

Applesham Farm by Mairi Eyres

PASTURE FOR LIFE

Integrating Livestock into Arable Systems

A Practical Guide for Farmers

Produced by Jonty Brunyee for Pasture for Life. Funded by the Farming in Protected Landscapes programme.



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1 Setting the Scene

Introduction

Integrating cattle and sheep into arable systems is increasingly recognised as a valuable method for improving soil health, diversifying farm income by enterprise stacking, and boosting resilience. By introducing livestock into crop rotations, especially through the use of herbal leys and cover crops, farmers can reduce dependence on artificial inputs, enhance biodiversity, and create a more sustainable, regenerative and profitable farming model.

The Challenge

Integrating animals into arable farms can be a challenge. Many have not had grazing livestock on them for some time, and the skills, motivation, stock and infrastructure may be lacking. The rotation may not suit full livestock integration.

With commitment and support, all these challenges can be overcome.

This Guide

This guide is aimed at beginners who are looking for information about the benefits of integrating livestock into arable and for those looking for practical help to improve their system.

It was written by farmer and adviser, Jonty Brunyee, for Pasture for Life as part of Pasture and Profit, funded by the Farming in Protected Landscapes programme.



Essebeare Farm, photo by Olly Walker

2 Regenerative Thinking

Regenerative farming focuses on the practices and principles that enhance soil health, improve biodiversity and rebuild water and nutrient cycles. Done well it can help reconnect landscapes, revitalise communities and provide more nutrient dense food.

Integration of livestock is a key component of regenerative agriculture and agroecology.

The Six Principles of Regenerative Agriculture

Minimise Soil Disturbance

Reducing tillage preserves soil structure, prevents erosion, and nurtures beneficial soil organisms. By avoiding deep ploughing, farmers maintain organic matter, enhance water retention, and boost fertility, creating a foundation for healthier, more resilient soils.

Keep The Soil Covered

Bare soil is vulnerable to erosion and nutrient depletion. Integrating cover crops and perennial cropping, and using rotational grazing where possible, ensures soil is continually covered, reducing erosion risks and promoting microbial activity, key to maintaining fertile, healthy land.

Maximise Diversity

Diverse and long rotations, and the use of polycropping, optimise photosynthesis and builds soil health.

Within a arable/grassland rotation, using a diverse species mix of grasses, legumes, and herbs creates a more balanced ecosystem that supports soil biology and attracts pollinators. Increased plant variety improves the resilience of the farm to extreme weather conditions and enhances nutrient cycling, and it's great for animal health too.

Maintain Living Roots All Year-Round

By keeping and feeding deep-rooted plants like chicory and clover in the soil throughout the year, farmers improve water infiltration, organic matter content, and overall soil structure. Living roots also play a crucial role in sequestering carbon, further benefiting the environment.

Grazing plants keeps them in a vegetive (green and leafy) state where photosynthesis is most active, meaning plants are generating the most glucose via photosynthesis, and the roots are active and fed.

Integrate Livestock

Livestock, through grazing, recycle nutrients via manure, naturally aerate the soil, and enhance microbial diversity. Grazing animals contribute to improved soil health, reducing the need for synthetic fertilisers and enhancing overall fertility.

Strategic grazing management ensures pastures are neither overgrazed nor underused. Maintaining optimal stocking density prevents soil compaction, encourages plant regrowth, and supports the long-term health of the grassland ecosystem.

Context

All farms are different and everyone is at a different stage of the journey. This must be respected.

The practices you employ and the scale that you try things, depends on your objectives, knowledge and attitude to risk, as well your soil type, climate, farming system and route to market.



Image: Cattle grazing a 3 year old herbal ley at Conygree Farm

3 Benefits of Integrating Livestock

The integration of livestock into arable systems not only supports ecological health but also offers direct financial, operational and social benefits too.

Improved Soil Health and Fertility

Livestock manure acts as a natural fertiliser, enhancing soil structure and boosting microbial activity. This process increases nutrient and water availability and stimulates deeper root growth, ensuring plants can access more nutrients and water from the soil.

Reduced Input Costs

By promoting natural nutrient cycling, grazing animals reduce the need for expensive synthetic fertilisers and herbicides. This can lead to significant cost savings, as well as a more sustainable and self-sufficient farm system.

Weed and Pest Management

Grazing can naturally manage weeds, reducing the need for herbicides. A diverse sward of plants, maintained through rotational grazing, also supports beneficial insects that help control pest populations, further reducing the need for chemical interventions.

Carbon Sequestration & Environmental Benefits

Well-managed grazing systems can mitigate climate change by sequestering carbon in the soil. Healthy, organic-rich soils store more carbon, contributing to climate action efforts while simultaneously improving land productivity. Diverse rotations and grazing livestock can improve a farms' habitat and biodiversity value

Financial Resilience

Incorporating livestock diversifies income streams, making the farm more resilient to market fluctuations and extreme weather events. This creates a more stable and sustainable business model, reducing dependency on a single revenue source. Environmental gains e.g. carbon sequestration, can attract additional grant support and green finance.

Social Value

Bringing animals back onto farm can add to social and cultural value. Livestock are part of our farming landscape and rural tradition, and they provide employment. Local communities and tourists enjoy seeing grazing cattle and sheep on farm and purchasing local food. Livestock can add fun and interest to an arable business.

4 Challenges and Risks of Integrating Livestock

While integrating livestock brings numerous benefits, it is important to address the associated challenges with thoughtful planning and management.

Logistics and Infrastructure

Introducing livestock requires investment in fencing, water supply systems, and animal handling facilities. Buildings and new machinery may be needed too. Proper planning ensures that livestock are well-managed without interfering with arable operations.

