TREESCAPES GUIDE

A guide to an array of tree planting opportunities available to Morrisons' farmers and suppliers

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Grow Green Carbon

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Context:

While food production is the primary purpose of farming, planting the right trees, in the right place for the right reason on your farm can have many positive benefits.

We hope this guide helps outline some of the opportunities and practical considerations for planting on your farm.

Contents

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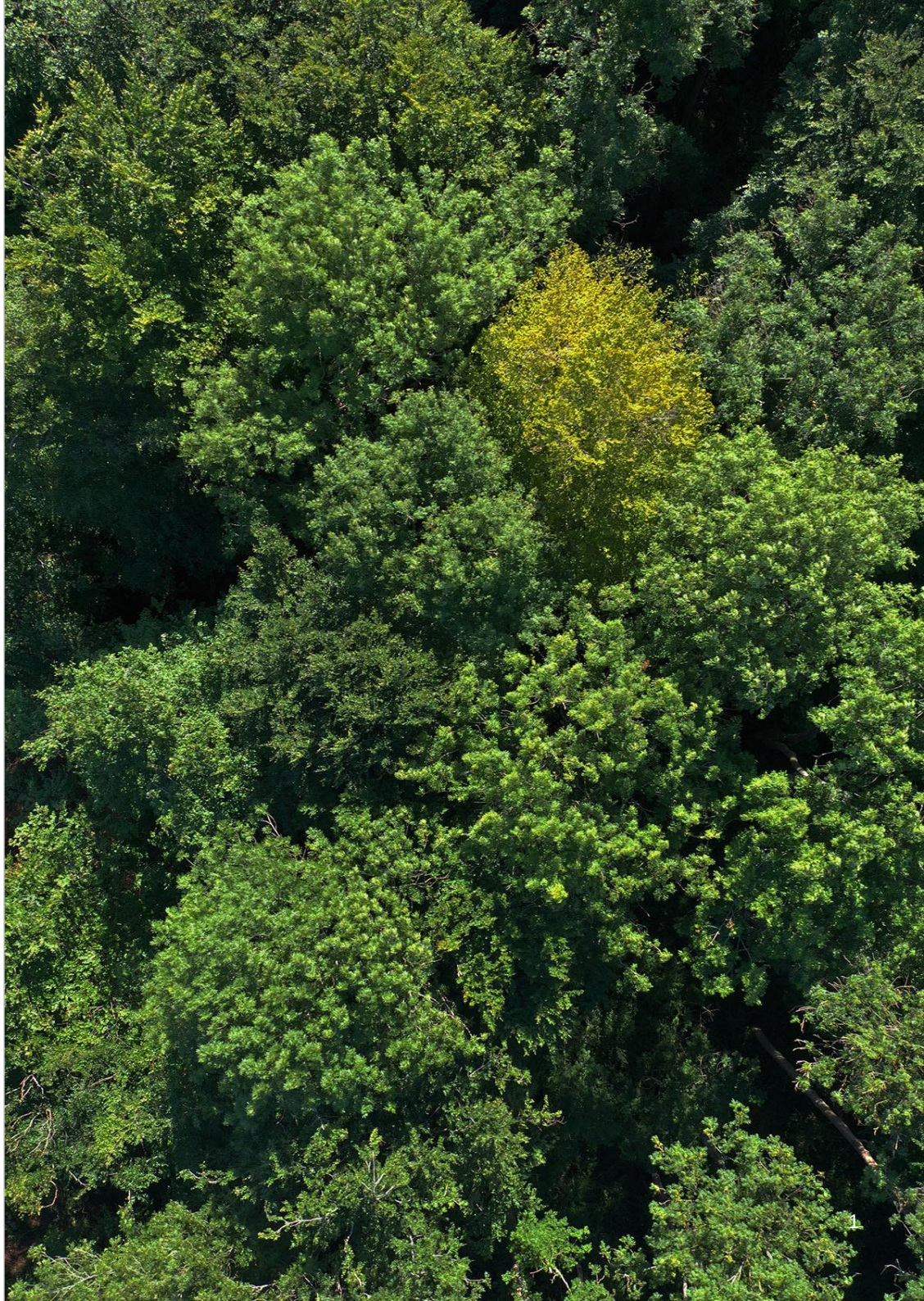


The 9 Benefits of Treescapes

Biodiversity

Biodiversity describes the variety of life on earth. The variety and complexity of nature is essential to its health and resilience. All treescapes add to biodiversity and will help to support its recovery to differing extents.

Carbon Capture and Storage

All our treescapes capture and store carbon, each at a different rate. This offsets emissions from other activities. The National Farmers Union (NFU) is aiming for agriculture to be carbon neutral by 2040[1].

Food Production

Woodland on its own offers limited food production potential. However, other treescapes such as agroforestry offer food production alongside natural capital benefits while hedgerows can be added to agricultural fields with limited disruption.

With careful planning and consideration, planting additional trees may increase animal productivity through microclimate regulation, shelter and tree fodder.

Timber Production

The UK imports £8.7 billion in timber each year. This is over 80% of our needs and makes us second only to China in world importers of timber[2]. The potential for import substitution is then high.

Some treescapes have the potential to generate wood of economic value by producing sawlogs, paper, woody biofuel crops, coppice wood or wood fuel. We see sawlogs as preferable as these keep carbon locked up for the longest time.

To produce timber, woodlands need to be actively and sensitively managed. Clearing small areas or thinning to allow light to penetrate to the woodland floor can promote regeneration and support "edge" habitat. A balance can be found where some timber can be harvested, whilst the woodland still supports a variety of wildlife.

Flood Management, Soil Erosion Control and Water Quality

Treescapes sited in the right places can help prevent flooding by reducing surface water runoff, control soil erosion by stabilising the soil and trapping sediment, and improve water quality by breaking down pollutants and encouraging water to filter through the soil.

Recreation and Welfare Benefits

Woodlands and other treescapes offer opportunities for leisure activities such as walking, cycling or bird watching. Research shows that these activities can play a valuable role in improving mental health and accelerating convalescence.

Air Quality and Noise Reduction

Trees and other vegetation such as hedges can help to block or capture air pollution, the majority of which comes from road transport. The two major pollutants are Particulate Matter (PM2.5 or PM10 depending on the size of the particle) and Nitrogen Dioxide (NO_2). A dense barrier of trees of from 15 to 30 metres can cut noise, prevent pollution travelling and filter some of it out. Similarly, a vegetation barrier can prevent pollution drifting from a road to a school playground or park. In the rural economy, there is also ammonia from livestock and poultry farms which can be removed by well-positioned woodland.

Cooling Shade and Windbreaks

Trees and hedgerows can provide cooling, shade and windbreaks in both rural and urban landscapes. This can help protect good quality farmland, reduce soil erosion and crop damage, provide shade to livestock and build resilience to climate change. Trees near to livestock sheds can also help to reduce heat in the summer and insulate in the winter.

Landscape Character and A Sense of Place

Landscape character describes what makes a place distinctive. Most landscapes in England have trees in one form or another. They help to create more beautiful local surroundings, and the sights, sounds and smells of nature. These all contribute to personal wellbeing.

Landscape character should always be taken into consideration when choosing to add treescapes. If your land lies within an Area of Outstanding Beauty, there will be restrictions on what you can do, so you should contact the AONB officers at the beginning of your planning process.

Potential carbon impact when you convert one hectare from Farm to Forest

Reduce

Emissions from UK farms currently amount to 45.6 million tonnes of carbon dioxide equivalent (CO_2e) a year[1].

There is a total of 17.3 million hectares of farmland in the UK[3].

Selecting UK farmland for replacement with woodland could reduce the amount of carbon dioxide emissions by as much as **263 tonnes** per hectare over 100 years. However, this decision needs to be weighed against the food production ambitions of the farm.

