

# Agroforestry 2017:

## improving productivity for farmers and foresters

The UK's first national agroforestry conference was held on Thursday 22 June at Cranfield University and organised by Woodland Trust, Royal Forestry Society and the Soil Association. Their hard work in promoting it over many months was rewarded with a sell-out of 250 attendees including farmers, foresters, landowners and researchers who joined together to explore the benefits and practicalities of bringing more trees onto farmland, and taking farming into forests.

The conference unashamedly attempted to pitch agroforestry directly into the mainstream. While there were still plenty of beards and check shirts in the audience, the appeal was to conventional farmers and land managers to embrace the benefits of trees on farms and to policy makers to facilitate it. While there have been many pioneers of agroforestry from within the organic movement, the 'O' word was deliberately underplayed, it seemed, in order not to put off conventional farmers and to dispel the aura of alternativeness surrounding agroforestry. After all - it's just trees on farms.

### The global context

Patrick Worms, senior science policy adviser at the World Agroforestry Centre, provided a global perspective on agroforestry. In a line that was guaranteed to please the crowd he declared that "Agroforestry is like pornography; you can't define it but you know it when you see it." Trees don't make sense unless they work for a living, he said and they must help farmers improve their livelihood, both in terms of economics and ecology.

Patrick took us on a whistle-stop tour of successful agroforestry systems around the globe: from coffee and timber in Nicaragua to meat, timber and wood pellets in the arctic taiga. What they have in common is that the productivity of the systems is higher than the monoculture equivalents. In temperate areas this, expressed as a Land Equivalency Ratio (LER), averages 1.4:1 i.e. 40% more. In the tropics where sunshine and water are less limiting it is higher. In a long-term experiment in Poitou-Charente in France where walnuts/wild cherry (70-90 trees/ha) are grown together with wheat on 62ha and compared with 10ha of walnuts planted at 200 trees/ha., the woody biomass was identical in the agroforestry and forest plots. The wheat yield was identical in the agroforestry and conventional plots for the first 25 years, except in drought years when it was higher in the agroforestry plots. The big impact however was in the soil, with soil carbon doubling in the agroforestry plot in 25 years, plus less soil erosion and higher water percolation in the agroforestry plot. Interestingly, now the agroforestry alleys have been converted to hay pastures as light competition has increased as the trees have matured, partly due to the rows being too close.

There is also huge potential for carbon sequestration - in Europe agroforestry could mitigate 1/3 of the EU carbon emissions. Trees in an agroforestry system are better adapted to strong winds as they root deeper than in a forest and have thicker stems. If you add in the benefits of reduced nitrogen leaching and increased



Photo: Phil Sumption

Hedges divide up the blocks in the vegetable rotation at Vital Veg, NE Scotland, protecting the veg from wind, providing additional income and supporting beneficial insects and biodiversity.

### Trees – Benefits to soil

- Nutrient cycling and utilisation is more efficient in agroforestry systems
- Trees ameliorate soil compaction and increase infiltration
- Trees improve the soil holding capacity for water and nutrients
- Increase in fungi/bacteria ratio and the number of earthworms near trees
- Under elevated CO<sub>2</sub> conditions trees invest in their mycorrhizal associations (scavenge deep nutrients - including P)
- Temperate agroforestry systems store more than 2t/ha/year of C.

### Trees – Benefits to crops

- Niche differentiation reduces competition and increases efficiency (tree roots may, however, compete with crop roots for water and nutrients)
- Increase in productivity
- Tree crops - long term investment - high value timber trees/fruit trees
- Boundary planting can reduce nutrient losses



Agroforestry at Tollhurst Organics

biodiversity then agroforestry is a win-win scenario. There are however some cultural barriers to overcome. Our institutions can't handle complexity very well and there is a tendency to equate tidiness with health in terms of how fields appear. The need is clear, according to Patrick: "We cannot solve the problems of soil erosion with more machinery, more diesel and more chemicals."

## Not just alley cropping!

Tim Pagella, of Bangor University asked what can Agroforestry achieve and looked at the evidence. Tim defined agroforestry as 'where trees interact with agriculture' ...the deliberate combination of trees (including shrubs) and agricultural crops and/or animals on the same land management unit in some form of spatial arrangement or temporal sequence such that there are significant ecological and economic interactions between tree and agricultural components.

