Case study

Tree shelter for livestock

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WOODLAND TRUST

CASE STUDY

Trees provide livestock shelter and other functional benefits

Livestock farmers explain the operational and economic effects of having trees in their sheep and beef farming systems.

The use of trees in sheep and beef production systems is of growing interest around the world due to a number of associated benefits. Much of the scientific support has, however, come from studies outside of the UK, particularly Australia and New Zealand. Considering some of the challenges of farming in the UK, trees have great potential to improve livestock health and welfare, and thus bring economic gains.

A study by Harper Adams in collaboration with the Woodland Trust is one of the first to be conducted in the UK to explore the operational experiences of farmers using trees and hedges within their sheep or beef systems.

Livestock farmers from around the country were asked about their motivations for incorporating trees on their farms and the associated costs and benefits. Farmers were interviewed from seven farms across England that represent a range of environmental conditions and farming systems.

Characteristics of farms studied

The seven farms varied in size (from 5 hectares to 1,070ha); altitude (60m above sea level to 2,000m); and environmental conditions (underlying soils, aspect, gradient etc.). The farms also varied in their operations as well as livestock systems, and across a spectrum from conventional to organic.

A range of farm tree features were incorporated within these farms, including hedgerow/boundary trees, riparian woodland strips and tree belts, hedgerows, in-field mature standard trees and mature woodland blocks.

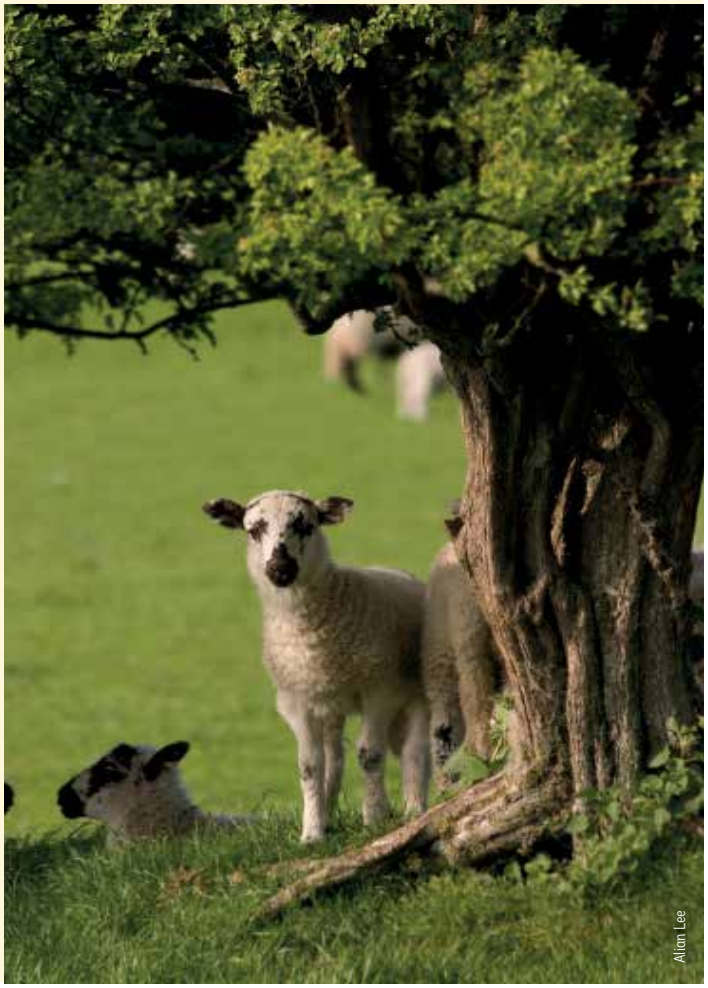
> "On a day when it's really hot, you will find the sheep are lying under the trees and that's why we put trees in that hedge"

Farmer motivations to integrate trees

Livestock shelter provision

Shelter provision was a key objective for many of the farmers, with trees providing shelter for animals from both cold and hot weather and acting as wind breaks. According to the farmers, shelter reduces animal stress, and as this is linked to animal productivity can lead to economic gains. Some of the farmers also believe that shelter provision during lambing reduces lamb losses; this was found by one farmer who lambed in a more sheltered, lower elevation field and experienced fewer losses than the previous year on a higher field.