263 tCO_2e per ha avoided

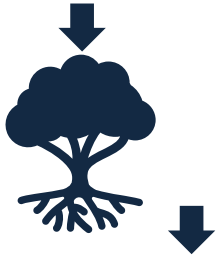
Sequester

Trees are a natural carbon sink meaning they pull carbon out of the atmosphere and store it.

In 100 years, **400 tonnes** of CO_2e can be sequestered in aboveground foliage[4] and an additional **140 tonnes** of CO_2e could be captured in soils per hectare[5].

This is based on largely broadleaf scheme.

400 tCO_2e per ha



140 t CO_2e per ha

Substitute

Using timber in place of building materials such as cement or aluminum or using woodfuels in place of fossil fuels can significantly reduce emissions.

A new broadleaf woodland is estimated to produce 340 m^3 of wood product per ha over 100 years[6], depending upon species planted.

Substitution of carbon heavy for carbon light substances in production processes is estimated to reduce emissions by approximately **142 tonnes of CO_2e per hectare** over 100 years[7].

142 t CO_2e per ha

Treescape opportunities

Hedgerows

CLOSELY SPACED SHRUBS OR TREES PLANTED TO FORM A LINE THAT CAN ACT AS A BARRIER OR BOUNDARY OF FROM 2 TO 5 METERS WIDE

Overview

Hedges have high natural capital value and are relatively easy to introduce and maintain. They can be designed not to interfere with farming operations, provide windbreaks and shade and reduce soil erosion. They can also encourage predators that are good for pest control. To support biodiversity, hedges should only be cut back at the right time of year and not too hard. New hedges can join to existing hedges and woodlands to form an unbroken network. This speeds up natural colonisation of new woodland and allows wild and plant life to move across the landscape more easily, supporting biodiversity. Hedges can be introduced in areas not suited to woodland, such as floodplain grazing marsh, good quality semi-improved grassland and lowland meadows. New hedges may initially require fencing to protect them from livestock.

Different Types of Hedgerows

Hedgerows can consist of a wide variety of mixed native species, such as hawthorn, blackthorn, hazel, field maple, spindle and wild roses. They may also contain trees, called ‘standards’, that are planted within the hedgerow; species can include oak, beech and hornbeam.

Hedges may be set on banks and can have ditches along one or both sides. The best hedges have wide margins, often referred to as buffer strips. These might be sown with flowers for pollinating insects.

The greater the diversity of plants in a hedge, and the wider and thicker the shrub layer, the more wildlife it will support and the longer the flowering and fruiting season. To get the most value from a hedge, it needs to be managed in a sustainable way.

Hedgerows

PLANTING DENSITY

2-year-old transplants

4 to 8 plants a metre, straight or staggered planting

1.5m width

PLANTING LOCATION

On field boundaries and across fields over 20ha

PLANTING STRUCTURE

Tree Shrub Bank Ditch Margin

TIME TO MATURE

5 Years

FINANCIAL COST

£8,000 per kilometre including establishment and around £2,000 a year maintenance for 30 years [8].

FINANCIAL INCOME

Mid and high tier grant funding in England is available at £11.60 a metre [9].

Food Production

Hedges can be planted to provide fruits, berries and nuts as well as improving agricultural productivity. They also protect livestock from extreme weather.

Carbon

Hedgerows provide a carbon store and offset emissions of an estimated 100 tonnes of CO2 a kilometre over 30 years [10].

Flood Management

Hedgerows slow water flows especially if introduced across sloping fields.

Air Quality

Hedges are highly effective at blocking particulate matter and harmful gasses and removing them from the atmosphere.

Biodiversity

Hedgerows are important habitats for mammals, birds and insects and can act as wildlife corridors.

Recreation and Wellbeing

Hedgerows can strengthen landscape character and shelter fields and paths from winds.

Timber Production

Is limited, but hedgerows can be harvested for wood fuels and management by coppicing can bring some benefits.

Case Study:

How a Cumbrian Farm Saved £18 a Ewe

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FARMER:	Paul and Nic Renison, Cannerheugh farm, Cumbria
FARM SIZE:	165 hectares
FARMING SYSTEM:	Livestock
AGRICULTURAL LAND GRADE:	Class
CONSTRAINTS:	Low soil fertility, strong winds
TENURE:	Owned with a mortgage
GRANTS:	Higher level and Countryside Stewardship + The Woodland Trust
SNAPSHOT:	How a Cumbrian farmer saved £18 a ewe
MORE DETAILED RESOURCES:	Mob Grazing and creating new hedgerows for livestock

Photo by Micheal Priestly

Photo by Micheal Priestly

“Adding hedgerows to a livestock farm can increase its productivity.”

Photo by Michael Priestley

Paul and Nic Renison moved to Cannerheugh farm in 2012. The farm has rough grazing, improved pasture and a small area of established woodland. It is home to between 900 and 1000 ewes, 30 suckler cows and 70 dairy heifers.

Paul and Nic decided to change to a ‘mob grazing’ system with a view to improving farm profitability. Small fields of just over 1 hectare were created using hedgerows. These are grazed intensively over short periods of a day or so, and then left to recover. The sheep are forced to eat all the plants on offer reducing their ability to be selective. The animal waste from grazing increases soil fertility. Feed and fertiliser costs were reduced by £18 a ewe within five years.

Combining mob grazing with new hedges and trees also led to better grass growth over a longer season as the provision of shelter increases the soil temperature in early spring and late autumn. And by providing new shelter for livestock on the farm, Paul and Nic have reduced lamb mortality.

The mob grazing system has improved the farm’s productivity by concentrating on soil health, sward diversity and shelter, but has also increased biodiversity across the farm. The trees and hedges are part of a productive farm system which also works sustainably with nature.

Case Study:

Mapping and Managing Hedgerows

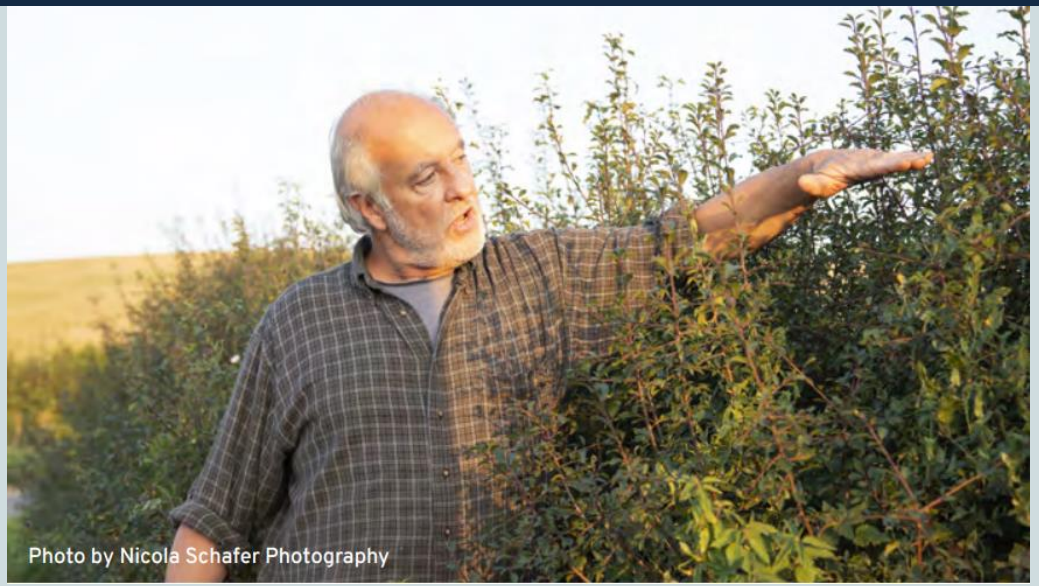


Photo by Nicola Schafer Photography

COMMUNITY GROUP:	Watlington Climate Action Group
PARISH SIZE:	1,372 hectares
FARMING SYSTEM:	Arable and livestock
AGRICULTURAL LAND GRADE:	Class 2 and 3
CONSTRAINTS:	Area of Outstanding Natural Beauty
TENURE:	Farms and estates
SNAPSHOT:	Top tips for managing hedgerows
MORE DETAILED RESOURCES:	Mapping and managing Watlington's hedgerows


Photo by Nicola Schafer Photography

Watlington Climate Action Group have teamed up with national hedge expert Nigel Adams to survey the hedgerows in their parish. They want to discover the condition and length of local hedges and, if asked, to provide management advice. They are also looking for opportunities to plant new hedges and hedgerow trees. The majority of local landowners have allowed the group access to their land to survey the hedges.