Soil Compaction

Overgrazing, especially during wet conditions, can cause soil compaction, which impedes water infiltration and root growth. Controlled grazing systems, such as mob grazing, can help mitigate this risk by rotating grazing areas and adjusting stocking densities. Sometimes you need act quickly and move animals off wet or over grazed crops.



Image by Mairi Eyres



Image by FECPAK

Disease and Parasite Management

Livestock management involves addressing the risks of diseases and parasites, particularly when animals are moved to new grazing areas. Rotational grazing, worming strategies, and regular health monitoring are essential practices for managing livestock health effectively.

Movements restrictions due to TB and Bluetongue etc. may cause practical and financial issues.

Labour and Management Requirements

Integrating livestock into arable systems requires additional time, effort, and expertise. Grazing rotations, animal health management, and coordinating with arable operations require careful planning and training.

Do you or does anyone in your team have the skills and capacity to the new enterprise on? Can you find a new entrant or join venture partner to work alongside you?

Welfare and Safety

Ensuring good animal welfare is crucial. Do your arable fields offer suitable shade and shelter from weather extremes? Are there risks such as deep ditches or busy roads on your land?

If there are lots of public access routes across the farm you will need to plan fencing and stock moves carefully and communicate to your community.



Meg's Farm



TMC Butchers

Routes to Market

You will need a route to market for your livestock. Not everyone wants to sell direct and some do not have a livestock market or abattoir close by.

Certification

Most livestock enterprises are farm assured, certified organic or as 100% pasture fed by Pasture for Life. You will have a decision to make and a little more administration to tackle. Understanding certification requirements is crucial for farmers looking to add value and to market their products to specific markets.

5 How to Integrate Livestock

Consider the following when looking to integrate livestock into your arable system.

1 Plan a longer and more diverse rotation

- When planning to integrate livestock on your farm take a whole-farm approach.
- Think about how livestock could fit into your current rotation.
- What small changes will help livestock integration?
- Could you have a longer and more diverse rotation offering multiple benefits and creating more grazing opportunities?
- How much forage will a grazier or new livestock enterprise need to make it viable?
- Align your livestock grazing with the arable calendar. Grazing of cover crops should be scheduled for the post-harvest, winter and spring fallow periods, while Golden Hoof cereal grazing will target the tillering winter crops. Herbal ley grazing is best suited to the summer/ autumn months.

2 Use herbal leys in your rotation

- A ley is a temporary grass crop ideal for use in an arable rotation.
- See the ley as a no input break crop.
- A typical rotation is 4 years arable followed by 4 years of herbal ley. Longer or shorter rotations are possible.
- A herbal ley is a diverse mix of grasses, legumes and herbs, including deep-rooted plants like clover, chicory, sainfoin and plantain.
- Herbal leys provide high-quality forage while simultaneously improving soil health.
- They can enhance drought resilience and nitrogen fixation, feeding the soil for following cash crops.

- Plants such as sainfoin and birds foot trefoil act as natural wormers improving animal gut health.
- They are great for wildlife including pollinators and beneficial insects.
- They can be established in the late spring or early autumn when the soil is warm.
- Choose a mix to suit your soil type. Take advice.
- A fine seed bed is recommended and seek good seed to soil contact by rolling.
- Topping may be needed to control weeds in year one but minimal maintenance will be needed.

Contents per Kg	%	kg
certified ORGANIC cocksfoot	14.0	0.140
certified ORGANIC perennial ryegrass	12.5	0.125
certified ORGANIC timothy	12.0	0.120
certified ORGANIC meadow fescue	6.5	0.065
certified tall fescue	8.0	0.080
certified ORGANIC red clover	5.0	0.050
certified alsike clover	2.5	0.025
commercial sweet clover	2.0	0.020
commercial ORGANIC sainfoin	20.0	0.200
certified white clover	2.5	0.025
certified birdsfoot trefoil	3.0	0.030
Commercial chicory	4.5	0.045
Ribgrass forage herb	2.0	0.020
Burnet forage herb	5.0	0.050
Yarrow forage herb	0.5	0.005

Fig 1 – A typical organic 15 species herbal ley mix (from Cotswolds Seeds)

- Fertiliser is not usually required.
- Graze carefully (lightly and quickly) until well established and don't overgraze in the winter.
- Herbal leys can be conserved as hay and silage although stalky plants such as chicory can be problematic.
- Herbal ley volunteers can be an issue in the following arable crops so control (mechanical or chemical) will be needed.
- Your agri-environment scheme (SFI/CS) may pay you to use herbal leys.
- The forage cost of a herbal ley can vary but see below for an example.

	Year 1 (per ha)	Year 2 (per ha)	Year 3 (per ha)	Year 4 (per ha)	Year 4 (per ha)	
Seed (organic)	284	0	0	0	**£284**	3 2.5kg/ha = £284
Fertiliser & Sprays	0	0	0	0	**£20**	Not needed. Organic.
Establishment	206	0	0	0	**£206**	Plough, cultivate, drill, roll, roll
Management	0	30	0	0	**£30**	Topping in year one to help tiller
Total	490	30	0	0	**£520**	
Annual Forage Cost	-	-	-	-	**£130**	**£520 spread over 4 years**
Stewardship income					£117	OP4 Organic Multispecies Ley
Annual Forage Cost (with SFI/CS)					£13	GS4 = £382/ha! so a forage cost of + £252 if conventional!

