

Farming With Trees

Trees can be utilised on farms/crofts within a wide spectrum, and to which the term 'agroforestry' can be applied, and include the following:

- Hedgerows and hedgerow trees
- Riparian Woodland Buffers
- Shelterbelts
- Wood pasture
- Controlled Livestock Grazing in Woodlands
- Silvopastoral systems
- Silvoarable systems

What is Agroforestry?

Agroforestry, put simply is using trees on farms, and can provide the following opportunities:

- New markets
- Sustainable agriculture
- Land stewardship
- Habitat for wildlife
- Improved water quality
- Diversified farm income.

Agroforestry practices help landowners to diversify products, markets, and farm income; improve soil and water quality; and reduce erosion, non-point source pollution and damage due to flooding. The integrated practices of agroforestry enhance land and aquatic habitats for fish and wildlife and improve biodiversity while sustaining land resources for generations to come.

The International Centre for Research in Agroforestry (ICRAF) provides the following definition of agroforestry.

“Agroforestry is a dynamic, ecologically based, natural resources management system that, through the integration of trees on farms and in the agricultural landscape, diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels.”

Hedges & Hedgerow Trees

Lengths of hedgerow and individual hedgerow trees play an important role in the maintenance of species diversity and are a characteristic feature in some areas of Scotland. Hedgerows enhance the landscape and provide food and cover for birds, invertebrates and small mammals. The best hedges have a variety of woody species and a rich weedy flora at the base. A dense, bushy structure is stock-proof and provides plenty of shelter for invertebrates, birds and mammals. Even slightly open hedges make efficient windbreaks, providing shelter and thus warmer conditions on the leeward side, which benefit reptiles in particular.

Tussocky grasses beside the hedge base will be used for over-wintering by the beetles and spiders that prey on crop pests. A number of bird species particularly appreciate hedgerow trees and hedge junctions. Any dead wood in the hedgerow and veteran trees can be valuable habitats for invertebrates and fungi. Hedge bottoms can be rich in wildflowers and provide a haven for invertebrates, ground-nesting birds, small mammals and reptiles.

Riparian Woodland Buffers

Riparian Forest Buffers are living filters comprised of trees, shrubs, forbs and grasses, including native plants, established in distinct zones. They enhance filtration of nutrients from surface run-off and shallow ground water, and these excess nutrients are utilized for plant growth. Riparian buffers protect the water quality of inland waters and are an effective tool for controlling erosion and providing food and cover for wildlife.

Riparian woodland buffers are strips of trees, shrubs and grass planted between cropland or pasture and surface watercourses. Riparian woodland buffers can protect water quality, reduce erosion and flooding thereby providing economic, social and environmental benefits:

Water quality – buffers have been shown to reduce non-point source pollution by absorbing and filtering animal wastes, sediments, nutrients and pesticides from croplands and pastures.

Erosion and flood control – buffers combined with bioengineering practices help stabilize streambanks, slow out-of-bank flood flows, and can protect both agricultural land and urban areas from flooding.

Reduce soil erosion – plants in riparian buffers help control soil erosion by stabilizing soil with their roots and acting as a physical barrier to reduce overland water flows. By slowing down the water, they promote infiltration and reduce channel flow and gully formation. Deep-rooted trees and shrubs stabilize stream banks and reduce erosion and sedimentation. Grasses The spreading fibrous roots of grass species bind soil to reduce erosion and their fine foliage at ground level traps sediment.

Wildlife habitat – buffers create habitat for both aquatic and terrestrial wildlife. Large trees adjacent to streams moderate stream temperatures through shading, and provide a source of large woody debris. Salmon, for example, need cool water temperatures and streambed gravel free of excess sediment for reproduction. Large fallen logs in streams catch and scour the gravel vital to salmonid reproduction and provide them places to hide from predators. Native trees and shrubs also provide terrestrial birds and animals with food, cover, nesting sites and travel corridors.

Shelterbelts and Shelter Woodlands

Shelterbelts and shelter woodlands are narrow bands and/or areas of trees planted to give shelter for crops, stock, gardens or settlements. They need to be carefully planned with denser planting of smaller species on the windward side, to create a smooth profile which directs the wind up over the taller species behind, with a minimum of turbulence caused beyond. The design of shelterbelts must allow for wind permeability in order to avoid the formation of eddies. Shelterbelts and shelter woodlands can also make a valuable contribution to biodiversity as well as providing agricultural benefits, a source of timber, provide shelter for stock and reduce wind erosion.