The parish of Watlington straddles the western edge of the Chilterns Area of Outstanding Natural Beauty. The Chilterns has many well-established tall, wide hedges with wide field margins. These provide one of the best farmland habitats for wildlife that it is possible to achieve. Some of the hedgerows contain up to 15 woody species including hawthorn, hazel, spindle, wayfaring tree and elder, and are up to 10 metres wide reflecting their great age. They are rich in bird life, especially songbirds such as yellowhammers and corn buntings, as well as the more familiar robins, blackcaps, greenfinches and goldfinches.

Hedge management is often seen as an annual tidying exercise using mechanical trimmers. But hedges are often too heavily cut. Light trimming is preferable, ideally to an 'A' shape. This better supports fruits, birds, small mammals and insects. Gaps in established hedges can also be filled with a range of native hedge or tree species: the more variety the greater the number of habitats and food sources supporting wildlife. Leaving trimming until January or February allows birds and small mammals to feed during the coldest months when other food sources are scarce.

Treescape opportunities

Woodlands

AREAS OF TREES OF 0.25 HECTARES OR MORE WITH CANOPY COVER OF 20% OR GREATER

Overview

Woodland is well suited to areas that are less productive for agriculture. It can also help create micro-climates that protect good quality farmland.

This is a permanent land use change and there can be business implications. Funding options to cover the initial cost and ongoing maintenance of tree planting are improving though their presence over the longer term is unknown. Maintenance such as watering, weeding and control of squirrels or deer may be needed.

Different Types of Woodland

BROADLEAVED WOODLAND

Composed of a variety of species, this primarily deciduous environment is well suited to the UK climate.

CONIFEROUS WOODLAND

Typically, this has been comprised of non-native monocultures. But Scots Pine is native and will succeed in infertile soils making it a valuable pioneer species.

WET WOODLAND

Woodland on areas that flood, providing a damp environment for wildlife that is highly biodiverse.

Woodlands

PLANTING DENSITY

1,100 - 4,400 trees per hectare

Minimum 0.25 hectares

PLANTING LOCATION

Land of grade 3 - 4

1 2 **3 4** 5

Arable or Pasture

PLANTING STRUCTURE

Canopy

Shrub

Ground layer

TIME TO MATURE

Broadleaf: **60+ years**

Coniferous: **40+ years**

FINANCIAL COST

£12.50-£20 per tree, including establishment and maintenance for 30 years [11].

FINANCIAL INCOME

Carbon credits (£18-80 per tonne), timber revenue, grants and scheme investments [4].

Food Production

Woodlands including nut and fruit trees contribute to food security and can also produce a habitat for game and species that control pests.

Carbon

Woodlands provide a carbon store and offset emissions of an estimated 180 tonnes of CO_2 per hectare over 30 years [4].

Flood Management

During heavy rain, trees in catchments and along river courses can slow peak flows and reduce soil erosion and surface run-off.

Air Quality

Trees can act as natural air filters removing particulate matter, harmful gasses and noise from the atmosphere or blocking their transmission.

Biodiversity

Woodland can improve biodiversity and attract predators provided it consists of a variety of native species.

Recreation and Wellbeing

Woodlands in areas accessible from a public path can provide opportunities for recreation and contribute to people's wellbeing.

Timber Production

Woodlands produce timber that can be harvested worth £20-£90 per tonne.

Case Study:

Natural Flood Management on the Blenheim Estate

The Queen Pool on the Blenheim Estate regularly becomes clogged and needs to be dredged. This is caused by sediment run-off in the Glyme and Dorn River Valleys further upstream. To help address this, Blenheim in conjunction with Nicholsons Forestry plans to plant 141 hectares of catchment and riparian woodland in the Dorn Valley. The trees will be planted on land that is currently cultivated. Local construction firm Morgan Sindall Group will provide part of the funding.

Water Quality in the area is poor due to high phosphate levels, soil erosion and sewage discharge. Some of the trees will reduce run-off, and in the longer-term, deeper root systems will enhance percolation into the soil, helping groundwater recharge in the winter. Wood fall features will be created in the river to slow the water flow during wetter periods, using species such as willow which will regrow.

A central aim of the project is to provide **new publicly accessible woodlands**. The area is already crisscrossed by 6 footpaths and the proposals include a 7-kilometre circular path. There will also be a woodland Visitor Centre providing outdoor learning and volunteering opportunities and birdwatching areas.

The new woodland is designed to **enhance biodiversity** by enriching ecosystems and protecting local flora. Wildlife rides seeded with meadow grassland will comprise 10% of the site. Species will be native and climate resilient based on 2080 climate predictions.

The project will **sequester 20,000 tonnes** of carbon over 25 years [4] through and tree planting. There will also be rewilded areas.

The sites will host **research** by Oxford University into carbon sequestration and soil carbon, trials of alternatives to plastic tree guards and squirrel control trials.

Jobs will be created by the planting, in maintaining the site and at a woodland visitor centre.

Case Study:

Natural Regeneration of a Previously Cultivated Field in the Cherwell Valley

Some areas of land may lend themselves to natural regeneration rather than tree planting scheme as they are less productive or difficult to farm.

The owner of this 10-hectare, field decided to pause farming operations about 10 years ago. The three photos show how shrubs and trees have regenerated naturally and become well established over time.

The local geology means there are springs in the area which made the ground so wet farm machinery was getting stuck and soil was being washed away down the sloping land. As well as eroding the soil resource, soil erosion affects water quality and can cause harmful nutrient issues in streams and rivers. As this was unproductive land it was not much of a loss to food production and farm income.

When allowing a field to naturally regenerate, the exact speed and type of establishment is hard to predict as every location is different. Fields which are near existing deciduous woodland will have a ready source of seed and wildlife to distribute it and this has the added benefit of extending precious ancient and existing woodlands. Allowing trees to grow from the natural seed bank in the ground will encourage trees that are native to the local area, promoting nature security.

Today, trees and shrubs have become well established at the site:

This oak tree at the top of the site has many new oak saplings (6-8ft tall) growing immediately around it.

At the lower end of the site the large tree in the middle right was mature in 2009 and since then brambles and a mix of shrubs such as buddleia spindle and dogwood and trees such as hawthorn and birch have established.

