Exploring the economic impacts of a transition to agroecology in the UK

A Soil Association policy briefing

There is a growing consensus that agroecological approaches have an important role to play in the transition to a farming system that works for climate, nature, and resilient, healthy food production. Based upon the application of key ecological concepts to farming, agroecology involves a range of practices, and is often seen in organic and agroforestry (the integration of trees and woodland on farms). It is widely referenced in Scotland's Vision for Agriculture[i], as in Wales' Sustainable Farming Scheme[ii] and the National Food Strategy[iii].

A series of European and UK-level studies[iv] suggest that an agroecological farming transition could feed a growing population a healthy diet while achieving deep emissions reductions at home and abroad, as well as restoring biodiversity. As a prime example of agroecology, organic farming has been used as the basis for much of the modelling that has been undertaken to date.

Despite the growing body of research around the wider benefits of this transition, key economic questions remain. What would an agroecological transition mean for farmers and farm businesses? Could the natural capital benefits of agroecological farming be achieved within profitable farming businesses? What policy and economic framework might be needed to achieve this?

The Soil Association commissioned independent analysis by Cumulus Consultants, and by Eftec working alongside Strutt and Parker to start evaluating these questions. Key insights from the research are set out below. By making the models available, we hope to support all those researching and developing policy solutions in this space and provide a foundation for further analysis.

Cumulus

Economics of a UK Agroecological Farming Transition

In this report, Cumulus explore the economic performance and prospects of UK agroecological farms compared with conventional farm businesses, based on in-depth literature review, case study development, and economic modelling.

The study defines how each of the main UK farm types could be adapted to integrate agroecological approaches. For the sake of comparison the modelling initially discounted current premiums for organic production (which often mean the public goods provided by agroecology are paid for privately), then looked at how the retention of more value in the supply chain by agroecological farms could improve profitability.

The report explores what policy and market frameworks are needed to support agroecological profitability, and the analysis generates farm-level and policy recommendations for an agroecological transition.

Read the full report and case studies at
https://www.soilassociation.org

Key findings

- Current and prospective policy and market frameworks mean the continued profitability of most UK farm types is at risk, even with conservative assumptions on input costs and with the prospect of Basic Payment Scheme reduction/phase-out.

- Heavy reliance on fertiliser and fuel means farmers are exposed to volatile global energy and input markets. While high grain prices are cushioning arable farmers from these input costs for now, these costs will be passed on in food prices to citizens. Livestock farms which are reliant on fertiliser and/or grain feed are particularly exposed. An agroecological transition could help insulate citizens from volatile food prices and the impact of rising input costs.

- The case studies show that agroecological farming at a range of scales can represent an effective strategy for improving economic performance, through several possible pathways to profitability. However, this requires a mindset shift to focus on gross margins, cost reduction and diversification rather than on increasing outputs. The profitability of cereal, horticulture, lowland grazing, and LFA farms could improve by between £3,000 and £34,000 for a typical farm compared to conventionally managed analogues.

- Although outputs tend to be lower on the modelled agroecological farms, the lower variable costs along with the greater capacity to access agri-environment payments and marginally higher farm gate value retention enable these agroecological farm types to improve profitability.

- Based on the modelling, when selling at conventional farm gate pricing, making agroecological horticulture, dairy and mixed farms profitable remains a challenge. High fixed costs pose a particular barrier. Innovative solutions are needed to reduce these costs, alongside continued research to explore these challenges in greater depth and to define solutions.

- Farm gate prices need to be improved by better value retention for farmers in supply chains. This requires trade policy that applies core food standards to imports, and a fairer distribution of value in supply chains, including through more direct and shorter supply chains.

Policy insights

- The modelling indicates that the agroecological transition is reliant on effective public funding to reward the positive climate, nature, soil health, water and air quality outcomes delivered through nature-friendly whole farm systems. This public support will represent better value for money and will be more likely to achieve its intended outcomes if the wider policy framework (trade policy, planning policy, regulatory baseline/cross-compliance, governance of carbon markets to achieve co-benefits for nature) supports a whole farm agroecological approach, so that competing drivers do not cause a net reduction in public goods at the farm level and national level.

- Private markets may play a positive role if they are governed to achieve co-benefits for nature and climate resilience alongside carbon reduction, but this won't substitute for government payments and will require well governed natural capital markets.