> "(Shelter from trees) increases lamb survival and health and welfare of the stock"



Allan Lee

Example of a shelter belt. The Pontbren project - a farmer led approach to sustainable land management in the uplands.

Challenging conditions faced by UK farmers:

- Exposure to harsh conditions can cause hypothermia in lambs and mastitis in ewes. New born calves are also vulnerable to cold stress and cows can suffer from pneumonia and frostbite.
- Challenging environmental conditions can lead to poor growth rate in lambs and calves, and poor condition and productivity in ewes and cows.
- Heat stress can cause over-heating in cows, causing reduced grazing and lower milk production, weight loss and poor body condition.
- Waterlogged ground can cause lameness and liver fluke in lambs, ewes and cows.

Benefits associated with integrating trees in livestock pasture (silvopastoral systems):

- Trees provide a natural source of shelter from heat, wind and rain, which results in increased animal performance and productivity.
- Trees can also moderate soil conditions, improving livestock health and reducing the incidence of liver fluke associated with waterlogged ground.

Other functional benefits

Several farmers reported livestock browsing of trees, which has potential health benefits through trees' nutritional and medicinal properties.

> "We use ivy a lot because it kills worms... the sheep love it"

Another motivation was to use trees to help shepherding and grazing rotations. Tree belts and hedgerows divide large open fields into smaller, more manageable sections. An upland farm with challenging terrain reported that tree planting in areas that are difficult to shepherd substantially aided twice daily routine checks of their sheep. Another farmer planted trees on wet land, which he also fenced off to restrict livestock access to liver fluke prone areas. Reduction in liver fluke cases reduces the need for medical treatment and therefore has economic benefits.

> "We have planted a few wet areas with woodland and I have seen a noticeable reduction in fluke"

Additional benefits of integrating trees

There are a number of benefits associated with trees, many of which are not unique to livestock farming. Most of these were reported by at least one of the farmers in this study as a motivation for planting trees.

Environmental

- Wildlife habitat provision
- Soil protection and reduced erosion
- Carbon sequestration and storage
- Improvements to water quality
- Improvements to air quality

Economic

- Wood products
- Farm diversification (due to products and services provided by trees)
- Supports change in farming system (e.g. from indoor to outdoor lambing)

Social

- Aesthetic value
- Recreational and sporting use
- Cultural heritage value

Typical costs of tree planting

Farmers must consider the initial investment in trees as well as maintenance costs and potential loss of revenue through converting productive land.

Costs for trees and guards vary depending on the tree protection required. Costs range from £670 to £1540 per hectare, based on 1,000 trees spaced 3 metres apart. Through the Woodland Trust's MOREwoods project, farmers could receive up to 60% of these initial costs and would therefore only contribute between £270 and £615.

Other schemes are also available, including subsidised Pasture and Shelterbelt packs and support for new hedging, and the Woodland Trust is here to advise. Five of the seven farms in this study received financial aid through grant schemes to plant their trees.

Putting a figure on the costs incurred through loss of income from productive land is much more difficult. However, it is often possible to plant trees on unproductive land. Also, shelter belts, for example, are typically only 10 metres wide, so don't occupy much land. The economic benefits that the trees bring in terms of flock and herd health may compensate for any loss of income from the land, but this has yet to be fully assessed.

What next?

The multi-land project is conducting a cost-benefit analysis of trees for shelter in sheep systems. Scientists are measuring the energy that sheep save due to trees moderating the climate through the provision of shade and shelter.

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