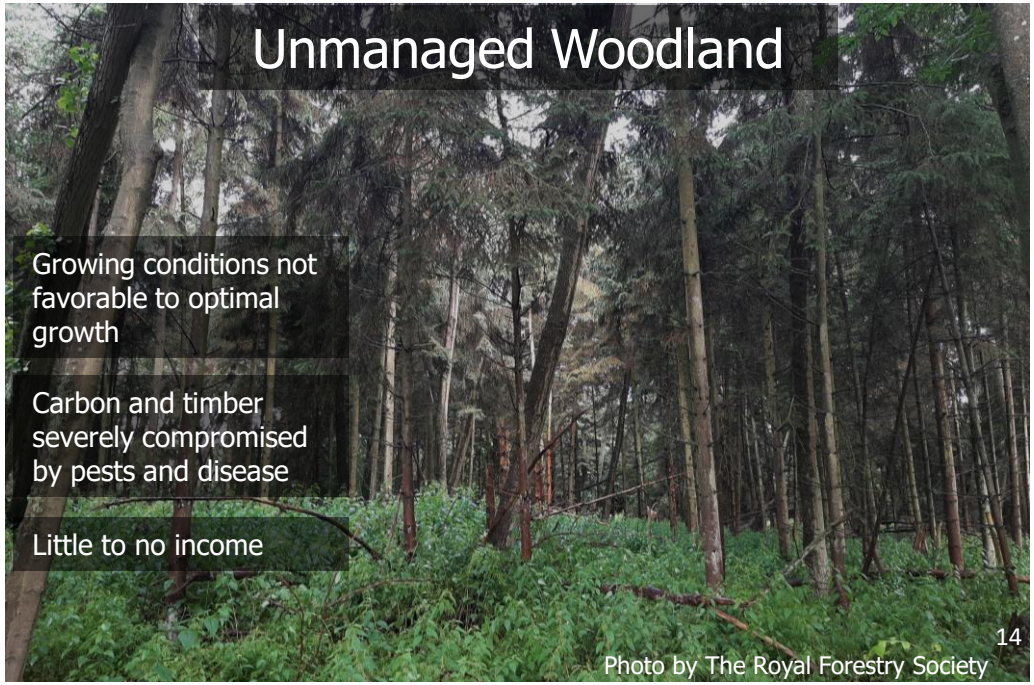
Bringing Woodlands into Management

Woodland management is essential in both the establishment and continuing development of healthy, productive woodlands. Correctly undertaken, management will secure the desired environmental benefits, as well as timber potential. Woodland management should be considered from the day a wood is planned.

Beyond timber, management can help woodlands recover or increase their biodiversity interest, protect and secure archaeological features in woodlands, improve landscapes & water quality, and increase the enjoyment of the woodland for recreational and sporting activities.

Woodland Management Plans are now essential for those clients wishing to secure woodland grant aid or take advantage of the Renewable Heat Incentive.

Forest Canopy Foundation Expert Providers help prepare woodland management plans for new or existing woodlands.

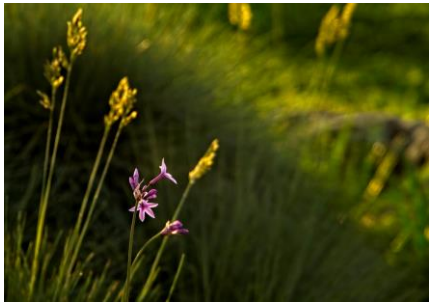


Species-Rich Grassland Allowing Scrub

Overview

Species-rich grassland is open, grassy habitat maintained as meadow by traditional grazing and cutting methods on a less intensive basis than typical pasture. It includes high numbers of wildflowers and sedges, but low levels of white clover, rye grass and injurious weeds. There may also be woody elements such as hawthorn. It is a highly valuable habitat for biodiversity, carbon capture and other natural benefits. Species-rich grassland can be grazed or cut for hay after plants have flowered and grass and flower seeds have set. It should not be ploughed or reseeded and no fertilisers or pesticides should be applied. The type of species rich grasslands that can be established depends on geology. They can be upland or lowland hay meadows; and acid, calcareous or neutral. Grassland can include scattered small trees and shrubs.

Examples of Species-Rich Grassland in the U.K.



LOWLAND MEADOWS:
Moist, deep soils that are neither particularly acid nor lime-rich, supporting flower-rich swards in the early summer, followed later in the summer by taller species. Occasional moisture loving trees such as willow, may be present.

LOWLAND CALCAREOUS GRASSLAND:
Famous for its floristic richness with up to 40 species per square metre and its rare and beautiful butterflies, this grassland includes lime-loving species and potentially shrubs such as such as guelder rose, dogwood and burnet rose, in addition to hawthorn and blackthorn.

LOWLAND DRY ACID GRASSLAND:
Can be species-rich, with up to 25 plant species per square metre. These include fine grasses, lichens and mosses, small rosette-forming species, low-growing herbs, and tiny annuals.

Species-Rich Grassland

Photo by Mike Pollard

Photo by Roselle Chapman

PLANTING DENSITY

N/A

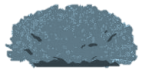
PLANTING LOCATION

Land of grade 3-4

1 2 **3 4** 5

PLANTING STRUCTURE

Shrub



Ground layer

TIME TO MATURE

It can take as long as 100 years for grassland to achieve its full soil carbon and biodiversity potential.

FINANCIAL COST

Approximately £350-£700 per hectare [12].

FINANCIAL INCOME

Both government grants and biodiversity net gain payments may be available.

Food Production

Periodic and extensive livestock grazing but at a lower intensity than on improved pasture. Can also be managed for forage.

Carbon

Species-rich grassland provide a carbon store and offset emissions of an estimated 220 tonnes of CO2 a hectare over 30 years [13].

Flood Management

Adds texture and roughness which reduces soil erosion and surface run-off.

Air Quality

Grasslands do not provide air quality benefits.

Biodiversity

Of a higher value even than woodland in some locations, species-rich grassland supports a huge variety of wildlife.

Recreation and Wellbeing

Species-rich grassland can provide desirable areas for recreation and make a strong contribution to people's well-being.

Timber Production

Grasslands do not offer timber production opportunities.

Case Study:

Restoring Species-Rich Calcareous Grassland


Photo by Roselle Chapman

Species-rich grasslands are not only biodiverse but are also an intrinsic part of our natural and cultural heritage. Calcareous grassland dominated the chalk hills of Southern England for many centuries, and was widespread until the 1940s, covering many of the steeper slopes in the Chilterns, the North and South Downs, Salisbury Plain and the Lincolnshire and Yorkshire Wolds. Little now remains.

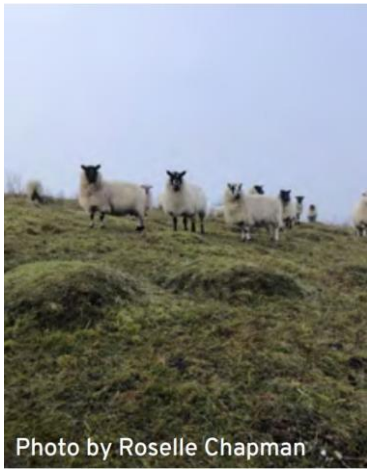


Photo by Roselle Chapman

Swyncombe Downs SSSI (46.4 ha) is an exquisite part of the Oxfordshire Chilterns, renowned for its chalk grassland. During the 1980s the site suffered from a lack of grazing which resulted in significant habitat degradation, but over the last 20 years the current landowner has worked tirelessly to restore it.


Photo by Roselle Chapman

SSSIs are intended to protect small islands of remaining high-quality habitat and landowners are legally obliged to manage them appropriately. But where real gains start to be made is where landowners stop cultivating adjacent parcels of land and bring them into conservation management. With careful grazing management and natural regeneration, The Swyncombe Estate has developed over time into good quality, species rich, semi-improved grassland with herb-dominated swards.


Photo by Roselle Chapman

Treescape opportunities

Agroforestry

Photo by Jason Ingham

TREES WITH CROPS OR LIVESTOCK ON THE SAME PIECE OF LAND

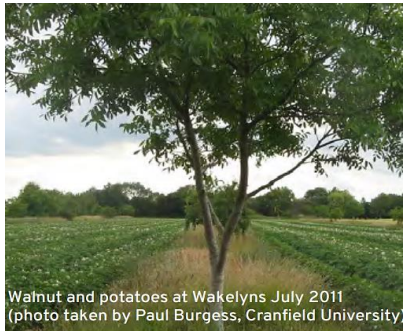
Overview

Agroforestry farming systems combine trees with agricultural crops or livestock. They improve nutrient cycling to increase yields, enhance farm productivity, increase wildlife, improve soil health, protect crops and animals from extreme weather, manage water flow, and contribute to climate change mitigation.

