DEFRA ORGANIC TECHNIQUES PRACTICE ABSTRACT NO. 1

MIXED FARMING THROUGH COLLABORATION

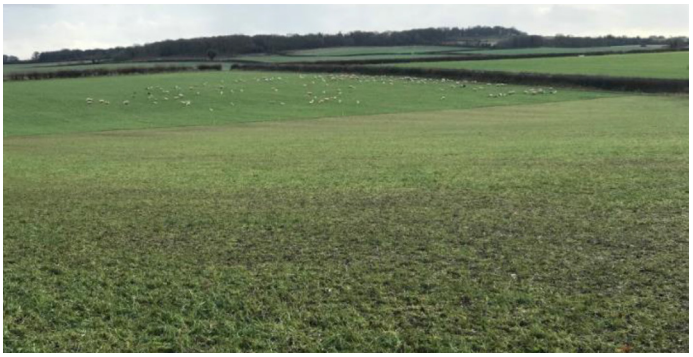

Photo: Sophie Alexander

PROBLEM

Increased specialisation in farming has led to a lack of diversity at the landscape scale and a reduction in ecosystem services. Arable farms have become over-reliant on external inputs with a shortage of organic matter and nutrient inputs in crop production. It is difficult to make grass leys profitable without livestock. Livestock farms face shortages of forage/fodder and there is a lack of knowledge/infrastructure for mixed farming systems.

SOLUTION

Specialist arable and livestock farms can collaborate to share knowledge, land and other resources for the benefit of both and enhance ecosystem services at the landscape scale.

OUTCOME

Collaboration between farming systems at a landscape scale can help arable farmers incorporate livestock into the rotation without requiring specialist knowledge or facilities, while allowing grass leys and forage crops into the rotation to help build soil fertility and control weeds such as blackgrass. Cooperation between crop and livestock enterprises provides additional grazing/forage for livestock farms. Collaboration helps link different habitats improving biodiversity and enhancing other ecosystem services. The coordination of cooperatives from crop and livestock areas could lead to the development of local markets and a new supply chain for harvesting, processing, transportation and distribution.

APPLICABILITY

Applicable production types

Application time

All year round with impact on the whole farm. Peak requirements for grazing/forage or manure should be carefully managed.

Required time

Initially high to set up. Once established little extra time should be required beyond maintaining good lines of communication.

Regulatory compliance

Pillar I and II; Animal Welfare; Waste management

EFA, NVZ, Health and Disease

Equipment/resource required

Individual specialist farms likely to already have the necessary equipment and infrastructure for crop or livestock production. Investments in new equipment/ housing can be done collaboratively.

Best in

Possible in most lowland areas of the UK. Opportunities for nutrient deficient crop farms and livestock farms where extra forage/grazing is required and excess manure needs removing.

PRACTICAL RECOMMENDATIONS

IMPLEMENTATION

- The most common types of agreement in collaborations between crop and livestock farms are:
  - Muck-for-straw deals
  - Host out-wintering livestock
  - Contract growing of forage crops
  - Grazing or cutting agreements
  - Grazing licence for a grass ley or grazing
  - Farm business tenancy agreement
  - Joint ventures
- "Flying flocks" are a good option for specialist arable farms with no permanent pasture. For the shepherd it provides additional acreage to start/expand flocks and clean grazing. Grass leys or diverse swards/herbal leys can improve soil structure and fertility, help control weeds such as blackgrass and

brome and increase arable yields. Good opportunities for beef or dairy to collaborate with arable also exist.

- Cooperation with neighbouring livestock farms provides the opportunity to incorporate grass/legume leys for grazing or cutting into short arable rotations, diversifying the rotation to improve soil fertility, reduce mineral fertilizer inputs, and fix nitrogen. This may help spread workload on the arable farm, reducing autumn drilling and harvest, and provide opportunities to help control pernicious weeds like blackgrass with a well-managed cutting/grazing regime.
- Agreements and contracts, though perhaps less necessary with close neighbours, can help farmers plan and provide a framework to avoid disputes, with both parties understanding exactly what they must deliver in the partnership. It is important to include a dispute resolution clause to help resolve any disagreements. Any agreement needs a regular review to ensure targets are being met, and problems identified and resolved at the earliest opportunity.
- Collaboration and knowledge exchange between farms is essential to help adapt and meet the needs of both farming systems e.g.
    - Feed can be grown to better meet the nutritional requirements of the livestock being reared e.g maize and pea intercropping to improve protein content of fodder.
    - Improved manure management to maximise nutrient content for enhanced crop growth and yield while reducing negative environmental impacts of leaching and volatilization.
    - Cropping cycles adapted to help meet forage needs of livestock.
- Farmer associations, can play a crucial role in building and developing the social networks needed to integrate crop and livestock farms, reducing farmers costs of information.
- Required information includes the quantity and quality of materials to exchange, farmers' willingness to change their current practices towards increased coordination (e.g. changing crop rotations, introducing new crops), and the equipment available to harvest, store, and transport the products being exchanged.
- A long term shared vision for improving sustainability and ecosystem services, and stable prices for the benefit of both farming systems can provide a greater stability and persistency of the collaboration.
- Acknowledgement of the benefits and targeting them from the outset, can provide the conditions for long term, stable collaboration.
- Infrastructure requirements should be carefully understood e.g. fencing, water. While through collaboration, the livestock enterprise will have access to these already, further investments may be necessary.
- Consider livestock housing, or manure storage, on the arable farm in order to reduce transport costs.