Fig 2 – Forage cost example for a herbal ley (ranging from -£130/ha to + £252/ha)

3 Use grazable cover crops in your rotation

- Cover crops are fast growing annuals which can be planted between arable cash crops e.g. after harvest and before spring drilling, or as a one year reset/fallow.
- They have the ability to boost yields as well as deliver financial savings, and some offer good grazing.
- A winter cover crop such as radish, kale, vetch, and ryegrass can help plug the gap in forage availability e.g. when you want to rest your herbal leys.
- They can benefit the following crop, increase organic matter levels, capture vital nutrients, improve soil structure and reduce pollution (run off, leaching and gaseous emissions).
- They are good for wildlife including pollinators and beneficial insects, and potentially, game birds.
- Your agri-environment scheme (SFI/CS) may pay you to use cover crops.
- To achieve the best results, several factors must be considered when choosing a cover crop including your objectives, planting dates, following crops/rotation and timings, soil type and location. Take advice.
- Careful management is needed to avoid issues such as bloating or toxic photosensitisation with certain crops e.g. buckwheat.
- You can use simple and cheap straights e.g. mustard, or more complex mixtures.
- They can be spun on before or after harvest, or conventionally drilled.
- Diversity is good if you want all the benefits of a cover crop. See the diverse seed mix below.

Contents per Acre	%	kg
certifed Winter Oats	31.8	3.500
certified Rye	29.1	3.200
certified Vetch	25.5	2.800
certified Crimson Clover	2.7	0.300
certified fodder radish	4.6	0.500
certified Forage Rape	3.6	0.400
certifed Stubble Turnips	2.3	0.250
certified Phacelia	0.5	0.050

Fig 3 – A diverse 8 species cover crop mix (from Cotswolds Seeds)

Grazing Cover Crops – AHDBs Top Tips

Cover crops for forage

- Brassicas, including kale, grazing turnips, stubble turnips and rape/kale hybrids, are generally suitable for feeding to all classes of beef cattle and sheep
- Under appropriate field conditions, non-lactating, spring-calving suckler cows can be outwintered on kale and stubble turnip systems with no concerns in relation to liveweight or condition loss
- To avoid the risk of calving in an unsuitable environment, cows should not be grazed on brassicas in late pregnancy.
- In late pregnancy, ewes fed on root crops will generally need additional protein to ensure their nutritional requirements are met
- Swedes are only recommended for cattle with fully mature teeth and are not suitable for 'broken-mouthed' sheep.
- Fodder beet, although technically not a brassica, can also be grazed in situ or lifted and fed to livestock.
- Forage gaps could also be filled by feeding silage or hay, but this will increase feed costs.
- Grazing buckwheat can have a toxic effect (photosensitisation) and should be avoided, not grazed
- White clover has higher digestibility, protein and mineral content than grass-only swards. Unlike grass, white clover retains its digestibility throughout the season as there is a continual renewal of leaves and little stem development.
- Clover will increase the crude protein content of first-cut silage by 1% for every 10% increase in the amount of clover in the sward.

Effective grazing management

- Livestock should be introduced to the cover crop slowly, allowing them to get used to it.
- Ideally, the cover crop should be strip grazed. If grazed areas are back-fenced, compaction can be reduced, which will benefit the establishment of any subsequent grass leys.
- Given the low fibre content of a brassica crop, livestock must have access to a source of roughage, such as haylage or straw. Haylage bales may be left in place after sowing the cover crop, again to reduce compaction that may be caused while transporting bales to the area during autumn and winter months.
- The correct amount of feed should be allocated depending on mob grazing requirements. This will ensure efficient use, which is important in any grazing system.
- Livestock should have constant access to water, ideally through a portable trough system, for ease of use and to reduce soil compaction.
- Relationships between livestock and soil health depend on the typical stocking density of the system and the duration of any intensive grazing period compared with the recovery time.
- At very low stocking densities, such as in sparsely grazed upland grasslands, any increase will result in a rise in the activity and number of soilborne organisms as there will be more food sources.
- Food safety standards do not allow cover crops to be grazed immediately prior to growing leafy salads, so green manures should be flail-mown before being cultivated.

Source: AHDB

See https://ahdb.org.uk/knowledge-library/cover-crops-for-additional-forage

4 Make the most of The Golden Hoof

- Grazing winter cereal crops (winter barley, wheat and oats) with The Golden Hoof is where sheep graze on cereal crops for short periods during tillering.
- Grazing cereals can reduce your fungicide use, remove diseased crops, cycle nutrients and increase soil organic matter.
- Crops offer good nutrition when there is limited grass, and the grazing is clean with no worm burden.
- Grazing your sheep on cereal crops lets your grass rest.
- Crops which are forward should always be grazed first. Barley will tend to be more forward than wheat and oats so should be grazed first.
- Early maturing varieties are ideal for this system, provided they are not stressed, if this is the case do not graze them.
- Graze the crop while it is tillering (growth stage 21-29) and not into stem extension (growth stage 30), at which point there is a risk of reducing the yield through damage to the ear.
- The crop must have a strong root system to avoid them being pulled out of the ground.
- Make use of short grazing periods (3-14 days depending on the crop biomass and soil/weather conditions) with high stocking densities, moving across your cropped area.
- Grazing the leaf to ground level is the aim as these will recover and by harvest time the grazed areas will not be identifiable... in fact, it may look better than any non-grazed plots.
- The sheep can be grazed behind an electric fence on a paddock-based system. It is important to monitor the grazing, and to move the sheep onto the next cell when the required level of grazing has been carried out.
- Have a back-up plan for poor weather e.g., a rough grass or catch crop area to move sheep to in snow, etc.
- Set up 2-3 paddocks at a time to allow ability to move sheep quickly if required e.g., weather or lack of labour.



5 Value your lay back land, stewardship areas and stock yards

- Grazing arable crops and leys can go wrong if the weather is extreme.
- Some animals might need to be closer to the farm yard if there are health problems or if you have a breeding flock/herd.
- Do you have a permanent grass field or two, weedy fallows, a grazable woodland or a stock yard? Maybe you have areas of the farm in a stewardship option that could be occasionally grazed e.g. field margins and wild bird mixes (check your agreement). If you do...value them and plan them into your system. They might come in very useful and grazing is usually better than topping.

