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NUFFIELD
Farming Scholarships

ROUTES TO REGEN

Inspiration for regenerative agriculture;

A Bitesize Guide

INTRODUCTION

Each year, up to 25 people aged 25-45 are selected as scholars and sponsored by the Nuffield Farming Scholarships Trust to travel, research and report on subjects they are passionate about and which contribute to advancing farming, food, horticulture, forestry and ancillary industries.

These studies bring new thinking, technology or management approaches from across the globe to the UK. While many know of Nuffield Farming scholarships, few people in the industry are aware of the huge knowledge base of global reports, dating back to 2006, that can be accessed via the online Nuffield Farming library.

This Bitesize Guide, supported by the Elizabeth Creak Charitable Trust, Central Region Farmers Trust, Gloucestershire Agricultural House Foundation and the Royal Agricultural Society of England, gives an insight into the practical experiences and research freely available at:

https://www.nuffieldscholar.org/reports

WHAT IS THIS GUIDE, AND HOW SHOULD I USE IT?

Routes to regen - Inspiration for regenerative agriculture

This Bitesize Guide on 'Routes to regen' is designed to provide a range of ideas to help anyone who is interested in exploring regenerative agriculture, what it is and how it is being practiced across the globe.

The reports featured in this Bitesize Guide are from Nuffield Farming Scholars who have spent no less than eight weeks travelling across the globe to further their knowledge and understanding of their chosen study topic, in this case, regenerative agriculture.

On return from their study tour, they present their findings, the conclusions they have reached and their recommendations to the industry in a variety of formats, including a written report, video and a presentation at the Nuffield Farming Conference.

This Bitesize Guide brings together research, discussions and ideas from relevant Nuffield Farming reports, all highlighted as 'Talking points' and 'In practice' sections, with 'Putting it into action' sections at the end which includes useful links. The Guide features short, thought-provoking extracts - each one includes a URL link and QR code to access the relevant Nuffield Farming report for more information, case studies and discussions.

TALKING POINT 1:

Setting the scene for regenerative agriculture

Samuel Smith NSch 2020

> ***In recent years, we've started experiencing the early signs of a climate breakdown. Extreme weather events are a new normal that global society must adapt to."***

While travelling through Europe and visiting farms in 2022, the heatwaves were making headlines. Record-breaking temperatures were being set and wildfires blazed in Spain and Portugal. Europe's rivers were at historically low levels and German barges, which transport millions of tonnes of commodities, were struggling to move along the Rhine River. It was the worst dry spell in 500 years.

While average changes to temperature and precipitation can cause changes in yields, it's the extreme climate events: heatwaves, droughts and the combination of these, which can seriously reduce yields or cause crop failure. For example, when drought occurs, the rate of photosynthesis decreases, shortening the growing period and lowering the yield. Exceptional water and heat stresses in 2022 and 2023 reduced the yields of many commodity crops and without major action, this will affect many of the world's most important crops, which will be in short supply if harvests are hampered.

When visiting farms such as Stone Ranch in Switzerland, it had not rained for months. I could see how concerned the father and son team were. Inspired by various regenerative agriculture (RA) pioneers, they were working against the grain of conventional farming in their community. And while they felt it was more resilient and the right thing to do, it was still early days.

SYSTEMS THINKING CHANGE

It was clear while studying my scholarship that a systems change mindset is essential if we are to scale regenerative agriculture in a sustainable way. Systems thinking can be used for many purposes, from designing resilient farm businesses to identifying impactful policies in the sector. Although, as I discovered, this way of thinking is still uncommon.

A food systems approach allows us to consider the full web of actors that influence how we grow food and what we eat, beyond just the direct supply chain. It helps us to view the world around us as a set of interconnections, and use this understanding, with various tools, to identify areas for action.

With climate pressures increasing, some adaptation will be necessary for most farms in the future, through strategies such as changing crop breeds, improved access to water and nutrients and smart decisions around planting. RA practices and mindsets are often complementary to this adaption, as they support farms to be more resilient and their farmers to build healthier soils.