EASE OF ADOPTION ON NON-ORGANIC FARMS

- Due to European organic regulations requiring 100% organic feed for organic dairy cattle and rules tightening for manure application from conventional livestock production to organic cropping systems, the practice is potentially easier for non-organic farmers to adopt since the resource specificity is not as high for the exchange of feed and manure and there are many more potential farms to integrate with.
- The main restriction may be a spatial one where due to increased specialization in different parts of the country, it may be challenging to find local farms to integrate with. High demand for crop partners may exist in areas with a high density of livestock production and vice versa. Therefore, resource scarcity may present the greatest challenge for non-organic farms.
- Supply chain requirements for low-maintenance breeds (e.g. easy care) could encourage uptake of this practice in arable/cropping sectors.

BENEFITS OF IMPLEMENTATION

- There are likely to be environmental, economic and social sustainability gains
- Promotion of ecological interactions over space and time.
- Reductions in water and air pollution through better manure management and soil health improvement through manure additions
- Reducing soil erosion
- Reductions in synthetic inputs

- Improvements in overall ecosystem services including soil fertility and biological regulation of pests and disease
- Efficient resource transfer
- Local supply and demand drive the exchanges
- Promotes risk sharing, adaptive capacity and resilience
- Internalised markets can also reduce the risk of income variability from conventional markets
- Improved land use for overall increases in productivity and economic return
- Farmer empowerment
- Improvements to farm management and workflow, social learning and social acceptance of agricultural activities
- Improved rural job opportunities, for example for young shepherds
- Circular systems could help improve the public image of farming

DRAWBACKS OF IMPLEMENTATION

- Can make management of integrated crop-livestock systems more complex
- Loss of autonomy in decision making, dependence on other farmers for decision-making and action
- Transport of raw materials among farms can reduce efficiency resulting in higher energy consumption and green-house gas emissions
- Infrastructure requirements
- Regulatory requirements
- Potential loss of cash cropping
- Mismatch between supply and demand of nutrients (especially N, P, K)
- Maximum distance of economically efficient transport depends strongly on topography and roads between farms and the type of animal manure as a function of its dry matter

BARRIERS AND RISKS

- Differing motivations, expectations, and concerns about farmers' respective roles in the working relationship
- Additional infrastructure requirements including livestock housing, manure storage, fencing and machinery
- Alterations to current operations and system and the management time required for this
- Ongoing costs to facilitating/arranging farm share/grazing agreements
- Soils and climatic risks
- Policy incentives may be required to facilitate implementation of crop–livestock integration beyond the farm level
- Retailers requirements for two-year break between livestock and horticulture crops which can result in a considerable financial impact
- Costs of setting-up farm-share/grazing agreements
- Costs of additional labour, new buildings and fencing on arable/cropping farms

FINANCIAL ANALYSIS

A large number of very different scenarios can be related with the adoption of this practice. Therefore the financial implications of adopting mixed farming were not assessed.

RELEVANT LEGISLATION AND CURRENT INCENTIVES

- There are many rules and regulations that accompany the keeping of livestock. Arable farmers must be aware of them, but through collaboration the knowledge and understanding will be held by the livestock farm. Movement of livestock between farms has health and disease risks and relevant regulations.

- Mixed farming systems should be promoted by CAP, the use of woody vegetation is already promoted at some extent as part of the cross-compliance and conditionality, direct payments but also within the Pillar II Agri-environment measures. But, a real promotion should be targeted. Most of the CAP funds are associated to plot scale and are not considered at landscape level. Operational groups could be used to test and demonstrate at field level the benefits of integrated mixed farming systems.

FURTHER INFORMATION

Further reading and weblinks

- Agri-Tech East (2018) Could 'flying flocks' be the answer to soil fertility and low margins? https://tinyurl.com/flying-flocks
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- Alvis J (2015) Achieving more from less with dairy and arable collaboration. A Nuffield Farming Scholarships Trust Report. https://www.agricology.co.uk/sites/default/files/Johnny-Alvis-report.pdf
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- Martin G, Moraine M, Ryschawy J, Magne MA, Asai M, Sarthou JP, Duru M, Therond O (2016) Crop–livestock integration beyond the farm level: a review. Agronomy for Sustainable Development. [online] 36:53 https://link.springer.com/article/10.1007/s13593-016-0390-x
- Mosquera-Losada R, Gilliland J, Franco P, Moraine M, Bernués, A. (2017) EIP-AGRI Focus Group Mixed farming systems: livestock/cash crops. MINIPAPER 5: Landscape Management through Mixed Farming Systems "MFS as an option for landscape management that enhances biological regulations." https://tinyurl.com/eip-mixed
- NSA (2017) The Benefits of Sheep in Arable Rotations. National Sheep Association. https://tinyurl.com/NSA-arable

CASE STUDY FARMER APPLYING THE PRACTICE: HEMSWORTH FARM

Location: Dorset

Size: 410 hectares

Enterprises: Spring wheat, spring barley, winter oats, beans

Photo: Sophie Alexander

Sophie Alexander said:

"I found the expense of having leys down for 3 or 4 years left a very big hole in the farm budget. Equally I wasn't ready to make the considerable investment of getting my own stock. I would have needed a lot of help; some labour and my own expertise was not good.

"Fortunately, there was a nearby organic farmer and we have been collaborating now for 5 years. I put the leys down for him and as he pays for the percentage of the farm in grass I have been able to incrementally put the infrastructure in (boreholes, perimeter fencing, cattle crushes and electric fencing). Before he came we spent a lot of time mowing and mulching to keep the weed burden down. Now I find the cattle do the job for me. We undersow our crops with the cover crops and then graze over-winter. Not just with the cattle but with sheep. Both in tandem is great. After the cows have been on the grass I might top it, but I might also run the sheep over it to finish it off and clean it up."

ABOUT THIS PRACTICE ABSTRACT

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www.agricology.co.uk

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