6 Implement mob grazing and adaptive management techniques

- Mob or rotational grazing mimics natural grazing patterns, with high-intensity grazing/pulses (of 200,000kg – 500,000 kg of livestock per ha) for a very short time (ranging from a few hours to a few days) followed by back fencing and long rest periods (typically 21 days to 60 days). This system encourages rapid regrowth of pasture and grazed crops.
- Adaptive management goes one step further, responding to the needs of your stock, soil, crops and your own capacity.
- Being adaptive means mixing it up by altering, when suitable:
  - Stocking densities
  - Rotation patterns
  - Grazing heights and sward maturity (on/off)
  - Grazing days/hours
  - Rest periods
  - Livestock species/class grazing order
  - Time of year
  - Grazing/cutting
  - Where you bale graze
  - Paddock shape and direction
  - Leader – follower strategy (e.g. cattle then sheep or sheep then chickens).
- By adding techniques such as tall grass and bale grazing you can extend the grazing period, keep costs down and build soil health.

7 Consider an integrated silvoarable system

- In silvoarable systems agricultural or horticultural crops are grown simultaneously with a long-term tree crop to provide annual income while the tree crop matures.
- Trees are grown in rows with wide alleys (say, at 32m) used for cultivating crops.
- The cropped plots between the trees could be in a diverse rotation with cereals, legumes, leys, fodder crops and cover crops.
- Livestock could be integrated into the rotation.
- The trees provide shade, shelter and browse for stock.
- The alleys can be set up with semi-permanent fence making mob grazing much easier.

8 Managing fencing and water supply

- Most arable farms will have limited livestock infrastructure.
- The use of temporary electric fencing and mobile water troughs will be needed.
- Investing in lightweight but robust fencing and troughs, that can be easily moved by hand or quad bike attachments, will make the enterprise more efficient and profitable. Take a look at suppliers such as RAPPA and Kiwitech (below) for a range of suitable equipment.



Balbirnie Home Farm

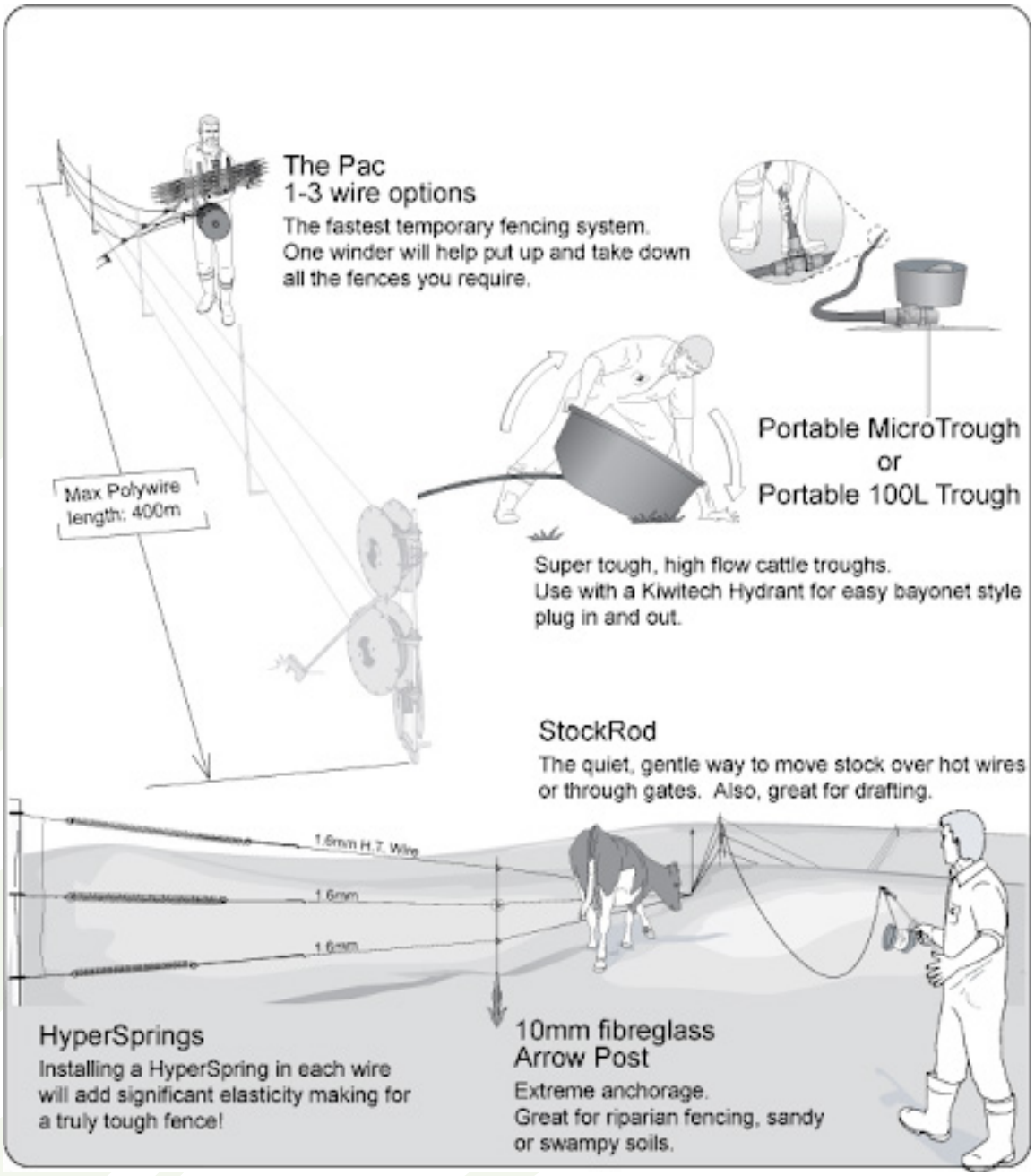


Fig 4 – Investing in good electric fencing and water troughs will be needed (source: KiwiTech)

- The use of semi-permanent or permanent fencing and troughs may be installed if a livestock are to be grazed regularly, maybe as part of a more traditional mixed farming system. This will need careful planning.
- Nofence collars allows livestock to graze within set perimeters with no physical fencing although there are risks to growing crops and it's always wise to fence external boundaries.
- Good livestock handling facilities will be needed. Portable sheep and cattle systems are available.

