In October 2007, we took on the tenancy and management of a 100ha farm in Cambridgeshire, England. Given our passion for organic farming and conservation we converted the farm to organic as soon as was practicable. Our aim was to develop an organic farming system which balanced productivity with environmental management and was truly sustainable in the long term.

The fen soils on the farm have very high levels of organic matter and are subject to oxidation and wind erosion – representing a loss of the farm’s most important resource. We wanted to protect the soil, retain productivity and enhance biodiversity.

From our previous experience working in Africa, we recognised the environmental benefits of agroforestry and were keen to develop a system at the farm with mixed tree and arable crops. Following changes to the Single Payment Scheme in 2009, which made fruit, vines and nursery crops eligible, we chose apple trees. We wanted to ensure a good commercial return within the period of our farm tenancy. If we had a longer tenancy period we could have considered nut, coppice or timber trees. Diversification into apples alongside arable crops created a greater enterprise mix and spread cropping risk, while also capitalising on a resurgence in demand for English organic apples for the eating and juicing markets.

In late 2008, we placed an order for 4,500 apple trees. After harvesting the cereal crop in 2009, we hand-planted the one-year old pot grown apple trees with a 1m² mipex mulch mat for weed control, a tree guard and a wooden stake for support. Between each row of trees we allowed for a 24m wide cultivated area for cereal, root or vegetable crops. We held our breath when drilling the first cereal crop between the rows of trees.
Agroforestry is an approach to integrated land use, combining elements of agriculture and forestry in a sustainable production system. Agroforestry systems are generally classified as silvo-arable (trees and crops) or silvo-pastoral (trees and animals). The central aim is to create a functional, biodiverse system that balances productivity with environmental protection.

Tree species can include timber, fruit, nut, coppice (or a combination) with cereals, vegetables, fruits, and forages planted between the rows. Agroforestry systems can produce food, fuel, fodder and forage, fibre, timber, gums and resins, thatching and hedging materials, gardening materials, medicinal products, recreational and ecological services – and more.

Agroforestry can offer environmental benefits in terms of resource use, resource protection and climate change mitigation. Integrating trees into the agricultural landscape also offers a real potential to develop the local economy by increasing economic stability, diversifying local products, rural skills and the economy, improving food and fuel security, as well as the cultural and natural environment and diversity of the landscape. Nevertheless, these potential benefits are not yet fully acknowledged or understood by UK producers or policy makers.
but the layout worked and the cereals performed well. There were also no problems with harvesting, but we did remind the combine driver to drive straight!

We planted 13 different varieties (all on semi-dwarf root stock), selected for taste, good storage, ease of pollination, disease resistance and late ripening. Late ripening was important to enable us to pick the apples from the cereal stubbles in the autumn. After harvesting the arable crops, we move straight from cereal to fruit harvesting. The aim is to spread the risk of a difficult or poor harvest over a wider window.

A normal orchard would have over 850 trees/ha. We have opted for a planting density of less than 100 trees/ha which allows us to use normal farm equipment, and eliminates the need for specialist orchard machinery. This keeps our fixed and operational costs down and means that any equipment is multi-purpose.

**Major advantages**

Unlike a new orchard, where all the land is effectively occupied by trees separated by narrow alleys, in our system approximately 4% of the land area is occupied by trees. This means that we can continue to crop 96% of the area while we wait the five years for the apple trees to reach full productivity. This is a major benefit for our cash flow.

We have Organic Entry Level and Higher Level Stewardship Scheme agreements with Natural England, as well as educational access for farmers, researchers and children. We have introduced a wide range of conservation measures including over winter stubbles and nectar flower mixtures within the system. We have sown multiple species of legumes and wild flowers beneath the tree strips to attract insects and pollinators – important for fruit production and beneficial to surrounding crops.

We are also working closely with the Organic Research Centre, the RSPB and several universities to monitor changes in flora, fauna and, particularly, farmland birds. Baseline studies were undertaken before establishment and even in the first year we saw improvements, with an increase in the number and species of bees, butterflies and birds compared to both the adjacent organic arable land and ‘conventionally’ farmed land. The research is on-going and we believe that the positive benefits to soil protection and biodiversity will continue to increase over time.

**Learning lessons**

In developing a new system, we have learnt a lot and made a few mistakes. We should have used bigger tree guards and taller wooden stakes, as we have had problems with hares and some stem breakages from fat pigeons! We also did not anticipate that we were creating 4,500 roosting spots in an otherwise open landscape.

On reflection, we are creating a sustainable business with Whitehall Farm, integrating conservation and profitable farming with some very novel approaches. We believe this approach has a bright future and is creating new horizons – literally!

This article draws on an earlier piece published in the spring 2011 edition of Organic Farming.

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