

Silvopasture in dairy systems

Dairy farms are increasingly under the environmental spotlight, and as producers turn to regenerative techniques, could silvopasture play a role? British Dairying finds out.

British agriculture is being scrutinised around issues of water quality, biodiversity loss, greenhouse gas emissions, tree cover and air quality. Amid challenging climate change targets, many non-governmental organisations are advocating tree planting. But woodland takes land out of agricultural production, so perhaps silvopasture could be the ideal middle ground?

Silvopasture is where trees are combined with grazed or mowed pasture to deliver a wide range of ecosystem and farm benefits, explains Maureen Kilgore from the Irish Agroforestry Forum. "With careful planning, dairy farms can integrate trees into their operations with minimal loss in the farmed area.

Extra income stream

"In addition, they can harvest the timber or other tree crops, all while mitigating carbon emissions, enhancing the environment and increasing farm resilience to climate challenges."

There are many benefits that trees and hedges provide in farmed landscapes, silvopasture seeks to enhance some of those benefits and add a few more, including reducing farm costs. "Mature silvopastoral systems can significantly extend the grazing season by providing more shelter for livestock, reducing farm costs by shortening the period when animals must be housed," says Professor Jim McAdam, a former researcher at Agri-Food and Biosciences Institute (AFBI) and Queen's University



Silvopasture can deliver a wide range of benefits for the environment and the livestock at the same time

Belfast. "They also promote better grass utilisation - particularly at the back end of the season - and improve animal health and welfare."

Improved productivity

As trees tend to root deeply, they can reduce soil erosion and soak up leached nutrients, reducing nutrient losses and speeding up nutrient cycling in the presence of grazing animals. The overall productivity of agroforestry systems is often greater than the sum of its individual parts, says Jim. "Research shows that temperate silvopasture practices improve the productivity of land managed separately for pasture or trees by 42-55%, depending on whether the productivity of the pasture is

measured by livestock or forage output, respectively."

There is a significant opportunity to help achieve climate change targets by increasing the carbon storage potential from farmland by using soils, crops and trees together. AFBI research in Northern Ireland has shown that a 24-year-old silvopastoral system established with wide-spaced ash can sequester up to 3.2t/ha of carbon per year. If the sequestration potential of appropriately managed hedgerows and tree rows is added to this, silvopastoral systems stocked at two livestock units/ha can move farms toward carbon-neutral livestock production.

Shelterbelts

There are other benefits to silvopasture: Shelterbelt systems reduce wind and temperature stress for animals, says Dr Lindsay Whistance from the Organic Research Centre. "When offered shade from hot, sunny weather, livestock can better maintain feeding behaviour, and therefore production. And they suffer less from reproductive issues and diseases like mastitis. In winter, meaningful shelter from cold and wet weather saves energy being wasted on keeping warm, maintaining better welfare and efficient production and growth."

Shade and shelter is not only beneficial to livestock - the grassland also thrives with this protection. Trees can reduce evapotranspiration and

increase the water holding capacity of the soil. This sort of resilience and consistency of pasture growth is of significant value to any livestock operation, especially where soils are prone to severe summer drought, as farmers are better insulated from risk.

Trees also offer some protection from night frosts, warming the ground by up to 6°C, which adds a considerable advantage to earlier spring growth and increases the length of the growing season in autumn.

"With careful consideration it is entirely possible to cut silage between the trees."

Dairy operations are particularly suited to the establishment of a silvopasture, explains Maureen. "A key aspect of managing silvopasture is rotational grazing, which is standard practice on many dairy farms."

Permanent paddock divisions are ideal locations to plant tree rows and is only necessary to erect a new fence on one side of the trees rather than both. "Tree layout and spacing can easily be configured around machinery use. With careful consideration

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to the width of alleys and headland areas to suit mowing equipment it is entirely possible to cut silage between the trees."

If only planting a small area to silvopasture, producers can use it at strategic times of year to extend the grazing season while also delivering the benefits above. "There is no need to interfere with the intensive milking platform," says Maureen.

Improving rough grazing

"Areas of rougher grazing are a good starting point because well-designed and managed silvopasture will undoubtedly improve that pasture quality." When designing planting, farmers should look at where their animals are subject to sun, wind and rain exposure - including around the milking parlour.

Depending on the tree species and land utilisation, the main advantage of silvopasture over other farm forestry systems is that there are both short-term and long-term harvests of the pasture and tree crops, respectively. Fruit and nut trees can start giving returns at between five and 20 years. In contrast, harvesting timber from trees varies from five years for rotational coppice to 80+ years for standard hardwoods.

Farmer case study

The Dooley family farm 102ha in County Limerick, in the heart of the Golden Vale, an area of rolling pastures known as the best land in Ireland for dairy farming. They have 130 dairy cows and 50 beef cattle, with 11ha of forestry - planted in 2006 - and 8ha of low-input pasture. In addition, they have 0.8ha of wild bird seed cover, with the land bounded on two sides by a river and a canal. Richard Dooley has recently

taken over managing the farm from his father Michael and has plans to plant more trees this coming year for several reasons.

"Apart from the forestry, I realise the benefit of trees on the farm for the environment and wildlife - and they may be beneficial for the cattle, too," he says. "This year I have really noticed that we need more shelter and shade for the cows; it is wide open countryside here. I would consider planting trees dotted throughout the pasture to provide shade rather than lines; parkland-style planting. I would also consider riparian planting along the river and canal to prevent pollution."

Nutritional benefits

The family use slurry and fertiliser on their fields and try to maintain pasture at 6.5pH. They follow a normal anthelmintic dosing regime for the cattle, and give a mineral bolus containing copper and cobalt in early spring. But Richard was previously unaware of the significant health and nutritional benefits that tree fodder can have for cattle, including providing minerals and antiparasitic properties.

"I would now consider planting a group of trees with nutritional benefits that they could graze when the trees are bigger; they would need protection when the trees were young though."

Richard feels strongly that farmers should be involved in deciding how to integrate trees into their farming system, to create a more sustainable farming model and allow food production to continue. The choice of tree, design and location will be important to the successful roll-out of agroforestry into existing farm systems.



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