6 Working With Others

- You or a member of your family or farm team may wish to take on the livestock enterprise.
- Alternatively, you may need to find and work with a grazier under a grazing agreement.
- Grazing agreements can be kept very simple where stock, fencing and labour is supplied by the owner of the stock and a weekly rent is paid to the arable farmer for the grazing. A grazing plan and weekly catch ups are recommended.
- More collaborative grazing agreement approach can work well. Some arable farmers prefer to do the planning and fencing, so they have more control over the moves.
- Would you like more skin in the game and reward? If so, consideration should also be given to joint ventures e.g. partnerships and contract grazing operations, where each party shares a set percentage of the input and returns. Joint ventures offer a fantastic opportunity to allow new entrants into the sector, meaning grazing is offered, risk and costs spread, and the enterprise can grow. Getting the right person/match and business framework is crucial.
- A land matching service, the Pasture for Life forum or your local farmer cluster group are good places to start when seeking a grazier or joint venture partner.

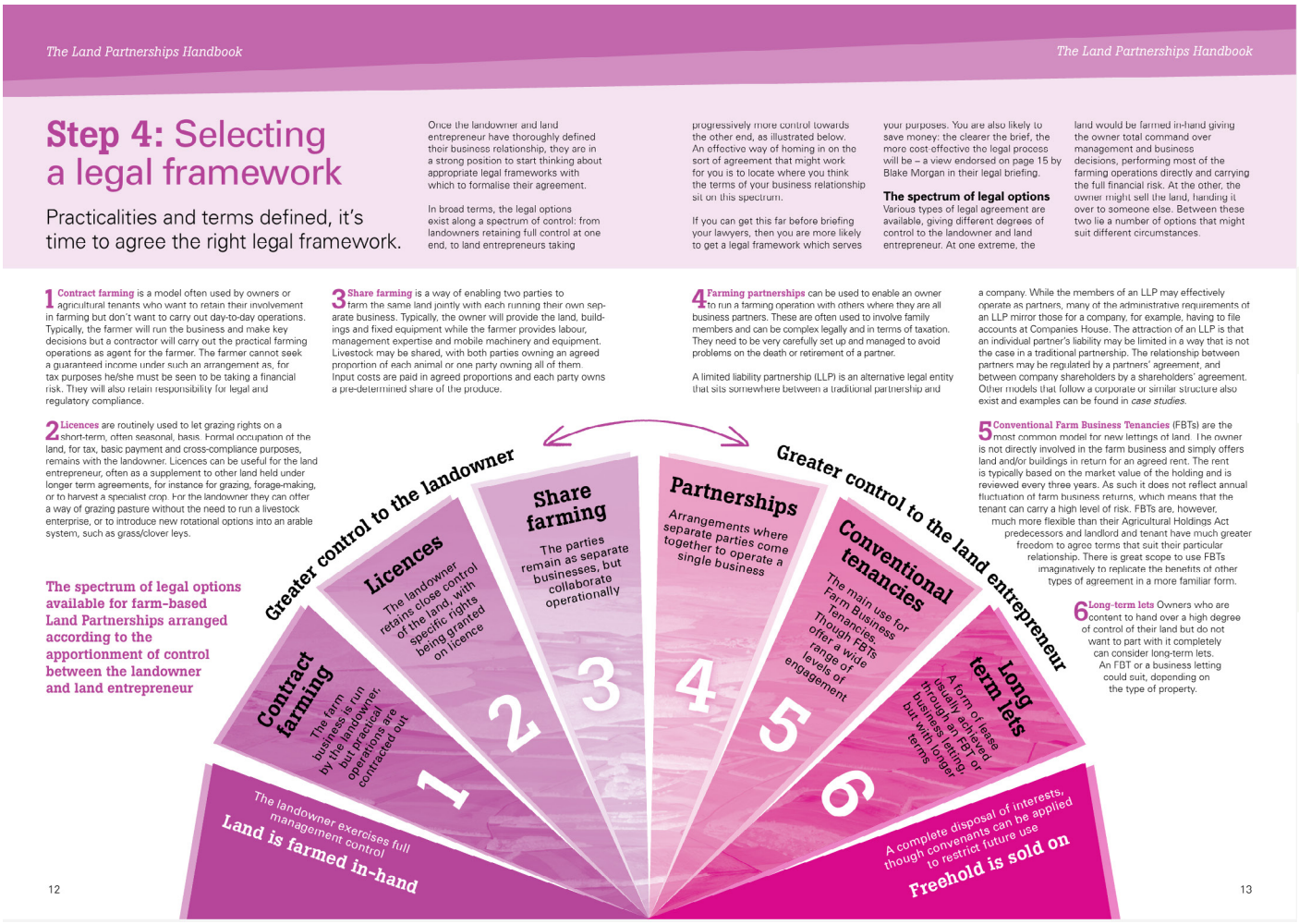


Fig 5 – Getting the business framework is crucial (source: Land Partnerships Handbook)

