AF4EU INNOVATION 01

COMBINING SHEEP WITH FORESTRY

ESTABLISHING A SILVOPASTORAL SHEEP SYSTEM IN IRELAND






1. Alder (*Alnus glutinosa*) in individual tree shelters 2. A lamb enjoying the shade of a tree protected by plastic mesh
3. Sheep grazing in the foreground, among *Quercus* (oak) and *Prunus avium* (cherry), with tree shelters 4. *Prunus avium* (cherry) in tree shelters, with sheep grazing in the background

WHAT AND WHY

"How sheep and forestry can be mutually beneficial"

In Ireland, sheep are highly compatible with agroforestry systems due to the country's mild climate and varied landscapes. Their grazing behaviour effectively manages dense grass and undergrowth, reducing competition for resources with trees and crops. Sheep perform particularly well in silvopasture systems, where tree species such as *Alnus glutinosa* (alder), and *Salix* spp. (willow) provide shade, shelter, and protection against frequent rainfall.

Sheep also contribute to nutrient cycling, enhancing soil fertility and structure in Ireland's predominantly fertile, though sometimes acidic, soils. Grazing in agroforestry systems helps control invasive vegetation, such as bracken *Pteridium aquilinum* (bracken) and gorse (*Ulex europaeus*(gorse), reducing the reliance on chemical herbicides.

The introduction of silvopasture systems in upland areas can present an opportunity to restore tree cover while maintaining upland grazing practices. Strategically planted trees offer essential shelter for livestock, reducing stress and improving productivity. Additionally, tree planting contributes to the establishment of green infrastructure, slowing overland water flow, enhancing soil water retention, and mitigating downstream flooding.

Tree planting in uplands must take into account the sensitivity of these habitats, many of which are subject to environmental protections. As such, any afforestation efforts must comply with ecological land classifications and be informed by a thorough ecological assessment. This ensures that tree planting is compatible with conservation objectives and sustainable land management practices.

Economically, the integration of sheep into agroforestry systems provides Irish farmers with dual-income streams through meat and wool production, while simultaneously improving land productivity and biodiversity. Additionally, sheep grazing supports carbon sequestration by facilitating tree establishment and growth in pasturelands, contributing to Ireland's climate mitigation goals.

HOW THE CHALLENGE IS ADDRESSED

"How to establish a silvopastoral sheep system"

Sheep silvopastures offer remarkable design flexibility, as individual trees can be cost-effectively protected, enabling efficient and adaptable layout planning. Trees provide essential shade and shelter, helping sheep regulate body temperature, whether carrying a heavy fleece or after shearing. This creates a favourable microclimate that enhances lamb survival and allows sheep to allocate more energy toward growth and production, leading to earlier finishing weights for lambs. Additionally, trees improve water infiltration and can extend the grazing season by up to 17 weeks annually, significantly reducing wintering costs.

Planting patterns such as dense clusters or wide bands along contour lines are recommended for optimal establishment and functionality in upland areas. Planting in riparian zones and valley bottoms is particularly effective for improving water retention, reducing sedimentation, and enhancing water quality at the catchment level.

Proper management is crucial to prevent tree damage in silvopasture systems. Set grazing is unsuitable, as sheep may damage trees when pasture quality declines. Rotational grazing is essential to protect trees and maintain the system's sustainability. Certain tree species with palatable bark, especially in spring, may require continued protection even after tree guards are removed. Wrapping tree trunks with plastic mesh has proven effective, as shown at Loughgall, Co. Armagh.

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ADVANTAGES

Timber production

With strategic pruning and shaping, silvopasture trees can produce high-value timber suitable for various uses.

Fodder production

Sheep can consume up to 40% of their diet as browse. Species such as *Salix* (willow) and *Corylus avellana* (hazel) are well-suited for coppicing or pollarding to generate nutrient-rich, palatable shoots for livestock.

On-farm resource provision

Tree species such as *Larix decidua* (larch), Quercus robur (oak), *Castanea sativa* (sweet chestnut), and *Robinia pseudoacacia* (black locust) can be cultivated to produce durable materials like fence posts, reducing reliance on external inputs.

Biomass and chipping

Coppiced wood and pruned branches can be processed into wood chips for applications such as mulch or bedding material, contributing to nutrient recycling and resource efficiency within the system.

Orchard management

Orchard grazing reduces mowing costs, utilizes pasture, and enhances soil fertility. Shropshire sheep, selected for their "tree-friendly" nature, are particularly suited for this role. Orchard grazing is unsuitable for bush-form apple trees or mountain-type sheep, which are more prone to climbing, browsing, and damaging bark.

Environmental benefits

Tree cover in uplands stabilizes soils, reduces erosion, and limits sediment transport, improving water retention and infiltration. This mitigates downstream flooding, enhances catchment resilience, and improves water quality by trapping sediments and filtering potential pollutants.

Several tree protection options are approved under the Agroforestry Scheme (FT8). The standard protection involves a 1.2-meter tree shelters secured with two fence posts. Fast-growing species like alder *Alnus glutinosa* (alder) and *Betula pendula* (birch) are best protected using foxwire with two posts, which provides robust and cost-effective coverage. For wider-spaced species such as *Pinus sylvestris* (Scots pine), a three-post assembly is recommended to provide better support and accommodate their growth patterns. These protection strategies promote healthy tree development while ensuring compatibility with silvopastoral systems, balancing productivity and sustainability.

HIGHLIGHTS:

- **Shelter from trees can give animals up to 17 extra weeks outside, saving on winter feed and housing. Sheep also keep on top of tough grass, bracken, and gorse, meaning less need for sprays.**
- **Trees like alder, birch, and willow help the ground hold more water, soak it in better, and reduce flooding. Grazing under trees also helps young trees get established and locks in more carbon.**
- **Animals naturally browse – up to 40% of their diet. Trees such as willow and hazel give them tasty, nutritious shoots that boost health and performance.**



Sheep grazing in a mature silvopastoral system

Further Information:

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