With eco-anxiety on the rise, I often wondered during my scholarship how farmers are mentally coping with the stresses of increasingly unpredictable weather and warnings of potential ecological collapse. While some may turn to their faith for spiritual comfort, a growing number of psychologists are also focusing on this issue. Caroline Hickman, an academic and board member at the Climate Psychology Alliance, offered some useful suggestions, including:

- Rather than minimising or diminishing the problem, we need to learn to live with the uncertainties and to be comfortable with them.
- To acknowledge that it's okay to feel anxious about climate change and to remember you are not alone.
- The importance of taking action, so as not to feel powerless and helpless; transforming those anxieties into something positive.
- Holding onto a radical hope for the future; that it's not too late to change the ending of the story.

Samuel Smith

> ***RA practices and mindsets…support farms to be more resilient and their farmers to build healthier soils."***

Regenerative agriculture: A shared ambition for the future of farming?
https://qrco.de/bgiGxG

TALKING POINT 2:

Striking the balance between economy and ecology

Geraint Powell NSch 2017

> ***"I liken the modern livestock farm to a camel being ridden across a desert."***

It's tough in that desert but, when the camel drops, the farmer knows there is a fix he can just about afford, to get the camel up and moving again. At the end of the season the camel and the farmer are in pretty bad shape, the residents of the desert are not happy with the farmer's treatment of the camel or the impact it's had on the desert. The farmer is paid just enough to keep him interested in doing it all over again.

Farmers are governed by the volatility of commodity prices, costs are escalating, productivity is stalling, and we are spending more on vaccines and treatments as diseases become more prevalent. All the while we are chasing numbers harder to, at best, break even, with most livestock businesses only making profit if support payments are factored in. We are farming by 'satnav', getting to a destination by following instructions without having understood the route, or questioned if it is the best route.

This became the aim of my study. We need to recalculate, find a better route, the challenge being: "How do we strike a healthy balance between economy and ecology?"

I travelled and met pioneers of regenerative farming practices who had become observers and students of the ecosystem processes. They mimicked nature to produce an optimum, without outperforming or compromising the ecosystem services that underpin our wellbeing and the production of most of our living needs.

These farmers are profit-orientated, allocating resources on regenerative principles and recognising the importance of the complex relationship between the sun, the soil, the plant and the animal. Over time they have become masters in harvesting sunlight to enhance animal health, performance and profitability.

This route takes more thought and planning and a different approach to how things are done. The balance between ecology and economy has to be reached. Farmers cannot keep giving our money away and watch our natural resources degrade. Knowledge gained through on-farm ecological monitoring and better awareness of ecosystem function will improve productivity and can also be the vehicle for positive communication between producer and consumer.

Change is not chosen voluntarily; it usually happens through disruption or is forced upon us. Disruption is coming our way in the form of Brexit. Trade relations and support payment mechanisms are likely to change. We need to build resilience into our current systems to ensure future viability of our livestock sector. Resilience is built by advancing the natural resources of soil health and diversity, and allocating all other resources in a regenerative way.

The UK, with its forgiving climate for growing green plants, stable politics, and a huge population to feed, has great potential to become world leader in regenerative agriculture.

Geraint Powell

> ***"The UK...has great potential to become world leader in regenerative agriculture."***

Sustainable grazing strategies that meet ecological demands:
https://qrco.de/bgiGzx

In practice: Regenerative agriculture pioneer Gabe Brown, North Dakota

Tom Chapman NSch 2011

Gabe Brown is an incredible guy. One of the reasons (but not the main reason) is found in his love and understanding of soil - or as he calls it the 'resource'. Gabe is focussed on improving the soil of his farm in North Dakota. He has a thorough understanding of what makes good soil and puts a lot of thought, time and energy into improving his 'resource'. Mob grazing is just one of the tools he uses. Cover crops are another.

However, there is something else, something far greater, which makes Gabe a truly outstanding person. He advises farmers across the US on how to improve their own resource. He speaks at countless conferences; he answers emailed questions; his telephone is called twenty or thirty times a day by farmers wanting to pick his brains. And he does all this for free! He refuses to take payment, other than to cover his out of pocket expenses and is convinced that he was put on this earth to spread the message, to disseminate his knowledge to farmers and thus to improve the soil of the world. (He has also written a book, Dirt to Soil: One Family's Journey into Regenerative Agriculture).