7 Case Studies



CASE STUDY ONE - CONYGREE FARM				
County	Gloucestershire	**Soils**	Cotswold brash. Silty clay loams.	
Farm size	73ha		**Ownership**	20 year FBT
Altitude	154m		**Annual Rainfall**	660mm
Enterprises	Suckler beef Breeding sheep Fattening pigs Market garden (joint venture) Honeybees (joint venture)		Horse livery Weddings and events Glamping Pop up farm shop Pastured eggs (joint venture)	
Land use	Arable (18ha) Improved pasture (5ha) Species rich pasture (40ha)		Horticulture (1ha) Woodland and scrub (7ha) Other (1ha)	
Rotation	Arable – 4 years herbal ley/spring barley + cover crop/wild bird cover Permanent pasture – all used for grazing or hay making			
Grazing livestock	Traditional Hereford cattle - 20 cows plus followers (50 head) Cotswold sheep - 50 ewes plus lambs (125 head)			
Agri-environment	The majority of farm is in Countryside Stewardship. SFI is being considered.			
Assurance	Pasture for Life (PfL) and Organic (OF&G) certified			
Routes to market	Pop-up farm shop Veg box scheme		Own events Wholesale – local pubs and farm shops	
How are livestock integrated into arable?	▪ Cattle and sheep rotationally graze the herbal leys on the arable ground. ▪ Some high impact grazing. ▪ Bale grazing is undertaken in the winter months using a ATV bale unroller. ▪ The stock also are used to 'munch and mulch' end of season bird covers and field margins following CS dates. ▪ Following spring barley a diverse cover crop is broadcast and scratched in to help build soil health. This is grazed in late winter by sheep before being ploughed in and a herbal ley established in May.			

Key infrastructure	▪ All fields are stock fenced with a hot top wire (no barb) charged from the mains or energiser (inc. solar). This allows easy cross fencing. ▪ Poly wire and step in posts are used to create grazing cells and to fence off margins when grazing is not allowed. ▪ Plastic moveable troughs fed with blue pipe. ▪ Water bowser with trough used in awkward fields with low water pressure.
Benefits of integration	▪ Soil organic matter is rising (monitored by the local cluster group) ▪ High biodiversity value ▪ A diverse, no input and profitable system
Challenges of integration	▪ Time is the biggest challenge ▪ Our Cotswold brash soils can burn off in the summer and we can overgraze
Top tips for those starting out	Keep it simple. The sun shines, it rains and green stuff grows. Our cattle and sheep turn this into meat for us to sell...with nothing added. Our low cost nature based system is profitable.
Other info	



CASE STUDY TWO - SS HORTON & SON
ED HORTON

County	Gloucestershire	**Soils**	Cotswold brash, Silty clay loams, chalk over clay, Denchworth clay	
Farm size	3800ha		**Ownership**	Various
Altitude	150-250m		**Annual Rainfall**	660mm
Enterprises	Pedigree Shorthorn suckler beef 190) Pig fattening unit (5500) Commercial units Joint venture sheep flock (2500)		Holiday lets Residential property Arable contracting Commercial grain storage	
Land use	Arable 3200 ha River meadows 120ha		Improved grass 430ha Woodland 50ha	
Rotation	▪ 18 different combinable crops for human consumption and seed. ▪ A diverse rotation designed around market demand, weed pressure, team capacity and soil type. Some bi-cropping. ▪ Includes OSR, milling wheat, durum wheat, spelt, winter and spring milling oats, winter and spring malting barley, triticale, milling rye, beans, peas, maize, phacelia, buckwheat, sainfoin, berseem clover, crimson clover, oxeye daises, knapweed.			
Grazing livestock	▪ Cattle - calving 190 cows + followers + 550-600 fatteners bought in. ▪ Sheep - 2500 ewes plus lambs + 750-2000 store lambs bought in.			
Agri-environment	3 Mid Tier CS agreements plus 6 live SFI's			
Assurance	▪ Red Tractor beef sheep pigs and arable, ▪ Matthews Regenerative Flour Standards, ▪ RSPCA high welfare pig unit, ▪ CHeCS High Herd Health Beef			
Routes to market	▪ Pigs – M&S Contract ▪ Beef – Morrisons Beef Scheme ▪ Lamb – Market and Export Kepak Group			

How are livestock integrated into arable?

Cattle

- Two mobs of in calf cows are strip grazed on green cover crops (and buffer fed hay) over winter ahead of spring arable cropping.
- Post Christmas they move on Westerwolds leys established after harvest.
- Supplemented with bale grazing using homemade herbal ley (GS4) silage which is laid out in lines, unwrapped underneath an electric fence so the cows have to eat them before they move onto the next block reducing waste and excess trash for the following crop

Sheep

- Sheep graze arable crops/fields from mid-August to May.
- Early post-harvest they graze OSR volunteers ahead of autumn cereal planting.
- Early October mobs of lambs are moved onto catch crops established post harvest. These home grown mixtures of mustard, phacelia and fodder radish are grazed prior to late planting of second winter cereals like spelt, oats or winter beans.
- Mobs that have been on OSR volunteers in October move to graze new crops of OSR in early November.
- The mobs that have been on catch crops move onto early planted crops of winter barley to graze them pre Christmas.
- Early December most mobs move onto cover crop grazing having been pushed over OSR and winter barley. These cover crops are cheap home grown mixtures designed to give varied rooting, autumn pollen and nectar sources and be palatable for lambs to graze.
- Late January mobs are split. Those close to finishing are moved on to turnips to finish them fast, the rest start to graze across all other winter cereals we have in the rotation. They will stay here until late march.
- From April any remaining lambs move onto turnips that are being grown ahead of late planted arable crops such as maize, buckwheat and phacelia.
- They will also be used to tidy up the Westerwold leys behind the cattle before moving back onto herbal leys in mid May for the summer

Key infrastructure

- Everything is behind electric due to very varied stewardship options in each field. Cells set up in advance.
- Mains water to standpipes feeding rolls of pipe to troughs.
- Lambs in the winter gain enough “green water” which reduces pipe moves.
- Mobile handling systems for in field weighting and sorting

Benefits of integration

- 60-100% reduction in fungicides on arable crops
- Increased crop gross margin
- Increased soil health and nutrient cycling
- 100% reduction of growth regulators in multiple arable crops
- Increased livestock carrying capacity
- Huge reduction in faecal worm counts due to having fresh, worm free grazing every 10 days on arable fields, allows the grassland worm cycle to be broken.