- Case studies clearly show that agroecological farmers are enterprising, and that they use diversification opportunities (such as eco-tourism) which can represent a cost-effective long-term investment for the taxpayer in securing public goods and can benefit rural communities and employment.

Woodland and trees in the farmed landscape: Towards a diverse, resilient and vibrant agroforestry and farm woodland economy for the UK

Also from Cumulus, this work is founded on the basis that agroecological farming takes a multifunctional approach to land use and business, and therefore embraces the integration of trees and woodlands into farming systems as part of a whole farm enterprise, instead of the counter narrative of separating land uses. As well as analysing the current situation and opportunities for agroforestry and farm woodlands, the report models the change in net income associated with the integration of a range of agroforestry and farm woodland systems into six main farm types. The model allows the customisation of assumptions around carbon payments, agri-environment payments and agricultural performance and extrapolation enables modelling of the macro-economic impact of different scenarios on the agricultural economy.

Explore the model and read the full report at
https://www.soilassociation.org

Key findings

- Agroforestry and integrated farm woodland offer a viable and cost-effective way to significantly increase tree planting across the UK without reducing agricultural production and offshoring impacts. Public and private payments will be necessary to incentivise integrated and low density agroforestry systems.

- Increased adoption of agroforestry has the potential to enhance the performance and resilience of UK food production.

- Agroforestry has the potential to support a wider and more balanced range of ecosystem services including carbon sequestration and food provisioning. Applying these integrated land use changes at a landscape scale is therefore potentially a more viable option for providing a wider range of public goods, along with food production, in combination with some traditional off-farm woodland creation to meet overall targets. If strategically incentivised, this is feasible without distorting the food and rural economies or risking carbon leakage offshore, through the complete conversion of agricultural land to deliver the targets in full.

- Strategically increasing agroforestry and farm woodland, has the potential to enhance the performance and profitability of the agricultural economy by restructuring the landscape to one more supportive of a range of agricultural activities, as agroforestry and farm woodland can generate new markets for tree related products and services, with positive environmental impacts.

Policy insights

- Policy support schemes across the agricultural and forestry sectors should offer explicit support for agroforestry and schemes should include consistent and defined support for the various types of agroforestry.

- Support schemes should provide land managers with guidance and advice on how to structure agroforestry and farm woodland systems to maximise productivity improvements; the support could be based on the value of the public goods provided by these systems and blended private funding sources may provide an effective way to help compensate land managers for these public goods.

- Support should focus on rewarding the public benefits provided by the maintenance of already established agroforestry and farm woodland systems, as well as funding for the creation of new systems.

- The integration of diverse farming and land use practices should be managed through a whole farm approach, so that the synergies of overlapping management practices on that land delivers wider benefits than each individual practice.
- The associated livestock welfare and environmental benefits of integrating trees into farming systems need to be clearly communicated to land managers and consumers.

- Different forms of fruit and nut production should be explored in the UK to better understand the viability of these industries, especially as the climate changes. If viable, policy support should be provided to develop local processing and supply chains as well as land management changes.

- Supply chains, local markets, skills, and technologies need to be developed and supported to help establish local and resilient supply chains for goods such as fruit, nuts, and farm scale timber supply.

- Systemic innovations to enable small scale dispersed agroforestry and farm woodland systems to access advice, contract work, equipment, and supply chains could help farmers access higher prices for tree related products. Cooperative models, service schemes, technology sharing and rental could all help reduce this scale issue.

Farm sector modelling under the Ten Years for Agroecology project

This report models the wholesale conversion of existing conventional farming in England to organic farming based on existing farming patterns and organic production levels. This hypothetical exercise was chosen to illustrate a baseline case of what a wholesale conversion to agroecological farming might look like. A 'bottom up' approach is used, which aggregates the outputs from different farm types, to illustrate how much agricultural production and domestic coverage of England's food demand would change from the current situation. This is then contrasted with IDDRI's modelling results scaled to an England level. The original IDDRI work illustrated how a broadly self-sufficient Europe could be sustained through agroecological farming, albeit with modified diets using a more 'top down' approach, whilst this approach makes it easier to look at the effects at a more granular level.

eftec

STRUTT & PARKER

Read the full report at https://www.soilassociation.org

Key findings

- The modelling highlights that the current structure of conventional farming in England is highly dependent on government subsidy, has a large negative effect on natural capital and has not provided high levels of food self-sufficiency for most types of food.