Research on agroforestry dates back 50 years - it is a relatively young science for an old practice, but one that is increasing in profile. Research effort is primarily aimed around the sustainable intensification of agriculture, increasing agricultural production whilst reducing environmental risk. The potential benefits are perceived differently by different groups but all are related to the multifunctionality associated with agroforestry systems.

- Fundamental research (hedgerows)
- Opportunities (tree fodder)
- Technical advice
- Exploring barriers to adoption (policy, cultural values, knowledge gaps)
- There is also interest in the benefits of scaling-up agroforestry systems.

There are many benefits on a farm and landscape scale in terms of water regulation and reducing flood risk. There are also positive impacts on wellbeing, both on and off the farm. However, not all agroforestry is good agroforestry! Tim stressed the importance of the right tree in the right place and designing systems that suit the local context. Crucially, you also need to get the economics right.

## AFINET

AFINET (Agroforestry Innovation Networks) is a collaborative European project, funded under Horizon 2020 (No. 727872), which aims to support innovation in agroforestry through enhancing knowledge transfer between farmers, foresters, researchers and advisers. In the UK, the project is led by Abacus Agriculture and ORC. As part of this we are forming a new agroforestry innovation group in the UK to improve practice in agroforestry by sharing existing knowledge and by identifying gaps where more information or research would be helpful.



During one of the hottest weeks of the UK summer, the AFINET partners visited a range of local agroforestry systems, including a traditional wood pasture (Hungerford Common), a mature silvopastoral alley cropping site (Bill Acworth at Little Hidden Farm), as well as the inspirational highly diverse organic vegetable system at Tollhurst Organic.

Some AFINET partners then attended Agroforestry 2017. The conference wrapped up with surgery sessions, including one hosted by AFINET partners. Conference delegates were invited on an agroforestry tour of Europe, with the opportunity to sample agroforestry products from nine countries.

The agroforestry energy continued the following day with the annual Farm Woodland Forum meeting, hosted by Paul Burgess at Cranfield University. Morning presentations included an overview of agroforestry policy in the UK and Ireland, coordinated by EURAF (European Agroforestry Federation) vice-president Gerry Lawson, and a series of talks exploring different aspects of agroforestry in practice. In the afternoon the group visited the apple silvoarable system of Stephen and Lynn Briggs, on the fenland soils of Cambridgeshire.



The 'Agroforestry tour of Europe' at Agroforestry 2017.

All in all, an inspiring week, and one in which the momentum building in the agroforestry movement was tangible.

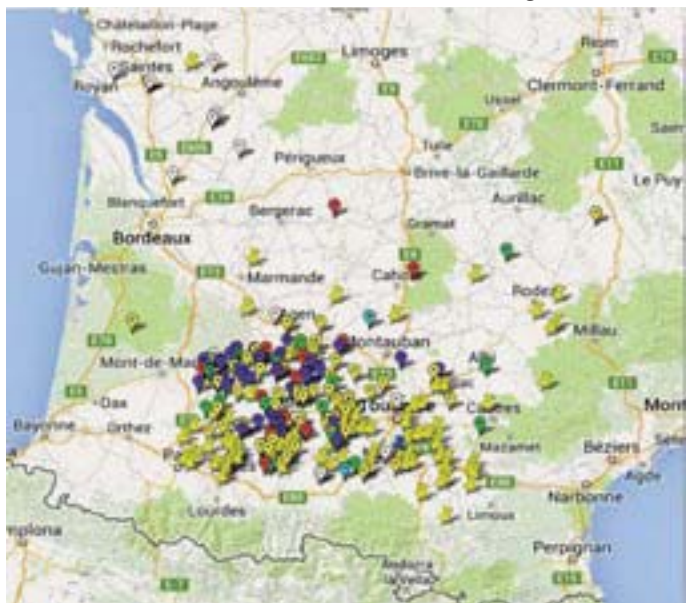
For more information contact: [jo.smith@organicresearchcentre.com](mailto:jo.smith@organicresearchcentre.com)  
<http://www.agroforestry.eu/afinet>