Challenges of integration	▪ Logistics – moving sheep to outlying farms is time consuming and expensive ▪ Planning – careful planning is needed to make it work and the weather can sometimes catch you out ▪ Labour – increase in labour requirements for constant electric fencing ▪ Fear – fear of change from the norm means sometimes in the early days we didn't graze hard enough and therefore negated the benefits
Top tips for those starting out	▪ Trial and error - find what works for you - don't just follow someone's lead ▪ Keep track of perceived outcomes and repeat to see if they actually work ▪ Ask for help/advice - there is plenty out there. ▪ Livestock integration is not a new thing, it's been done successfully for generations previously, we had just forgotten how to do it.
Other info	▪ The sheep joint venture is a collaboration between SS Horton & Son and a neighbouring farmer/grazier. ▪ Both parties have breeding stock assets in the flock. ▪ The sheep grazier pays SS Horton & Son 45p/head per week for grazing. ▪ Labour (employed by the grazier) is equivalent to 1.5FTE for cattle and 3 FTE on sheep.



CASE STUDY THREE - OVERBURY ESTATE
JAKE FREESTONE

County	Worcestershire	**Soils**	Cotswold Brash Sandy Clay Loam	
Farm size	1600ha		**Ownership**	Owned
Altitude	30-300m		**Annual Rainfall**	710mm
Enterprises	Arable (WW,WB,OSR, Beans, Linseed, Covercrops, Turnips) Let land for Broccoli and Beetroot Sheep Agri-Environmental Schemes Contract Farming Agreement (200ha)		Part of a wider Overbury Enterprises Nursery School Property Forestry ShooT	
Land use	Arable 900ha Vegetables 30ha Permanent Grassland 307ha Temporary Grassland (GS4,SAM3) 108ha		Agri environment (Mid-Tier & Higher Tier) SFI, Margins, unharvested headlands, lapwing plots, beetle banks, skylark plots, wildbird seed, pollen and nectar, Wading bird habitat	
Rotation	Varies due to soil type and cropping but focus on first wheat. Mostly WWheat, WBarley, OSR, WWheat, Cover, WBeans, WW,Cover, S Barley, Grass, WWheat			
Grazing livestock	1000 ewes, 200 followers and lambs			
Agri-environment	Mid and Higher Tier, SFI			
Assurance	Red Tractor, LEAF Marque, Green Farm Collective Wheat			
Routes to market	Commodity markets, lamb boxes, OSR to private crush		Malting barley through a growers group	

How are livestock integrated into arable?	▪ Grazing herbal leys in rotation with mob grazing, moved every 4/5 days. Larger permanent grass fields are difficult to manage like this as can't split up so run larger group of sheep in these areas. ▪ Grazing cover crops through the winter-fields sub-divided into 3-4ha blocks and sheep moved every few days. Covers include oats, radish, turnips, mustard ▪ Grazing stubble turnips in small areas, ewes moved every few days. ▪ We take the ewes off the grass in early December to try and get a 90 day rest to ensure suitable sward for lambing onto ▪ Grazing understory of clover periodically
Key infrastructure	▪ 10,000t grainstore and ancillary buildings (workshop/tractor store) ▪ Pratley handling system ▪ Livestock trailer x2 ▪ Te Pari weigh scales with auto drafter ▪ Lots of rappa fencing
Benefits of integration	▪ Increase in organic manure going onto arable fields ▪ Opportunity to reduce pre drilling glyphosate with grazed cover crops ▪ Sheep will graze all the weeds ▪ Annual cost of £15,000 not having to make silage, hay and bale straw for indoor wintering of the ewes ▪ Improved grass growth and lamb weights from resting swards, leaving more grass wedge to regrow, especially on thinner soils
Challenges of integration	▪ A lot of fencing-labour intensive ▪ Water needs moving with the sheep, difficult in the winter when wet ▪ Difficult during very wet winters having to move sheep more frequently and get fences up ▪ Moving younger animals around the farm ▪ Knowing when to remove the sheep to burn off the cover crops to remove any 'green bridge' and get a good regrowth for the herbicide to work ▪ Cover crops slow to grow as late harvest on the hill (Cotswold brash) so not always enough forage ▪ Earlier harvest in the vale so better cover crops/turnips but wetter ground for winter grazing
Top tips for those starting out	▪ Sheep will pretty much eat anything (bar buckwheat-caution) so can be creative with the cover crop mix, makes it more palatable for them as well ▪ Try rotational grazing on a small area and see for yourself how the sward and livestock react