Using Agroforestry systems can avoid the trade-offs between food production and other public goods that occur in many modern farming systems. Whilst agroforestry is commonly practiced in lower intensity farming globally, modern farming has neglected it as a practice. However, there is increasing interest in the potential benefits for both food production and nature. There is now more funding available, and advice should be sought to find the best options for your farming business.

The Three Types of Agroforestry

Wild Cherry at short rotation coppice, Northern Ireland (Photo by Paul Burgess, Cranfield University)



Walnut and potatoes at Wakelyns July 2011 (photo taken by Paul Burgess, Cranfield University)

Photo by Jo Smith

SILVOHORTICULTURAL:

Trees are grown in rows with alleys in-between for cultivating plants. The growth and performance of these plants may be measured for research.

SILVOARABLE:

Trees are grown in rows with wide alleys in-between for cultivating crops, with sufficient spacing for agricultural machinery. Tree and arable crops can be taken from the same field, improving productivity.

SILVOPASTURAL:

Trees are introduced into a forage production system for cattle, sheep, pigs, horses or chickens. This is usually permanent pasture, grazed rotationally, but could be pasture cut for hay or silage.

In all cases the tree component may be timber or fuelwood trees, or a fruit or nut crop. Using a diversity of trees improves the resilience and attractiveness to wildlife. Understory planting also makes an important contribution. Nitrogen-fixing trees can also be used to supply nitrogen for the forage crop. Trees are grown as standards or as pollards.

Agroforestry

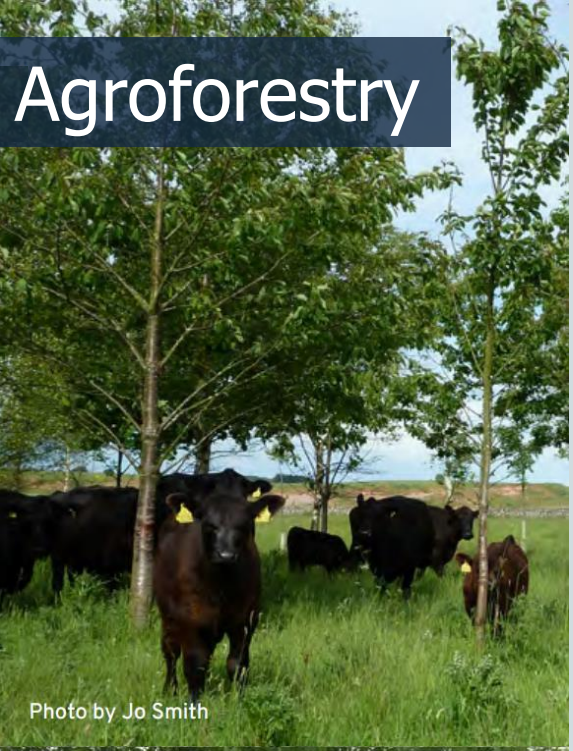
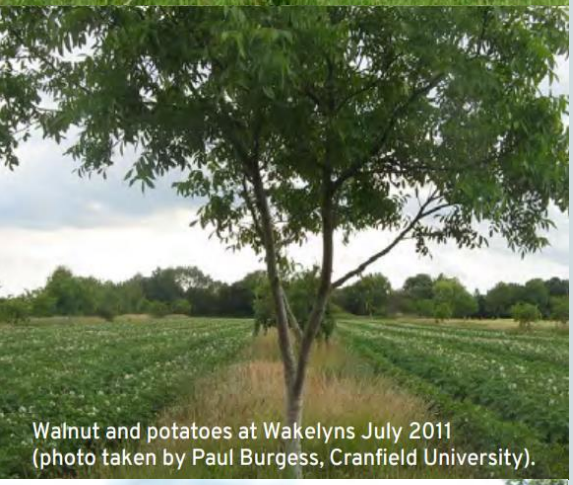


Photo by Jo Smith



Walnut and potatoes at Wakelyns July 2011 (photo taken by Paul Burgess, Cranfield University).

Photo by Jo Smith

PLANTING DENSITY

Silvohorticultural: 70-179 trees per hectare

Silvopasture: 100-200 trees per hectare

PLANTING LOCATION

1 **2 3** 4 5 | 1 2 **3 4** 5

Silvo-horticulture | Silvo-pasture

PLANTING STRUCTURE

Trees interspersed with other plants or livestock

TIME TO MATURE

Trees 5-60+ years depending on species.

FINANCIAL COST

Around **£12.50-£20 per tree** including establishment and maintenance for 30 years [14].

FINANCIAL INCOME

Eligible for grant support under the Basic Payment Scheme and may also be eligible under ELMS. Income sources are more diversified than under conventional farming systems.

Food Production

Fruit or nut trees act as extra income crop. Strips of trees can boost productivity and improve soil health across a whole field.

Carbon

Silvopastural systems can store an estimated 90 tonnes of CO_2 a hectare over 30 years[15] and silvohorticultural 230 tonnes [15].

Flood Management

During heavy rain, agroforestry will help reduce soil erosion and surface run-off and can also protect crops from winds.

Air Quality

Agroforestry reduces ammonia emissions from poultry and livestock as well as odours.

Biodiversity

Providing a more productive, sustainable alternative to traditional agricultural systems.

Recreation and Wellbeing

May be more visually appealing than traditional agricultural systems but unlikely to be publicly accessible.

Timber Production

Will only provide limited amounts of timber or fuelwood.

Case Study:

Agroforestry: Farming in Three Dimensions


Photo from Stephen Briggs

COMMUNITY GROUP:	Stephen Briggs, Whitehall Farm, Cambridgeshire
FARM SIZE:	105 hectares
FARMING SYSTEM:	Silvoarable
AGRICULTURAL LAND GRADE:	Class 1
CONSTRAINTS:	Flat land with erodible soils
TENURE:	15-year tenancy
GRANTS:	Basic Payments Scheme, Higher Level Stewardship
SNAPSHOT:	Agroforestry: Farming for the Future
MORE DETAILED RESOURCES:	The Agroforestry Handbook

Grown in Britain

Stephen Briggs' consultancy ABACUS Agriculture are a certified Canopy Expert Provider.


Photo from Stephen Briggs

Stephen's farm is the UK's largest agroforestry system. It consists of 4,500 apples trees in rows with spring wheat, barley and oats and winter wheat grown in between. The trees are planted in a North-South orientation at a density of 85 trees per hectare with 24m arable alleys between them, wide enough for a combine harvester. The 3m wide strips of trees are under-sown with pollen and nectar mixes.

Stephen had to work within a 15-year tenancy and provide a reasonably quick income stream. He chose apples rather than a hardwood or nut crop such as walnut, as the trees mature more quickly. Productivity from the fruit crops is roughly the same as from the field crops, on a per unit area basis.

The trees have helped boost conventional crop performance by reducing soil erosion from wind, creating better drainage in winter and creating microclimates which support moisture levels in dry periods. With two crops a year taken off the same land at different times, he points out he is harvesting more sunlight for longer.

Looking at a future with warmer UK climates, Stephen calls this "climate-smart" farming. Combining annual and perennial crops have helped to mitigate the increasing risks associated with extreme weather events. Meanwhile he is making better use of his soil, fixing more carbon and reducing nitrogen leaching. Adding new woody elements to his cropping system has also improved levels of beneficial fungi in his soil and biodiversity has flourished on his farm with recorded increased populations of beneficial insects and bird species.

"We're using the space above the ground and below the soil in a more imaginative way" Says Stephen. "We're farming in three dimensions."