The origins of his 'calling' lie in his experiences during his earlier years of farming. At the time, he was a conventional farmer, highly mechanised and reliant on high levels of artificial input. However, as many may remember, farming was in the doldrums and Gabe will freely admit that he was all but broke, exacerbated by losing four years of cropping in a row as a consequence of extreme weather conditions (hail, drought etc). He reached the point where he didn't even have enough money to buy the fertiliser for the crops one year, and realised that shortly he would be out of business.

As a last throw of the dice, he planted some legumes to add natural fertility in lieu of the missing artificial fertiliser. To cut a long story short Gabe, being an observant and intelligent man, realised that the legumes not only improved fertility, but also had an impact on the soil health and consequently the water cycle. Thus began his long experiment which continues to this day. Gabe's understanding of soil and its needs is amazing. He talks in terms of the carbon:nitrogen ratio (10:1 is optimum) and of the balance between bacteria and fungi in a soil (cultivated soils are predominantly bacterial with very little fungi - there is a strong correlation between high bacterial/low fungal levels and high incidence of crop disease; such soils also encourage annual weeds to grow, to the detriment of the crop. If we increase the soil fungi levels, the crops become cleaner and healthier).

He now farms organically and is achieving yields only slightly less than conventional farmers, but with massively lower costs so his bottom line, as he openly tells anyone who asks, is (like his soils) in rude health. This is testament to a good man doing a thoroughly good job.

> ***Gabe's understanding of soil and its needs is amazing."***

Are mob grazed cattle the perfect arable break?
https://qrco.de/bgiH2G

TALKING POINT 3:

What is regenerative farming - the key principles

Jimmy Stobart NSch 2020

> ***Regenerative farming is all about working with nature to rebuild soil health, boost biodiversity, and improve ecosystems while producing nutrient dense food and fibre."***

Going beyond just sustaining the land by actively restoring it using natural processes. Focusing on healthy soils, better water cycles, and reducing the need for synthetic inputs, regenerative farming helps create stronger, more resilient farms. The goal is simple: leave the land in better shape for future generations while maintaining a productive and profitable system today.

Keep the soil covered

Bare soil loses moisture quickly and is prone to erosion. Keeping it covered with plants, mulch, or crop residues helps retain water, protect against extreme weather, and support soil life. A well-covered field improves fertility and resilience.

Minimise soil disturbance

Excessive tillage disrupts soil structure and microbial life. By reducing tillage or switching to no-till methods, farmers can improve soil health, water retention, and carbon storage.

Maximise plant diversity

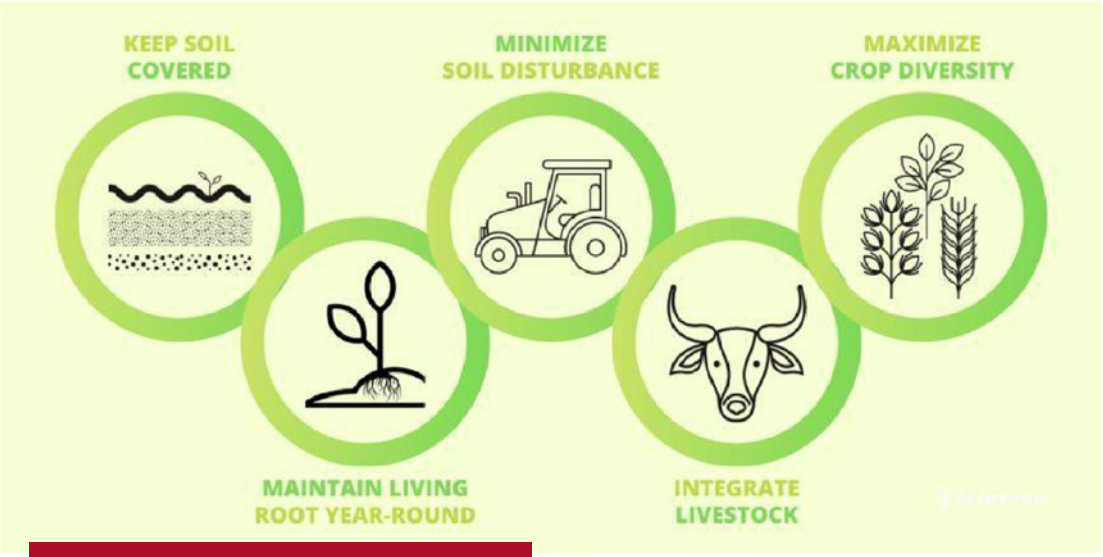
A mix of crops, diverse pastures, and cover plants helps improve soil biology, break disease cycles, and build resilience. Diversity above ground leads to diversity below ground, which is key for a thriving farm ecosystem.