- Under a scenario in which current conventional farm types convert to organic farm types, food self-sufficiency would fall, due to lower yields in organic systems, but overall farm income increases. This relies on the maintenance of current farmgate prices, the high degree of diversification income reflected in current organic farm businesses, and continued payments for the environmental public benefits of organic farming.

- Under this organic scenario, there would be additional natural capital benefits over the next 60 years estimated at £74bn, which would strengthen the case for continued public subsidies to the sector. The analysis of natural capital values quantifies impacts on air quality (and human health), emissions and sequestration of greenhouse gases, and water quality of the shift. In the short term, carbon emissions reductions due to ending artificial fertiliser use and sequestration in trees, and reductions in air quality, have the largest monetary value.

- The proportion of farms that have significant livestock enterprise increases in the 2018 organic scenario. There is a significant increase in woodland area as part of 10% green infrastructure on farms in the 2018 Organic scenario including agroforestry and small woodland expansion, increasing woodland cover in line with the Climate Change Committee target of 19%.

- In the wider long term transition to agroecology, with more research on improving crop yields and farming systems, and an accompanying change in people's diets, food self-sufficiency would increase for most types of food and there would be a similar boost to natural capital benefits as under the organic scenario.

- Under the 2050 agroecological scenario, cereal output drops, along with the area of grass and forage for livestock, reflecting the diet changes in the "TYFA diet" and the phase out of feeding grain to ruminant livestock. The total area of vegetables increases significantly, raising significant issues of transition and investment costs.

Policy insights

- The researchers conclude that an agroecological transition in England is a realistic prospect, and is worthy of further investigation as a means of achieving environmental, climate, economic and social targets for the sector and wider society.

- To support this further investigation there is a need for better data on agroecological yields and farming systems, more research investment in improving organic yields, and better understanding of the practical issues and barriers to converting conventional farms to agroecological methods.

- An agroecological transition will require a major change in the balance of crops grown domestically. This is likely to require corresponding changes on a large number of farms.

- The natural capital benefits of a transition (through the reduction in negative impacts from agriculture) are material in relation to the scale of economic activity in the sector, and to the case for government spending and policy to support such a transition. Society will be better off if agricultural production is less intensive and its negative environmental impacts, and their consequences for human health and wellbeing, are reduced.

Soil Association conclusions from the research

The challenge of feeding the entire population a healthy and sustainable diet whilst restoring a stable climate and recovering nature is one of the most pressing of our time. As it stands, western diets associated with industrial farming systems are leading to significant public health problems, as well as taking us beyond our planetary boundaries because of their damaging environmental impacts.

Various scenarios have been envisaged to solve this challenge, with agroecological approaches (of which organic is a clearly verified exemplar) as a leading contender. These rely on natural rather than synthetic sources of nitrogen, normally recycled via ruminant livestock; minimal use of pesticides; restoring biodiversity in farmland; multifunctional use of land through integration of productive forestry into farmland and more.

However, there are significant questions about the productive potential of agroecological approaches, the economic implications of a wholesale shift to agroecology, and what these might mean for both farmers and citizens.

Previous work by IDDRI has illustrated the European level implications of an agroecological transition for food production and the climate in their Ten Years For Agroecology[v](TYFA) modelling exercise.

This TYFA model concluded that agroecology could be consistent with a net neutral food balance in Europe, when accompanied by a wholesale shift to a healthier diet.

This would be based on a significant increase in production and consumption of vegetables and fruit, a reduced consumption of dairy products and grain-fed meat, a reduced but still significant role for grass-fed ruminant meat, and a significant increase in proteins from legumes. Further modelling by IDDRI[vi], commissioned by the Food, Farming and Countryside Commission, suggested that the UK with it currently high "global food footprint" could reduce that global footprint with a dietary transition alongside agroecological production, and could even free up land for other uses.

These encouraging findings mean that there is increasing interest amongst farmers in adopting agroecological approaches to food production, amongst citizens in moving to more sustainable and healthy diets that align with global environmental limits, and with politicians in finding policy mechanisms that could realise these benefits.

Building on this work, the studies presented in this briefing provide a better understanding of the macroeconomic and farm level impacts of an agroecological transition.