Photo from Stephen Briggs

Case Study:

Integrating Bioenergy and Livestock Production


Photo by Organic Research Centre

COMMUNITY GROUP:	Will Simonson, Elm Farm, West Berkshire
FARM SIZE:	85 hectares
FARMING SYSTEM:	Livestock - sheep
AGRICULTURAL LAND GRADE:	Class 3
CONSTRAINTS:	Poorly drained clay soils
TENURE:	Share farming arrangement
GRANTS:	Basic Payments Scheme
SNAPSHOT:	Tree shelter for Livestock
MORE DETAILED RESOURCES:	Elm Farm briefing

The trees grown in an agroforestry system can also be used for energy production. Elm Farm was the base for the Organic Research Centre from 1980 to 2019 and is now privately-owned. The farm sits within a wooded landscape in the North Wessex Downs Area of Outstanding Natural Beauty. It has approximately 9.5 kilometres of large traditional mixed species field boundary hedges. The soils are mainly Wickham Series poorly drained clay loams, susceptible to structural damage which limits the range of agricultural activities.


Photo by Organic Research Centre

An innovative alley cropping system integrating short rotation coppice for bioenergy with livestock production was established in April 2011. This used an alley cropping design with tree rows running north/south, planted in twin rows 0.7m apart with 1m between trees, with an initial density of 1,000 trees per ha. Willow was chosen as it has a dual value as both a bioenergy source and a livestock fodder. The second species was common alder which fixes nitrogen and coppices well.


Photo by Organic Research Centre

The system allowed the farmhouse and buildings to be entirely self-sufficient in fuel, while also providing potential sources of tree fodder, woodchip for animal bedding and increased shade and shelter for livestock therefore increasing the resilience of the farm business. The environmental benefits include increased biodiversity on the farm, increased carbon capture and storage and soil protection.

Community Orchards and Forest Gardens

Overview

Community orchards are small areas managed by the local community to produce fruit, most typically apples, and encourage wildflowers. Local people are encouraged to become involved with the orchard, and regular management events are held, alongside wider community events such as celebrating Apple Day each October.

Forest gardens are community spaces modelled on the structure of a young natural woodland, utilising plants of direct and indirect benefit to people – often edible plants.

Both need community and possibly also local government support to succeed. Agreements with landowners as to site lease or sale would need to be sought.

A WIDE VARIETY OF APPLES

The Orchard Project recommends apple varieties that taste good and are more resistant to disease:

GREENSLEEVES:
Can be eaten fresh from the tree for at least a month.

EGREMONT RUSSET:
A classic English apple from the Victorian era.

SATURN:
Disease resistant but with good flavour.

CHIVERS DELIGHT:
A medium-sized crisp apple developed in the 1920s.

THE CORE BLIMEY:
Crisp and juicy yet strong and resilient.

Case Study:

Langford Community Orchard

Photo by Langford Community Orchard

COMMUNITY GROUP:	Langford Community Orchards Group
SITE:	Langford Community Orchard, Bicester
FARM SIZE:	0.4 hectares
SITE ACCESS:	Open to all members of the public
AGRICULTURAL LAND GRADE:	Class 4
CONSTRAINTS:	Limited volunteer time
TENURE:	Tenancy, subject to review
GRANTS:	Planning gain from a private developer
SNAPSHOT:	Langford Community Orchard
MORE DETAILED RESOURCES:	The Orchard Project Guides and Advice

Photo by Jane Griffin

In August 2012 Bicester Town Council gave permission to establish a community orchard on a one-acre site. This was originally farmland with still visible ridges and furrows formed by ploughing with horses. It had been planted up with fruit trees and bushes by a landscape architect when Langford Village was first built, but then became neglected for many years.

The members of the Langford Community Orchard Group worked together with Grassroots Bicester and Bicester Green Gym. The first task was to rescue the fruit trees from a massive overgrowth of brambles and elderberries which smothered everything. More fruit trees were uncovered as well as redcurrants, blackcurrants, raspberries, and even mulberries!

The next stage over two winters was to prune the neglected fruit trees to remove dead branches and to let light and air into their middles and finally to mulch them with compost and grass mowings.

As yet, there is not enough variety of wildflowers in the orchard to attract bees, butterflies, moths and insects important for pollinating the fruit trees. A wildflower patch has been established including rare yellow rattle donated by BBOWT's Meadow Farm project. Together with more plant variety in the hedges, this will encourage wildlife.

But a rich variety of plants makes an attractive place for humans too! Apple Day is celebrated every October. Activities include, scything classes apple pressing, face painting, a scarecrow competition and bug hunting with the local wildlife trust.

Photo by Langford Community Orchard

Photo by Langford Community Orchard

Photo by Langford Community Orchard

PLANTING DENSITY

300-400 trees per hectare planted in grid formation.

PLANTING LOCATION

Grade 2-3 land

1 **2 3** 4 5

PLANTING STRUCTURE

Rows of trees from North to South to maximise sun exposure

TIME TO MATURE

Trees 5-60+ years depending on species.

FINANCIAL COST

Around **£20-£40 per tree** including establishment and maintenance for 30 years [11].

FINANCIAL INCOME

Eligible for grant support such as the Grow Nature Seed Fund. Tree sponsorship may also be an option.

Food Production

Fruit or nut trees act as extra income crop. Small scale production of food and drink such as apple juice.

Carbon

Community orchards provide a carbon store of an estimated 74 tonnes of CO2 a hectare over 30 years [16].

Flood Management

During heavy rain, trees can slow the effect of flooding. Orchards would also reduce soil erosion and surface run-off.

Air Quality

Trees can act as natural air filters removing particulate matter and harmful gasses from the atmosphere.

Biodiversity

Orchards are havens for biodiversity. They offer both food and shelter for species which have high conservation priority.

Recreation and Wellbeing

Orchards are excellent places for people to come together to cultivate local and unusual varieties of fruit trees and to learn about nature.

Timber Production

Community orchards do not offer timber production opportunities.

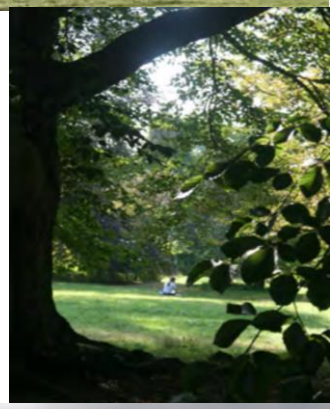
Treescape opportunities

Parkland Trees

DIFFERENT TYPES OF TREES

The trees species chosen would need to be suitable for urban conditions and match well with any trees already established in the area.

These could be scattered trees or lines of trees designed around the site and local needs.

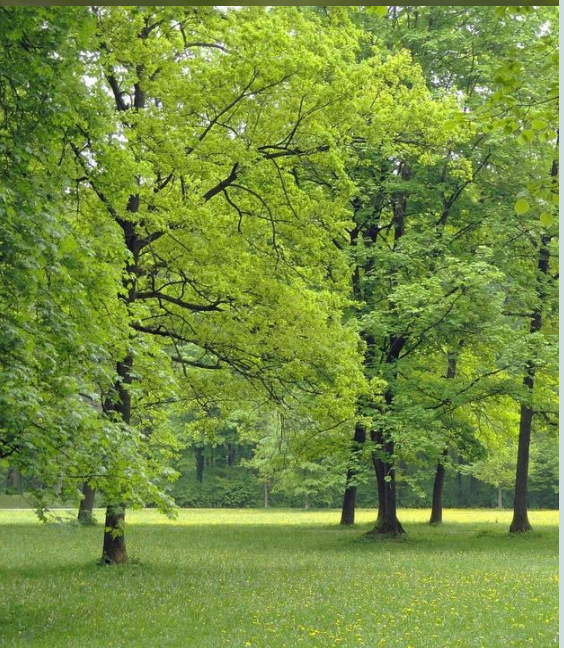


Overview

Trees can be added to spaces with full or limited public access. Trees need not cover the whole site but could be added in discrete areas on a case-by-case basis.

Parkland trees play an important role in providing recreation, controlling air pollution, and reducing the temperature of urban heat islands as our summers become hotter.

Local Council Tree Officers should be consulted. Collaborative projects are more likely to succeed.



