on their back in a lush green field. The person is wearing a patterned top and white shorts. In the background, there is a line of trees and a field of tall grass. The text "Thanks for listening!" is overlaid in white on the top left of the image.

**Thanks for
listening!**

References

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