The macroeconomic modelling of a transition to agroecological approaches suggests that, overall, farm income would increase. This hypothetical finding reflects the high degree of diversification in organic farm businesses. It also assumes the maintenance of current farmgate prices and continued payments for the environmental public goods delivered by organic farming, suggesting an important role for both public and private investment in the transition to agroecology.

The analysis also made an initial evaluation of the natural capital implications of the shift, giving a conservative positive benefit of £74bn over 60 years. This reflects greater tree and green infrastructure cover, among other things. However, it was noted that, within the current economic paradigm, these benefits to the national accounts do not accrue to the farming balance sheet, and therefore provide little incentive for farmers to move to more agroecological and resilient farming approaches.

The key role of dietary change in the UK

The work also underlines the closely intertwined issues of dietary and agricultural changes within the shift to a more sustainable food system. Farming in England, largely dominated by conventional systems, does not meet our domestic food demand for almost all products.

In particular, there are notable deficits in fruit and vegetable production, and significant "hidden imports" of feedstocks for domestically produced meat and dairy. However, when the dietary change to a healthier and more sustainable diet modelled in TYFA is included, the picture changes markedly: self-sufficiency is achieved across the majority of food categories.

In addition, the original modelling by IDDRI assumed scope for increase in organic yields resulting from targeted R&D and improvements in system efficiency. The authors of the farm sector modelling under the Ten Years for Agroecology project report noted that this would likely require significant changes on a large number of farms, with a shift towards integrated cropping and livestock operations, as well as significant changes on farms starting to produce fruit and vegetables.

They also note that the shift away from synthetic nitrogen would require a large increase in fertility-building red clover for arable production, as well as a switch away from arable production for livestock feed towards crops that feed people - meaning a greater use of pasture instead of grain and soya to feed livestock.

The farm level modelling showed diverse impacts for predominantly arable farms, a key challenge would be the transition away from synthetic nitrogen, requiring both the adoption of more leguminous crops in the rotation and the incorporation of some ruminant livestock. Under current conditions, and assuming no premium prices for agroecological production, the agroecological cereal farm is less profitable than its conventional counterpart.

However, the modelling is highly sensitive to changes in assumptions: when the environmental benefits of agroecological approaches are rewarded, along with a modest uplift in current conventional prices and a 50% increase in historic synthetic nitrogen costs, the agroecological system gains the advantage.

For horticultural farming, a transition to agroecology is harder to model due to the huge variety of operations, but retaining profitability is particularly dependent on securing better farmgate prices. This will require ability to differentiate to the consumer, innovations such as dynamic procurement, the adoption of appropriate technologies and consideration to the complex land tenure models of current conventional horticulture.