Keep living roots in the soil

Keeping plants in the ground year-round feeds soil microbes, improves water infiltration, and builds organic matter. The more roots in the soil, the better its structure and fertility.

Integrate livestock

Well-managed grazing mimics natural systems, helping cycle nutrients, stimulate plant growth, and improve soil biology. Livestock play a crucial role in regenerating land when using planned grazing systems.



The five regenerative principles

Credit: Cool Farm Tool

Jimmy Stobart

> ***"Going beyond just sustaining the land by actively restoring it using natural processes."***

Effective monitoring methods that measure ecological outcomes in grazing systems: https://qrco.de/bgiH6H

TALKING POINT 4:

Talking point: Soil biology and what we know (and don't)

Wil Armitage NSch 2013

> ***"We know that science has only studied a fraction - possibly as little as 1% - of our soil biology."***

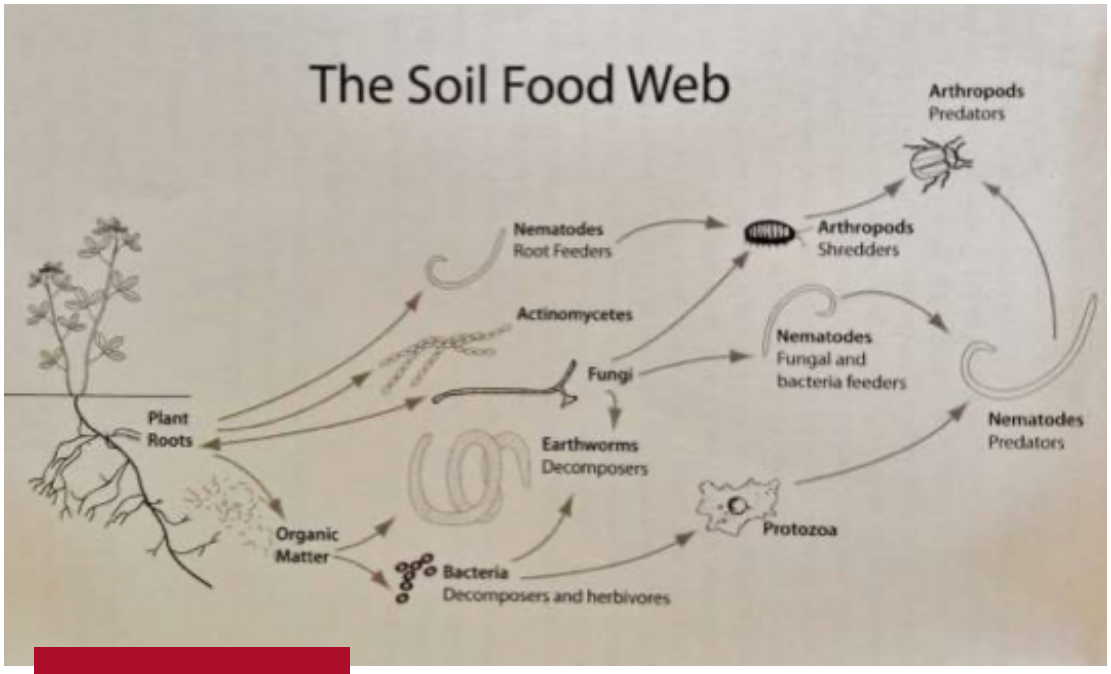
In a healthy soil it is estimated that there are 1,000kg of livestock/acre that we don't see; living, breathing, reproducing and maintaining the vital nutrient links between the soil and plants; these include mites and earthworms, fungi bacteria, amoeba and nematodes. What we do know about our soil life - and the massive impact it has on the health of our soil – is that soil biology retains nutrients.

