Agroforestry: Reconciling Production with Protection of the Environment

Since 2009, the Organic Research Centre has been working on an agroforestry programme investigating the value of temperate agroforestry for sustainable production of food, fuel and fibre.

* Agroforestry is a concept of integrated land use that combines elements of agriculture and forestry in a sustainable production system. An emphasis on managing rather than reducing complexity promotes a functionally biodiverse system that balances productivity with environmental protection.

* Agroforestry systems are classified according to the components present – trees with crops are referred to as *silvoarable*, trees and animals as *silvopastoral*, and trees with crops and animals as *agro-silvopastoral*.

* In the UK, traditional agroforestry systems include wood pastures such as the New Forest, browsing of acorns and beech mast (pannage), parklands, pollarding, orchard grazing and hedgerows. Modern systems include silvoarable and silvopastoral systems, and woodland chicken and egg production.

* There are both ecological and economic interactions between the trees and crops and livestock. Total productivity of agroforestry systems is usually higher than in monoculture systems due to complementarity in resource-capture i.e. trees acquire resources that the crops alone would not.

* Agroforestry systems support the production of a wide range of products including food, fuel, fodder and forage, fibre, timber, gums and resins, thatching and hedging materials, gardening materials, medicinal products, craft products, recreation, and ecological services.

* Trees modify microclimatic conditions including temperature, water vapour content of air and wind speed, which can have beneficial effects on crop growth and animal welfare.

* By minimising nutrient losses and maximising internal cycling of nutrients, and by enhancing pest and disease control, agroforestry systems reduce the need for agrochemical inputs.

* The role of agroforestry in protecting the environment and providing a number of ecosystem services is a key benefit of integrating trees into farming systems. Other such benefits include regulation of soil, water and air quality, enhancement of biodiversity, pest and disease control, and climate change mitigation and adaptation.

* Integrating trees into the agricultural landscape has the potential to impact the local economy through increasing economic stability, diversification of local products and economies, diversification of rural skills, improved food and fuel security, improvements to the cultural and natural environment, and landscape diversification.

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Moving agroforestry into the mainstream – going forward

The potential of agroforestry as a sustainable land-use system that combines production with conservation of natural resources has not yet been fully realised in temperate regions. Three key areas of activity essential for promoting agroforestry into the mainstream are research, dissemination and policy changes.

Research:

Scientific research on agroforestry systems started in the late 1970's, and focused on tropical systems; studies on temperate systems only starting to appear in the literature from the early 1990's. The long time scale needed for such research is a limiting factor, with very few examples yet available of complete cycles of the systems through to tree harvest. Research needs range from studies at the fine-scale (species interactions), the farm-scale (economic as well as environmental benefits) right up to the landscape-scale (e.g. watershed impacts on nitrate leaching, biodiversity enhancement), national-scale (e.g. home-grown timber and fuel to reduce imports and increase renewable energy production) and global-scale (climate change mitigation and adaptation). The Organic Research Centre is adopting the ecosystem services framework to shape our agroforestry research programme, to consider how productive services can be balanced with regulating, supporting and cultural services.

Dissemination

Another primary barrier to wider adoption of agroforestry is limited awareness of agroforestry practices among producers, foresters, landowners, conservation organisations, policy makers and the public. For agroforestry to be established on a wider scale, economic viability and practical management skills need to be demonstrated to farmers. We are developing an 'Eco-Agroforestry Network' which aims to promote knowledge transfer and establish a platform for collaboration between the various sectors. We have organised and contributed to a number of producer-focused workshops and have a number of events planned for the future. An extensive review of research literature will form the basis for the development of a major publication, which will also include our research results, a review of policy and UK case studies.

Policy changes

A lack of policy support is seen as one of the main barriers to wider adoption of agroforestry, with the integration of trees at a low density into agricultural land challenging the conventional specialisation of forestry and agricultural policy mechanisms. Within the UK, where subsidies can represent a significant proportion of farm income, agroforestry has a limited future if it is ineligible for support payments. Changes to current UK and EU agricultural policies would be needed to fully support widespread uptake of agroforestry. Under Pillar I, agroforestry needs to be recognised by the EU as a valid land use to be eligible for Single Farm Payments, while under Pillar II, adoption of Article 44 across the whole of the UK would support the first establishment of agroforestry. This could be implemented either by incorporating Article 44 into existing Farm Woodland grant schemes (as in NI) or by creating a separate scheme, similar to the Energy Crops Scheme, which would provide payments for the establishment of agroforestry. It is less clear how agroforestry could fit within existing agri-environment schemes, although it may be possible to develop options that reflect the environmental benefits of an agroforestry approach. To promote agroforestry as a sustainable approach to production, there is a need to identify clear market and policy reasons for providing support, by collating, managing and, through research, providing evidence on the benefits of agroforestry to balance production with delivery of ecosystem services.

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