

## The benefits of hedgerows and trees for agriculture

Dr William Stiles: IBERS, Aberystwyth University.

Woodland patches and hedgerows are essential components of the agri-ecosystem. The resource of trees and hedgerows on farms has [declined](#) in the UK in the twentieth century, due primarily to agricultural intensification which has driven the creation of larger more simplified field systems. This loss may reduce ecosystem service provision and biodiversity in both livestock and arable systems, and may also have a negative influence in certain terms on productivity.

The primary functions of hedges are for the purposes of stock management or to mark land boundaries. Hedgerows also represent a habitat resource which is particularly important for species within the agri-ecosystem, which would struggle to persist in managed field systems. As such, to protect this valuable resource, legislation was passed in 1997 which has successfully reduced hedgerow removal in England and Wales. The re-establishment or replacement of hedgerows and woodland patches on farms remains an area for development, yet has great potential to deliver multiple benefits in economic, ecological and environmental terms.

### Shelter and biosecurity

The benefits derived from the availability of shelter and shade can be huge for livestock. Extremes of heat and cold are a feature of the seasonal UK climate which can affect production. Shelter can increase lamb survival rates by reducing the effect of wind chill and thus hypothermia, particularly in the early stages after birth, and can reduce feed requirements in the winter months as livestock exposed to cold conditions will require greater feed inputs in order to keep warm. In the summer months, heat stress can reduce milk yield in dairy herds and can adversely affect numerous biological functions relating to production in both [sheep](#) and [cows](#), including fertility.

Animal health may also be improved through reductions in standing water from increased infiltration rates associated with greater tree and hedgerow cover. Reductions in damp conditions in fields may in turn reduce incidence rates of lameness, caused by softening of interdigital space leading to increased foot infections, and liver fluke, through reductions in the presence of snails which carry the parasites.

A thick stock proof hedge can also offer a barrier to the spread of disease as this reduces animal to animal contact which is the primary vector of disease transmission between farms and between livestock. Tree planting, even on small scales such as shelter belts, can potentially be more effective due to the larger physical separation between fields, and therefore between flocks or herds. Of course, it should be stated that this does not constitute total protection from the spread of disease, but is one of several approaches which can help to reduce the incidence of disease outbreak.

### Enhanced ecosystem services

The provision of hedges and woodlands on farms can increase the delivery of ecosystem services, both directly and indirectly: directly, hedges and woodland patches can increase the potential for carbon capture and storage in [woody biomass](#) and via the [improvement of water infiltration rates](#) to

soil, reducing the potential for flooding; indirectly, they can increase the habitat resource availability for essential wildlife, including species that undertake pollination or act as natural controllers of other pest species.

Food production from crops is reliant on insect pollination. Certain crops such as apples are almost totally dependent on insect pollination. Pollination services have been estimated to save the UK economy between [£430 – 603](#) million annually (in 2007/2010), and whilst these figures should be treated cautiously as they are accepted to be estimates at best, the economic benefits derived from insect pollination are likely to be substantial. Managed honey bees are an essential component of pollination, however populations are currently vulnerable to threats from disease and pesticide usage, making populations of wild pollinators increasingly important. Thus, these groups need to be considered judiciously when deciding on land management approaches which may influence wild and managed pollinator populations.

The abundance and diversity of species which would contribute to biological control is positively influenced by varied habitat opportunities, such as those offered by hedgerows and woodland patches. Increasing the resource of hedgerows and woodlands can therefore increase populations of predator species and natural enemies of pests, which can improve the potential for [biological control](#) and reduce the need for farmer input or pesticide usage. Biological control is a service provided by species of farmland birds and predatory invertebrates, such as spiders and predatory beetles, as these groups feed on, and therefore limit the populations of, pest species.

The production of products such as timber is also an ecosystem service provided by increasing the resource of on farm woodlands. Any such tree planting scheme therefore would not constitute land lost from production, as the biomass produced can ultimately be used for the commercial purposes of fuel or timber production. Consequently, there are multiple commercial benefits which can be realised by increasing the resource of woodlands and hedges on farmland.

## **Biodiversity**

Hedgerow and tree resources can increase habitat opportunities and forage availability in the form of flowers and fruits for important wildlife groups, such as [pollinators and farmland bird species](#). Improvements in the availability of nest site or food resources means larger populations of species throughout the food chain, as energy is transferred from the bottom up to higher trophic levels; or in simpler terms: more flowers and forage, means more bugs, means more birds (or other animals).

This influence is largest in situations where hedgerows and woodland patches are comprised of multiple species and varieties. Mixed species planting can offer a diverse array of forage, with different food options becoming available at different times throughout the year, offering a more stable array of resources. This can have directly beneficial effects in terms of farmland production, through improvements to crop pollination rate or the natural control of pest species.

To further improve resource availability, management such as hedge cutting should also be undertaken sympathetically. Autumn hedge trimming can remove berry resources and reduce the potential for forage in the winter months, with negative consequences for over-wintering bird

species. This could be avoided by delaying cutting regimes [until February to March](#), by which time the berry crop has been utilised and naturally depleted.

At a landscape scale, increasing the resource of hedgerows and woodland patches potentially [improves the connectivity](#) between patches of formerly continuous habitat. Habitat connectivity is necessary in terms of biodiversity by linking habitat patches and allowing the movement of species which may otherwise become isolated and vulnerable to decline. Hedgerows can act as corridors along which wildlife can move, reducing the effects of habitat fragmentation and isolation. This is an important concept in the context of climate change where losses of habitat connectivity could result in barriers to movement, impeding the dispersal of species which need to move (typically) northwards as the climate changes.

Overall, the provision of trees and hedgerows can deliver numerous benefits economically, ecologically and environmentally. Agri-ecosystems are expected to be subject to significant environmental change in the coming years and decades. There are strong economic arguments for increasing the presence and availability of hedgerows and tree resources, in the form of shelterbelts and patches of woodland, which could increase ecosystem service provision and reduce the effects of climate change at the same time. This will consequently facilitate a self serving outcome of reducing current environmental impact, which is expected to have significant impact on UK agriculture in the coming years. Through tree and hedge planting, land managers have an opportunity to exploit a simple and affordable way to future proof landscapes against shifts in weather and climate, such as increased precipitation, and by doing so lessen the environmental impacts of tomorrow whilst profiting from economic gains in real terms today.