## French agroforestry - a landscape approach

Fabian Balageur from the French Agroforestry Association (AFAF) spoke about agroforestry initiatives in France, including Agr'eau: developing a resource efficient, eco-friendly, climate-smart agriculture across the Adour-Garonne basin in South West France. On the need for trees, he said: "We have seen the effect of treeless landscapes resulting in too much or too little water. If you think agroforestry is expensive, think again." The mean soil loss in the EU is 2.46 t/ha annually and 12.7% of European arable land has soil loss of more than 5t/ha annually.

Agr'eau is a farmer-centred initiative launched in 2013 which aims to collaboratively develop farming practices that enable sustainable soil and water management through a landscape approach and intensification and optimisation of farming systems, producing more with less, while protecting the environment. AFAF is one of many partners that include advisers, researchers, river conservationists, foresters, bee-keepers, road maintenance officers and more than 300 farmers (a number that is still increasing). Farmers are the motor of innovation sharing outcomes, results and advice in what Fabian called 'Conversation Agriculture'.



The keystone of the Agr'eau initiative – the pilot-farms. 125 are expected by 2018

Agroforestry is a key tool to reach the aims of the project and they are building on the results of twenty years of field and research experience. They want to move from the vicious circle of one crop per year, with low biomass production and soil left bare for the remainder, to a virtuous circle of up to three crops per year, permanent soil cover and high biomass production. No-till and direct seeding of crops into living mulches can produce up to 7t of biomass per ha and result in very healthy fertile soils. Fabian showed a chart which illustrated the complementarity of wheat and walnuts in capturing sunlight, with peak demands at different times. Through combining agroforestry with cover crops France could capture twice as much carbon as it is presently doing and at the same time transform the landscape and increase biodiversity,

## Government asked to support game-changing agroforestry systems

Some of the UK's leading farming and forestry organisations have put their names to a letter to Secretary of State Michael Gove, highlighting the benefits of agroforestry, the practice of cultivating trees and crops or livestock on the same area of land.

The current Rural Development Programme for England does not include options to support agroforestry, the result of a perceived lack of demand from farmers and landowners to adopt the practice.

Tom MacMillan, Director of Innovation at the Soil Association, said: "We know that the new Secretary of State is looking for bold ideas to square the UK's environmental and economic goals, and agroforestry is one of the exciting opportunities to do that in the agricultural sector. Our understanding of its potential for farm businesses, tackling climate change and supporting our soils is growing all the time and the early adopters already show inspiring examples of how to make it work. On a large scale this could be game-changing. But to exploit it fully, and to remove some of the barriers farmers have identified, requires strategic support from government."

A well-managed agroforestry system can boost land productivity by up to 40% by making efficient use of natural resources. Trees also store carbon, improve water management and enrich biodiversity. By using trees alongside livestock you create natural shelter that improves livestock welfare. These are just some of the benefits explained in the letter to Secretary of State Michael Gove, signed by organisations that want to see agroforestry brought in to the mainstream.

protect crops from wind and pesticide drift, close the fertility loop and provide habitat for predators of crop pests. Water quality and reduction of soil losses may be a big driver, but the aim is for a diversified and productive landscape, with fuelwood and biomass not only coming from forests but from roadsides, river banks and agroforestry schemes – developing new jobs and market opportunities along the way.

## Agroforestry in practice

The most inspirational part of the day was the farmer panel, talking about their experiences of growing trees on their farms. The panel comprised;

- Stephen Briggs, Whitehall Farm, Cambridgeshire
- David Brass, The Lakes Free Range Egg Company, Cumbria
- Paul and Nicola Renison, Cannerheugh Farm, Cumbria
- Andrew Barbour, Mains of Fincastle Farm
- Prof. Chris Stoate, Allerton Project, Leicestershire
- James Thomas, Haywood Oaks Farm, Nottinghamshire