PLANTING DENSITY

Up to 250 trees per hectare

PLANTING LOCATION

Suitable public and open spaces

PLANTING STRUCTURE

Any

TIME TO MATURE

Dependant on Species

FINANCIAL COST

At least **£12.50 - £20** per tree including establishment and maintenance for 30 years but can be higher [17].

FINANCIAL INCOME

Grants may be available through the Urban Tree Challenge Fund and Trees for Cities

Food Production

Parkland trees do not offer food production opportunities.

Carbon

Every tree provides a carbon store of an estimated 1 tonne of CO2 over 30 years[17].

Flood Management

During heavy rain, trees can slow the effect of flooding. Parkland trees would also reduce soil erosion and surface run-off.

Air Quality

Trees can act as natural air filters removing or blocking airborne particulate matter and harmful gasses.

Biodiversity

Parklands have considerable potential to sustain and enhance biodiversity.

Recreation and Wellbeing

Tress add character, visual appeal and provide shade which increases the quality of green spaces..

Timber Production

Parkland trees do not offer timber production opportunities.

Managing Your Project

Sylva Foundation has developed the ***myForest*** service as an online platform to support sustainable forest management in Britain.

The core service is used by thousands of woodland owners, managers, professional agents and educators, to map and manage tens of thousands of hectares of woodlands across Britain.

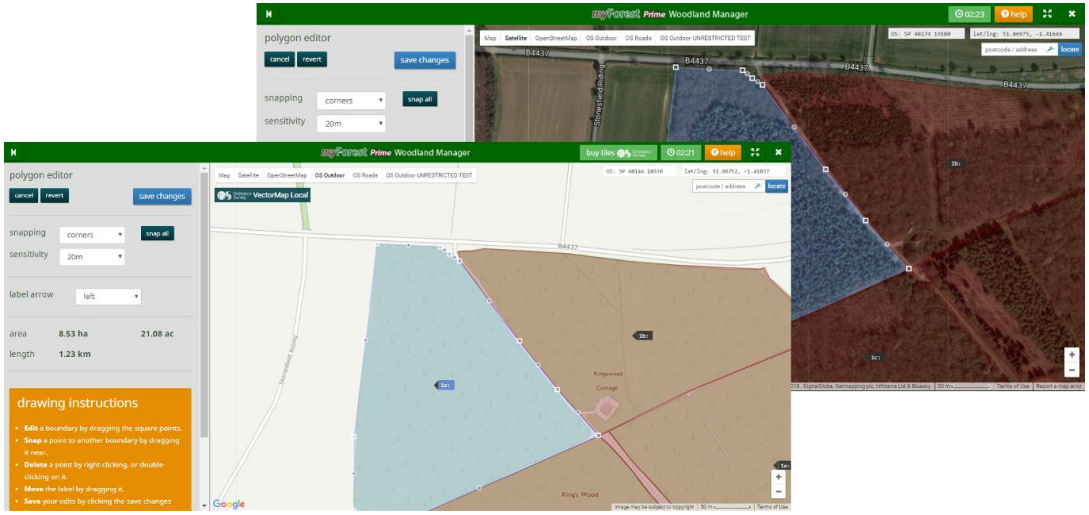
This service remains free to all users, providing an effective means for the charity to support sustainable forest management across the country.

Find out more here: https://myforest.sylva.org.uk

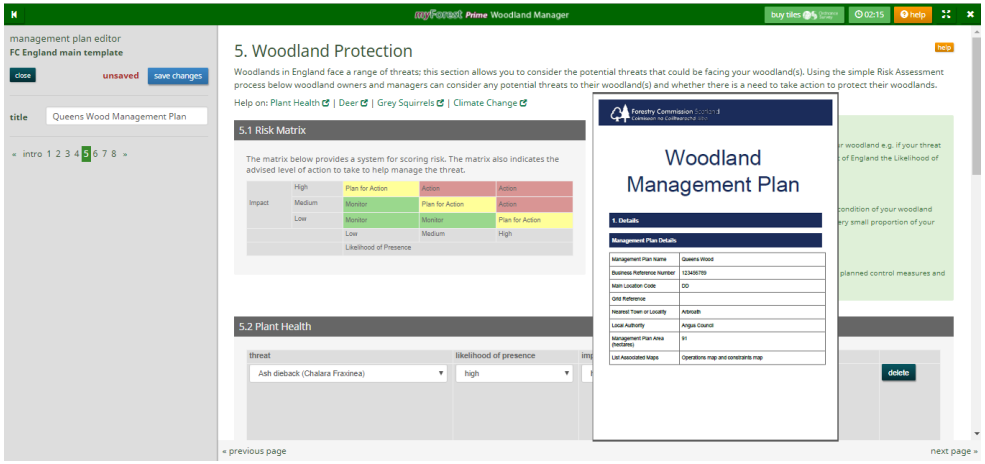
SYLVA FOUNDATION

myForest

Map and label your woodland using Ordnance Survey or open-source background maps



Create woodland management plans using Scottish Forestry and Forestry Commission templates



Funding Opportunities

as of 24th February 2022

There are several grants and other incentives available for woodland creation, maintenance, management and tree health. Here is a brief overview so you can see at-a-glance which you would like to explore in more detail.

England

England Woodland Creation Offer (EWCO)

The EWCO is a flagship new grant scheme for farmers and landowners to encourage investment in woodland creation. These woodlands will help to mitigate climate change, deliver nature recovery and provide wider environmental and social benefits.

Can receive a grant up to £8,500 per hectare and annual maintenance payments of £300 per hectare for 10 years. EWCO also offers up to £8,000 in 'Additional Contributions' (per hectare) for nature recovery, water quality, reduced flood risk, riparian buffers, close to settlements and public access.

Find out more here: https://www.gov.uk/guidance/england-woodland-creation-offer

HS2 Woodland Fund (HS2WF)

The HS2WF provides funding for woodland creation and restoration of plantations on ancient woodland sites (PAWS). Your land will need to be within a 25-mile zone of phase one of the HS2 route from London to the West Midlands.

Can receive a grant up to £8,500 for native woodland creation and £4,000 for PAWS restoration.

Find out more here: https://www.gov.uk/guidance/hs2-woodland-fund

Woodland Creation Planning Grant (WCPG)

The WCPG provides funding to prepare a Woodland Creation Design Plan which is UK Forestry Standard (UKFS) compliant. Landowners, land managers and public bodies can apply to the FC to support the planning of woodland creation.
Can receive a grant up to £30,000 per project.

Find out more here: https://www.gov.uk/guidance/woodland-creation-planning-grant

Urban Tree Challenge Fund (UTCF)

The UTCF provides capital funding to plant and establish large 'standard' trees in urban and peri-urban areas. The fund will provide three years of establishment payments following planting of the trees.
Can receive a grant up to £30,000 per smaller project.

Find out more here: https://www.gov.uk/guidance/urban-tree-challenge-fund

United Kingdom

Woodland Carbon Code

The WCC is the UK's voluntary carbon standard for woodland creation projects. If you are a landowner and can demonstrate that you meet this standard, you can sell the carbon sequestered in your woodland in the form of Woodland Carbon Units.

Buyers have recently paid between £5 and £15/tCO2e for carbon units captured by woodland projects verified through the WCC.

Find out more here: https://www.woodlandcarboncode.org.uk/

The Forest Canopy Foundation offer higher rates (£30-£80) per tonne of CO2e for carbon sequestered in elite schemes audited by Grown in Britain. See: https://forestcanopyfoundation.co.uk/

England (cont.)

Woodland Carbon Guarantee (WCaG)

The WCaG is an incentive scheme to help accelerate woodland planting rates across England to mitigate for the effects of climate change.

The WCaG provides you with the option to sell your captured CO2 to the government for a guaranteed price every five or 10 years up to 2055/56, which provides an additional long-term income from your woodland.