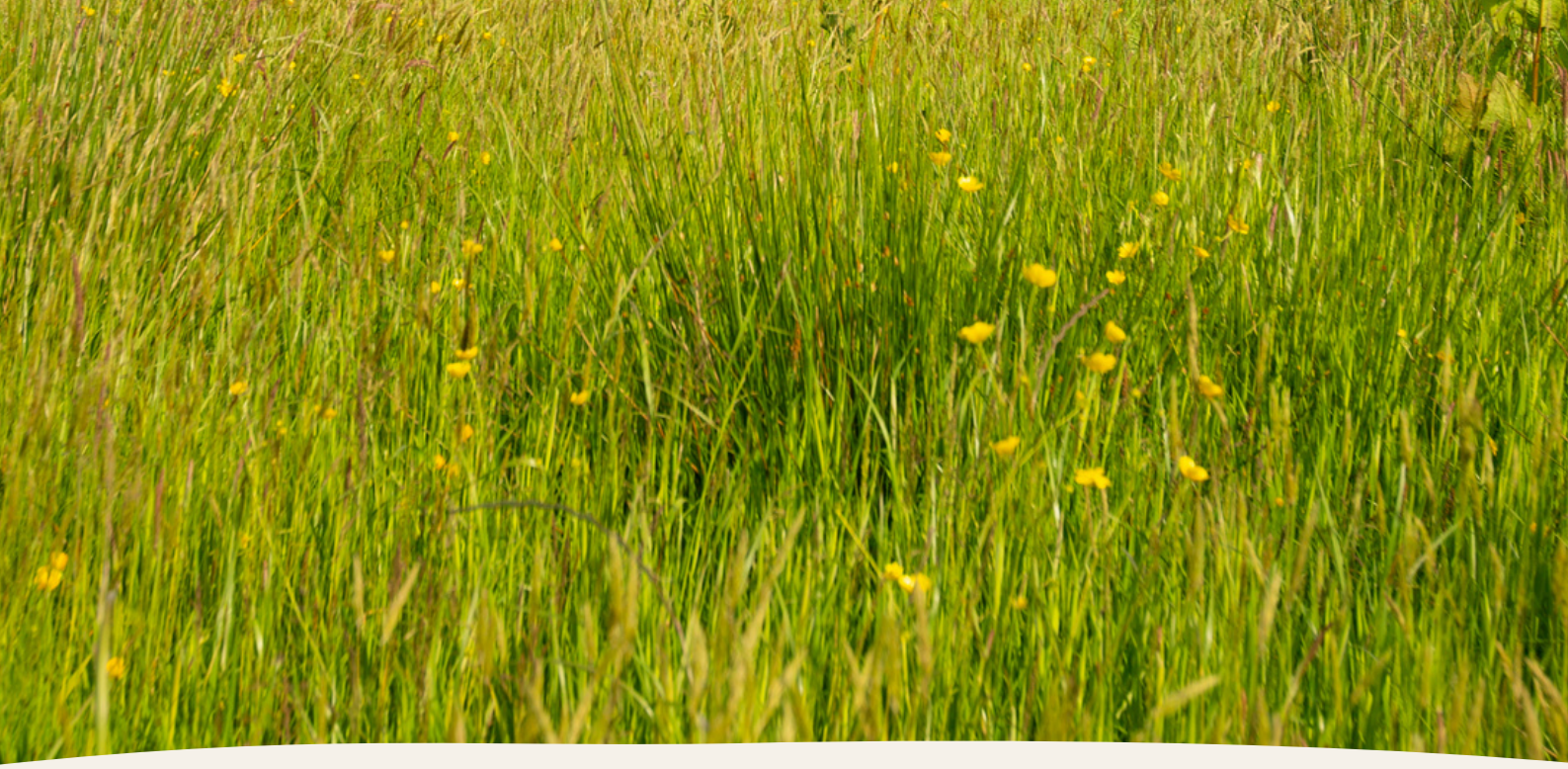
Pasture based lower-input/lower-output agroecological approaches to dairy farming struggle to show profitability at current conventional farmgate milk prices. Organic systems usually balance this by retaining more value through direct marketing and higher prices (retail milk prices already often fail to reward conventional dairy farmers and to reflect the environmental externalities of production). Future strategies to aid agroecological transition could include research into optimising stocking levels on pasture (such as mob grazing) and dual-purpose breeds to enable better returns from meat production in dairy systems.

Without farm support or agri-environment payments, existing livestock farms tend to be unprofitable, though agroecological farms make less of a loss. In a scenario where nitrogen costs remain elevated and farm payments continue to shift towards payments for environmental public goods, an approach focused on gross margins, rather than yield maximisation, favours a transition to agroecological approaches with lowland livestock.

Upland livestock farms struggle to be profitable without subsidy under current conditions and the significance of fixed costs tends to favour high stocking densities. The lack of underlying profitability provides an opportunity to consider the wider social and societal issues for upland farming, and the research suggests a need to refocus policy. Long term sustainable farm businesses that focus more on carbon sequestration and building natural capital alongside agricultural production will be the most desirable way forward.

Mixed farms, which are subject to economic pressures favouring specialisation, are commonly thought to be closest to an agroecological typology with the potential to integrate cereal, horticultural and livestock operations. In reality, the complexities of managing multiple enterprises and associated marketing make the economics challenging. The route to profitability may lie in new ways of stacking different businesses on farm, more value retention, more sophisticated ways to recompense the ecosystem services provided by complex systems, and more peer-to-peer networking, collaboration and research.

Overall, the results give us greater confidence that an agroecological transformation is a feasible and economically viable possibility, both at a national and at farm level. It would also bring considerable benefits to natural capital, and improve the overall resilience of our food and farming system. However, it is also clearer than ever that a significant shift to healthy and sustainable diets is an essential component of the transition, and we need to understand more about the impact on overall household food budgets, how farms and supply chains would need help to restructure, the way in which building natural capital is properly rewarded, and the way farmers themselves understand the impacts of an agroecological transition.



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