While the cynic might have twigged (pun intended) that the session was a huge plug for the Woodland Trust and their grants and advice, there is nothing like practical 'dirt under the nails' experience for informing and motivating the next generation of agroforesters. The most relevant for growers was James Thomas of Haywood Oaks Farm, veg growers on the sandstone ridge of Sherwood Forest in North Nottinghamshire. James can recall more than one occasion when he stood watching his livelihood literally wash away before his eyes. The problems of water and wind erosion were worsening at his farm. Weather events seemed to be getting harsher and more extreme with gully erosion ripping through some fields. They have planted 3ha (7.4ac) of strategically positioned shelter belts in eight blocks, on areas which are most prone to erosion, to protect the topsoil against the dangers of erosion from wind and rain. The trees should improve the productivity of the farm and eventually fuel their woodchip boilers.

Stephen Briggs' silvo-arable (apple trees/cereals) agroforestry system will be familiar to many readers. Stephen was also galvanised into establishing an agroforestry system by seeing his topsoil blowing across the Cambridgeshire fen. Planting trees reduces the wind speed protecting the soils. It also provides resilience against climate change, increases natural predators and biodiversity and improves the aesthetics of the farm. Importantly, being fruit trees they provide a quicker economic return in the context of a 15-year farm business tenancy.

## Finding or making a market

Sophie Churchill, President of the Royal Forestry Society introduced the principles for finding a market for your agroforestry products. With forestry products, as with any other crop, active management is needed – timber values go up with management. Growing trees may not be familiar to you, so take advice on technical issues, business planning and marketing. Think about creating a team. Share cropping or shared skills can complement the business. When setting up you need to calculate the whole farm value of the agroforestry approach. You may need to understand new and unfamiliar markets, or create new ones. Options range from timber and biomass to fruit, nuts and tourism/ecosystem services.

Paul Burgess of Cranfield University covered the non-market benefits of agroforestry. Agroforestry can increase the stock of natural capital and improve the flows of regulating and cultural ecosystem services. Environmental accounting can be used to value these stocks and services. Sometimes a company, e.g. a water supply company, may provide payment for ecosystem services. Because many benefits are widely distributed across society, the UK government should support agroforestry. Options include payments for:

- Agroforestry establishment/management
- Farm-level management plans for greenhouse gases
- Results e.g. for each net tonne of carbonsequestered or for each open-access hectare

## Multi-functional land use – fit for the future

Perhaps a barometer of how the policy environment is changing was the presence on the final plenary panel of Christopher Price, Director of Policy at the CLA, who candidly admitted being party to the dismissal of agroforestry as an option when Countryside Stewardship was being created, when it was deemed there was no interest amongst farmers and landowners. Supporting the call for government to now support agroforestry he said: "As a sector farming needs to improve both its productivity and its environmental ambitions: agroforestry has the potential to deliver on both of these which is why CLA members are increasingly taking it up. However, if we are to see the full benefits of agroforestry we need the right regulatory and policy frameworks in place. Devising a post Brexit agricultural policy provides the opportunity to revisit these issues, improving the incentives and removing the obstacles."

Closing the conference Beccy Speight, CEO of the Woodland Trust, said: "Agroforestry needs to be a mainstream component of a new fully integrated land management policy. The practical examples and robust evidence we have heard today of trees supporting farm businesses and new commercial opportunities are powerful tools with which to influence a new, post-Brexit policy. Collectively, we must secure policies that prevent trees on farms from continuing to fall through the cracks.

"We are calling on the Government to take a new and ambitious approach which tackles administrative blockages, harnesses innovative sources of funding and properly reflects the valuable interplay between trees, woods, forestry, farming and the environment."

### Phil Sumption

Get presentations and watch videos of farmers featured in the Conference at: <https://www.soilassociation.org/farmers-growers/agroforestry-conference/>

## Trees for your farm



Make agroforestry a part of your farm. Improve soil and water quality, give shade and shelter to livestock and reap the benefits of a year-round crop. The Woodland Trust offer:

- free advice and support for famers.
- a tree planting assessment for your whole farm
- tailored planting schemes
- advice about how trees can work for your farm business.

Funded by Accor Hotels and delivered through the PUR project for suitable sites.

Call 0330 333 5303 or email: [plant@woodlandtrust.org.uk](mailto:plant@woodlandtrust.org.uk)