Find out more here: https://www.gov.uk/guidance/woodland-carbon-guarantee

Countryside Stewardship Grants

Countryside Stewardship is jointly delivered by the Forestry Commission, Natural England and the Rural Payments Agency (RPA) on behalf of Defra. There are a range of woodland grants available under Countryside Stewardship. These are as follows:

Woodland Management Planning Grant (WMP) part of Countryside Stewardship

The WMP is a one-off payment to create a 10-year Woodland Management Plan for woodlands over 3ha, which is UK Forestry Standard (UKFS) compliant.

A minimum grant of £1000 is available, which increases depending on area size.
Find out more here: https://www.gov.uk/guidance/woodland-management-plan-grant-countryside-stewardship

Funding Opportunities

Woodland Tree Health part of Countryside Stewardship

There are two elements within this grant:

- **restoration provides support for restocking woodland after felling due to a tree health issue; phytophthora or ash dieback.**
- **improvement provides support for the removal of diseased trees and infected rhododendron.**

Can receive a grant up to £6,800 per hectare.

Find out more here: https://www.gov.uk/guidance/woodland-creation-grant-countryside-stewardship

Woodland Improvement (WD2 and capital items) part of Countryside Stewardship

This grant is to improve the biodiversity of woodland and/or make it more resilient to climate change.

Applications for Woodland Improvement are made under the Higher Tier, using the Woodland Improvement option (WD2) and/or capital items, such as fencing or bird boxes. Woodland Infrastructure (FY2) is now a stand-alone grant, that can be applied for all year round; items include roading, turn around areas and entrance ways.

The WD2 option pays a blanket £1000 for 3–10-hectare woodlands; for woodlands over 10 hectares, £100 per hectare is paid for five years. There are additional payments that could amount up to £260 per hectare, for options such as deer and squirrel management, PAWS restoration and Access for people.

Find out more here: https://www.gov.uk/countryside-stewardship-grants/woodland-improvement-wd2

Wales

The Glastir Woodland Creation Scheme

Glastir is the Welsh Government's sustainable land management scheme, through which financial support is offered to farmers and land managers. There are a number of different strands of the Glastir scheme, two of which are relevant to forestry: Glastir Advanced and Glastir Woodlands (covering Glastir Woodland Creation and Glastir Woodland Restoration).

Find out more here: https://naturalresources.wales/guidance-and-advice/business-sectors/forestry/woodland-creation/glastir-woodland-scheme/

Scotland

Forestry Grant Scheme (FGS)

Forestry and farm woodlands in Scotland are financially supported by the Forestry Grant Scheme administered by Scottish Forestry.

The FGS supports the creation of new woodlands and the sustainable management of existing woodlands. You can apply for support under eight categories: agroforestry, woodland creation, forest infrastructure, woodland improvement grant, sustainable management of forests, tree health, harvesting and processing and forestry co-operation.

Find out more here: https://naturalresources.wales/guidance-and-advice/business-sectors/forestry/woodland-creation/glastir-woodland-scheme/

DO YOU WANT TO PLANT TREES?

Get in touch!

Forest Canopy Foundation have a certified network of Expert Providers throughout the UK who can offer support on tree planting and woodland management, hedgerows, agroforestry, parkland trees and biodiversity.

Expert Providers are Grown in Britain audited forestry professionals who are certified and trained to deliver Canopy woodland creation and management schemes.

Forest Canopy FOUNDATION

Morrisons Since 1899

Expert Providers

ABACUS AGRICULTURE (AGROFORESTRY)

www.abacusagri.com / 07855 341309 / advice@abacusagri.com / **Surrey**

ATALA

www.atala.co.uk / 07709 596152 / enquiries@atala.co.uk / **Yorkshire**

CARTER JONAS

www.carterjonas.co.uk/forestry-woodland / 01213 899681 / **National**

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NICHOLSONS LOCKHART GARRATT

www.nicholsonsgb.com / 01869 340342 / contact@nicholsonsgb.com / **Oxfordshire**

PENFOLD'S WOODLAND MANAGEMENT

www.penfolds.org.uk / 01428 722301 / office@penfolds.org.uk / **Hampshire**

PRYOR AND RICKETT SILVICULTURE

www.silviculture.co.uk / 01432 851311 / info@silviculture.co.uk / **National**

WESSEX WOODLAND MANAGEMENT

www.wessexwoodland.com / 01488 685007 / info@wessexwoodland.com / **Berkshire**

Reference List

1. NFU, 2022. *Achieving net zero – meeting the climate change challenge*. [online] Available at: <https://www.nfuonline.com/updates-and-information/achieving-net-zero-meeting-the-climate-change-challenge/> [Accessed 8 February 2022].

2. Confor, 2022. *Forestry and Timber Q&A*. [online] Available at: <https://www.confor.org.uk/resources/publications/confor-publications/forestry-and-timber-qa/> [Accessed 8 February 2022].

3. DEFRA. 2021. *Agricultural Land in the United Kingdom 2020.*

4. Based on a WCC Calculation in Lowland Mixed Broadleaf Creation Scheme (2021)

5. Poulton, P. R. 2006. *Rothamsted Research: guide to the classical and other long-term experiments, datasets and sample archive.* Rothamsted Research, Harpenden.

6. Based on Wood Fuel Co-operative. 2022. *Guide to Traditional Logs - Wood Fuel Co-operative.* [online] Available at: <https://www.woodfuel.coop/wood-fuel-guides/guide-to-traditional-logs/#:~:text=Hardwoods%20and%20softwoods%20have%20almost,500kg%20per%20solid%20cubic%20metre.)> [Accessed 8 February 2022].

7. Based on emission factors from Gustavsson, L. and Sathre, R., 2006. Variability in energy and carbon dioxide balances of wood and concrete building materials. Building and Environment, 41(7), pp.940-951.

8. Based on model budget for hedgerow planting and management (2021)

9. GOV.UK. 2022. *BN11: Planting new hedges*. [online] Available at: <https://www.gov.uk/countryside-stewardship-grants/planting-new-hedges-bn11> [Accessed 8 February 2022].

10. Crossland, M., 2015. The carbon sequestration potential of hedges managed for woodfuel. *The Organic Research Centre, Elm Farm*.

11. Based on a model budget for EWCO planting and management lowland and broadleaf scheme (2021)

12. Based on Woodland Carbon Guarantee (WCaG) scheme and UKA ETS carbon pricing (5th March 2022)

13. Janssens, I.A., Freibauer, A., Schlamadinger, B., Ceulemans, R., Ciais, P., Dolman, A.J., Heimann, M., Nabuurs, G.J., Smith, P., Valentini, R. and Schulze, E.D., 2005. The carbon budget of terrestrial ecosystems at country-scale–a European case study. *Biogeosciences*, *2*(1), pp.15-26.

14. Pywell, R.F., Bullock, J.M., Tallowin, J.B., Walker, K.J., Warman, E.A. and Masters, G., 2007. Enhancing diversity of species-poor grasslands: an experimental assessment of multiple constraints. *Journal of Applied Ecology*, *44*(1), pp.81-94.

15. Beckert, M.R., Smith, P., Lilly, A. and Chapman, S.J., 2016. Soil and tree biomass carbon sequestration potential of silvopastoral and woodland-pasture systems in Northeast Scotland. *Agroforestry Systems*, *90*(3), pp.371-383.

16. Nair, P.R., Nair, V.D., Kumar, B.M. and Showalter, J.M., 2010. Carbon sequestration in agroforestry systems. In *Advances in agronomy* (Vol. 108, pp. 237-307). Academic Press.

17. Robertson, H., Marshall, D., Slingsby, E. and Newman, G., 2012. Economic, biodiversity, resource protection and social values of orchards: a study of six orchards by the Herefordshire Orchards Community Evaluation Project. *Natural England Commissioned Reports*, (090).

18. Rates based on model budget for tree planting and management (2021)

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