CASE STUDY FOUR - DUNTHROP FARMS				
County	Oxfordshire	**Soils**	Cotswold brash. Sandy loams.	
Farm size	500ha		**Ownership**	Freehold and FBT
Altitude	220-160m		**Annual Rainfall**	640mm
Enterprises	Sheep Arable		Pigs Forestry	
Land use	Arable (350ha) Rotational herbal ley 50ha Unimproved pasture (40ha)		Species rich pasture (3ha) Agroforestry c.17ha Woodland 40ha	
Rotation	▪ Arable – flexible 8yr rotation - 4 years herbal ley/WOSR/WW or WO/SW or SO/WO or SB/4yr herbal ley ▪ Permanent pasture – all used for grazing, hay making, green hay			
Grazing livestock	▪ Pigs on pasture (20 head) - finishing ▪ NZ Romney sheep - 400 ewes plus lambs (1000 head)			
Agri-environment	Multiple Countryside Stewardship. SFI Pilot, SFI 2023, SFI EO application submitted, higher tier expression of interest and Landscape Recovery			
Assurance	Pasture for Life (PfL) and part grassland in Organic (OF&G) conversion and Regenagri regenerative certified			
Routes to market	▪ All goes into Farmers Fresh currently but we will be looking for more direct & aligned routes to market			
How are livestock integrated into arable?	▪ Sheep graze all catch and cover crops ▪ Golden hoof - graze all winter crops – oats, wheat, OSR, Barley ▪ Graze 4 yr herbal leys in arable rotation			

Key infrastructure	▪ Little hard infrastructure ▪ Lots of electric fencing ▪ Plastic moveable troughs fed with blue pipe ▪ 2x IBC drinkers and 2000l water bowser with trough used to facilitate tricky to reach fields ▪ 2x quad bikes, rappa mobile handling system and livestock trailer ▪ Sheep dogs!
Benefits of integration	▪ Huge benefits to arable rotation. ▪ Grazing cash crops facilities zero use of fungicides and plant growth regulators ▪ Has also stimulated large areas of cover and catch cropping with high percentage of grazed cover ▪ High biodiversity value ▪ A diverse, no input and profitable system
Challenges of integration	▪ Perceptions – overcoming naysayers and self-doubt ▪ Managing stocking density in OSR – relatively easy to overgraze ▪ Getting cover crops established early enough ▪ Logistics and labour
Top tips for those starting out	▪ Start small to trial in year one but if it works in your system don't be afraid to scale up. ▪ Don't be afraid not to do something and see what impact it has. ▪ Look for positive reinforcement and treat every failure as an opportunity to learn ▪ We've never overgrazed a cereal but be mindful of soil conditions and if in doubt move stock and revisit later.

CASE STUDY FIVE - NEW BUSINESS VENTURE

SILAS HEDLEY-LAWRENCE - COTSWOLD CATTLE CO

The Cotswold Cattle Co is focusing their new business venture on the integration of beef cattle onto arable estates including permanent pasture where available. We are building collaborations with multiple land owners to achieve soil health, system improvement and natural capital goals. Our beef is sold through our own smash burger company using the same name, Cotswold Cattle Co.

Our aim is to produce great beef, cost effectively, that delivers on the goals of the landowner whilst progressing our vision of regenerating landscapes and cooking up the best smash burgers.

It is key to clarify the objectives of the land owners we are working with. Some may prioritise improving soil health, while others seek biodiversity, environmental subsidy goals, climate resilience, improved ecosystem processes or performance of cash crops... quite often, combinations of all of the above.

Once we understand the goals of the landowner, we assess what land is available, soil health, the crop rotation, cover crop availability, herbal ley use etc. We then propose an optimal grazing plan that that aligns with both the landowners' goals and our own. Planning will always be different depending on context.

The challenges of integrating cattle include:

- How do we get sufficient water to them, particularly on arable farms with no livestock infrastructure.
- TB testing and movement restriction issues.
- Establishment of cover crops - we need feed value and the ability of covers to hold cattle in winter weather conditions.
- The less diverse covers will need more supplementation to meet mineral and nutritional demands. Bale grazing may be considered.
- Demand for cattle integration often sits on the winter, so planning water infrastructure around freezing temperatures and weather conditions.

There are usually more variables in putting together a grazing plan for integration of animals into arable than on a grassland system due to cropping complexities and risks.

Top tips:

1. Positive mindset, and alignment of objectives, is important.
2. Invest in the right genetics and stock class for the arable platform available.
3. Don't focus solely on maximising feed utilisation. Muddy cold cattle standing on poached fields is neither doing you, your cattle or the landowner a favour.
4. Diversity of plant species is key for photosynthesis, roots and livestock diet.
5. Manage to achieve the outcomes you desire.
6. Don't be afraid to change plan if you are not achieving the outcomes you want.

Further Reading and Resources

1. AHDB (Agriculture & Horticulture Development Board)

A wealth of information on everything from cover crops, sheep and beef practice, grazing, market trends and financial management. See https://ahdb.org.uk

2. Agricology

Practical information about sustainable farming based on agroecological principles. See: https://agricology.co.uk

3. Cotswold Seeds

As well as selling cover crop and herbal ley seeds, you will find some very useful case studies and information here. See https://www.cotswoldseeds.com

4. Innovative Farmers

A range of case studies including some on farms successfully integrating livestock into arable systems, herbal leys etc. See https://www.innovativefarmers.org/

5. Kings

As well as selling cover crop and forage crop seed, you will find some very useful case studies and information here. See https://kingscrops.co.uk

6. Fresh Start Land Partnership

Although an old resource the Land Partnership Handbook (downloadable on this site) is still a very useful resource. See http://freshstartlandenterprise.org.uk

7. National Sheep Association

Lots of useful information particularly The Benefits of Sheep in Arable Rotations report. See https://nationalsheep.org.uk/assets/documents/nsa-the-benefits-of-sheep-in-arable-rotations.pdf?v=1714907331

8. Pasture for Life

Information on pasture-fed livestock systems and certification. See https://www.pastureforlife.org

9. Soil Association

Reports on organic and agroecological farming, soil health and biodiversity. See https://www.soilassociation.org/

This resource is funded by the Farming in Protected Landscapes programme

Department for Environment Food & Rural Affairs

Chilterns National Landscape

Cotswolds National Landscape

North Wessex Downs National Landscape

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