Wood pasture

Wood pasture consists of scattered trees in a grassland or heathland setting. It is a habitat fashioned by generations of rural people grazing livestock and maintaining trees on the same site. The grazing needs to be just right; light enough to allow trees to grow (and occasionally to regenerate), but sufficient to prevent a woodland forming and shading out the pasture. Where this is achieved over a long period of time, a unique habitat develops, which today, on ancient wood pasture sites, harbours many rare and important species.

The trees are a key feature. On ancient wood pasture sites they are often very old, sometimes very big and may have been cut back (pollarded) in the past. These veteran trees can be centuries old and host long-established communities of fungi, lichens and specialist insects. They are also home to birds, bats and other wildlife. Having trees like this, surrounded by nectar-filled wild flowers and open semi-natural grassland, creates a special wildlife habitat and a classic landscape.

Remnants of this landscape have survived throughout Scotland, although the extensive rural practices that created and maintained it have died out. The wood pasture that remains provides evidence from past centuries of the traditional stewardship and careful husbandry that formed this great Scottish landscape.

Controlled Livestock Grazing in Woodlands

Ancient and semi-natural native woodlands provide a range of habitats supporting a rich diversity of flora and fauna, many of which depend on the continual existence of these habitats for their survival. The ecological character of these woodlands owes much to their historical management and this includes grazing by domestic livestock. Past woodland grazing regimes featured cattle and sheep in particular, but also pigs and goats.

By maintaining controlled grazing regimes in ancient and semi-natural woodlands by livestock their activities can be used to promote woodland regeneration, result in more natural plant communities, and age-class structure of the tree and shrub component, and enhance overall biodiversity. Careful timing of grazing periods can be deliberately targeted to promote particular plant species (or groups of species) regarded as especially important at a site, and thereby the fauna that depend on them.

Both wood pasture and controlled livestock grazing systems can create historical landscapes returning the appearance of the land to that of the traditional forests in which animals grazed.

Silvopastoral Agroforestry Systems

Silvopastoral agroforestry systems are those in which trees are planted at wide spacing into grazed, permanent pastures and are managed as a single integrated practice. Silvopastoral systems have been shown in the UK to provide a number of benefits to farmers. With proper management, trees can be grown to produce timber with no reduction (or only a small reduction) in agricultural production from the same piece of land. This compares with more conventional farm forestry in which land must be allocated separately to the woodland enterprise resulting in a loss of agricultural area and agricultural production. The total return from the land is, therefore, potentially greater from agroforestry. A silvopasture practice diversifies farm income;

can minimize the need for chemical or mechanical vegetation control; and can reduce hay and feeding costs for livestock.

Agroforestry creates welfare benefits to grazing livestock through the provision of shelter and shade and can generate new opportunities for wildlife. More species of insects and a greater abundance of insects are found in agroforestry. The same applies to birds with more species (both open-field and woodland bird species) and a greater abundance of birds in agroforestry than in conventional agriculture.

Silvopastoral management creates an environment where trees, forage, and livestock can be developed to their full economic potential. Ideally, the tree species selected for a silvopastoral practice should be marketable - this includes both the wood itself and other products such as nuts or fruit, offering another source of income in addition to livestock. In a rotational grazing system, a successful silvopastoral practice requires understanding forage growth and managing the timing and duration of grazing to avoid browsing of young tree seedlings or the elongating shoots. Precautions should be taken, such as fencing, to prevent trampling or rubbing of the young trees as well as over-grazing and soil compaction.

Silvoarable Agroforestry Systems

Silvoarable systems are those in which trees are planted in rows with an arable crop in the alleys between. In Europe, such systems can diversify farmers' incomes, provide high quality timber and provide environmental and landscape benefits. However the uptake of such systems by farmers can be limited by a lack of knowledge, uncertainty and government incentives that discriminate against agroforestry. These systems, however, can potentially provide high value lumber or veneer logs while income is also derived from the companion crop planted in the alleyways.

In Summary

Currently many of these woodlands are not managed in a way that maximises their full potential and the benefits that they can provide. To achieve this, advice and assistance to farmers, crofters and land mangers is required, including the much-needed modifications to incentive schemes.