UEAA NEWSLETTER

2023, No. 7

Nitra, December, 22, 2023

LATEST NEWS

Agroforestry – or '3D farming' – an exciting tool for UK farmers

A useful short definition of agroforestry is 'farming with trees'. Agroforestry includes both the integration of trees on farmland and the use of agricultural crops and livestock in woodlands[1].

Agroforestry usually consists of arable crops being grown between rows of trees planted 25-40 metres apart. The trees help create a beneficial microclimate for the row crops, protecting them from wind and overheating, as well as foraging deep into the soil for nutrients which would otherwise be unavailable for the crops and spreading them on the surface in the form of leaf-litter in the autumn [2].

Different types of agroforestry for different systems are being tried – including trees with livestock (silvopasture) and trees within arable (silvoarable). It can also include trees in hedgerows and buffer strips, forest farming i.e. cultivation within a forest environment, and trees in small-scale i.e. in smallholdings with animals, mixed or peri-urban or urban growing areas.

Much of the British landscape is actually an agroforestry landscape, comprising a mosaic of trees and farming systems. In Cambridgeshire (Whitehall farm), Stephen Briggs, farmer and soil scientist, has planted 4,500 fruit trees alongside his wheat, barley and oats producing business, establishing the largest agroforestry system in the UK. The system was implemented to reduce wind erosion affecting the fine grade of soils on the farm. It enhances biodiversity, creates a mix of perennial and annual crops better able to meet the challenges of climate change and diversifies their cropping.

According to Stephen, agroforestry is an exciting tool for farmers with huge potential to deliver a nature positive food and farming system for the UK. Making full use of the available sunlight, nutrients, and moisture, growing upwards as well as at ground level can hugely increase productivity.

There are plenty of barriers for farmers in adopting agroforestry, but there is a range of benefits that agroforestry systems can bring as well. When agroforestry is done well, it can deliver gains for the industry and gains for the society.

Gains for farmers

Agroforestry can optimise farming systems by incorporating trees right into them, significantly benefitting crops and livestock health and productivity as well as farmer income. Improved grass growth and soil health positively affects crop or livestock yields. The trees also help protect against flooding and topsoil erosion. They increase farmland biodiversity and provide wildlife corridors thereby reducing fragmentation of habitats that has been so harmful to beneficial wildlife like insect pollinators and predators of crop pests.

Agroforestry with livestock can greatly enhance animal welfare. The trees provide shelter for livestock – a critical service as temperatures rise and extremes become more frequent. Fodder too as 'tree hay' has been proven to enhance productivity. Studies have indicated that productivity can be increased using agroforestry, even up to 40%. Hens on land with 20% tree cover were found to have higher laying rates and shell density meaning higher output, fewer seconds' eggs, and reduced losses[3].

Trees can help reclaim eroded and degraded land as they create stability and deliver water and nutrients to lower down in the soil. Furthermore, the timing of leafing tends to be later in the year for trees than crops, so they use sunlight at different times of the year, effectively collecting more of the sun's energy.

There is a significant potential for using agroforestry systems to build carbon in woody components and sequester carbon in soils.

Additional income can be generated by using the trees for livestock fodder, biofuel or timber production, and for fruit and nuts which can provide fresh produce for possibly more local markets. Diversifying food systems will help build resilience in a time of growing climate and food security uncertainties. Replacing monocultures of identical crops with a more complex agroforestry system can make farming more resilient and sustainable, and cycles nutrients far better.

With all the benefits described and more diverse outputs, supported by public and markets, the economic risks to the farmer will be significantly lessened.

Gains for society

All the evidence is clear – we urgently need to plant many thousands of trees across the UK to reach our climate net zero ambitions using a nature-based way to remove harmful emissions and help with adaptation.

But land is not infinite and the demands on land will just grow. As the Royal Society recently noted[4], we would be far better off doing more than one thing on land – as Sustain has always argued[5], and multifunctionality, such as that delivered by agroforestry, can be a huge strength. The Government's Committee on Climate Change agrees agroforestry has a crucial role, estimating that it could result in carbon emissions savings of 5.9 $MtCO_2e$ per year by 2050, which equates to 13% of the total current emissions from the agriculture sector[6].

Beyond climate and carbon, there are major gains to be delivered such as controlling water runoff and soil erosion, flood alleviation, and enhanced soil health through inputs of organic matter and nutrients.

Challenges for agroforestry systems' adoption

As with anything new in farming there are significant challenges to overcome. Putting trees onto productive cropland feels a step too far for many, given that it means changing what they have always done. Agroforestry is knowledge intensive, and it does require a culture shift and a willingness to learn new skills and to take risks. The significant capital and labour costs involved, especially in the establishment phase, can present financial barriers. Trees take time to grow, and management and maintenance costs need to be met. In the current financial climate where farmers have ever-growing energy and labour costs and are being squeezed by low prices and harsh competition between the buyers, this will be a challenge.

Tackling these challenges will require strong government support via creation and maintenance payments for tree planting and investing in the new markets and the infrastructure needed. It also needs a new level of practical understanding and knowledge. Government and the farming industry need to rapidly scale up access to case studies, training opportunities and demonstration farms across the country. Lastly, we need consumers willing to buy the diverse products available from these new diverse systems – from fruit and nuts to woodland meat and wood products.

IfA, Abacus and ADAS are the UK partners involved in a unique pan-European network of Pilot Demo Farmers covering 27 countries all pedo-climatic areas, under the seven years HE Climate Farm Demo project. The aim is to accelerate the adoption of Climate Smart Farming practices and solutions by farmers and all actors of the Climate Smart Agriculture Knowledge & Innovation Systems. Abacus is running a living lab at Whitehall farm on agroforestry and co-ordinating the Agroforestry and Relations to Landscape experiences, from 27 countries.

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