Nutrients are held in the bodies of the micro-organisms, earthworms and all living creatures in the soil. The nutrients are temporarily tied up while they are alive but when these organisms die and decompose, the nutrients become available for other organisms to consume.

If you have 20 earthworms/square foot you have nearly 1 million/acre. An earthworm has a four year life cycle and, as one quarter of them therefore die each year, 80 units of nitrogen/acre are released into the soil.

Plant residues contain nutrients but these are not immediately plant available. They first have to be broken down by the soil life before the minerals are released back into a plant-available form. Highly decayed plant residue and soil life eventually turn into stable organic matter known as humus.

Humus retains nutrients in the soil because it has a high CEC (cation exchange capacity) nutrient holding capacity. The more soil/biology life there is, the more humus there is, the higher the CEC and the higher the fertility of the soil.



The Soil Food Web

Credit: Wikipedia

Wil Armitage

"In a healthy soil it is estimated that there are 1,000kg of livestock/acre that we don't see.."

Sustainable milk production: the vital role of soil for feed integrity:
https://qrco.de/bgiHBf

TALKING POINT 5:

If you want to re-engage with your soil…

Kate Speke-Adams NSch 2015

1. "As to methods there may be a million, but principles are few. The man who grasps the principles can successfully select his methods..." This quote from Ralph Waldo Emerson must be considered when addressing soil health issues. There is no 'magic bullet' product or practice that will cure degraded soils. Once the cause and effect of said degradation is understood methods can be chosen to correct it.

2. Be mindful of what your personal barriers to change are so that if they are restricting progress you will be able to identify this and rectify it.

3. Change does not occur over the short term and support during the process is essential. Involving family and/or friends in the process establishes a valuable support network.

4. Sir Isaac Newton used the phrase "Standing on the shoulders of giants…" and this is recommended for those adopting new techniques. Learn from those who have already implemented them successfully; involvement with innovative groups and taking advantage of key alliance opportunities can ensure the transition is less challenging.

5. Think of soils as a bank account; whatever we take out with cultivations and cropping we need to replenish with grazing, manures, chopping straw, cover crops. Understand the cost-benefits of good soil health so that funding opportunities are a consequence, not a driver of change.

Kate Speke-Adams

> ***"There is no 'magic bullet' product or practice that will cure degraded soils."***

How are farmers re-engaged with their soils? Through fear, finance, regulation or education? https://qrco.de/bgiHDw

TALKING POINT 6:

Soil carbon recommendations

Rob Richmond NSch 2011

- Soil is not just a narrow NPK chemical test, or something to stand cows on. Fertility is about building a carbon rich, biologically active soil.
  Recommendation: Farmers need to understand the requirement for a broader, more balanced approach to crop nutrition. They also need to recognise that both UK and worldwide soils now have very low levels of soil carbon and need to be regenerated, not just sustained, in order to safeguard our food supply.

- Carbon building needs to be included in all crop rotations.
  Recommendation: Farmers must adopt appropriate methods that can be used to help develop a carbon rich biologically active soil, from simple additions (e.g. compost) to the grazing of biodiverse pastures.

- Grazing well managed biodiverse pastures has the potential to reduce the methane emissions of ruminants by 20%.
  Recommendation: Livestock producers should adopt rotational grazing of biodiverse pastures.

- Carbon rich soils are important to the efficient management and use of rainfall and nutrients.
  Recommendations: The agricultural industry must be encouraged to adopt measures to build soil carbon levels to help with water management and quality for the wider community.

- You are what you eat.
  Recommendation: By recognising that disease (of soils, plants, animals, humans) is a result of unbalanced nutrition, we can find real solutions rather than cures!

- The 20th century was about chemistry; the 21st century is about biology.
  Recommendation: By harnessing the power of biology, farmers can build resilience into their farms, so reducing the risks associated with extreme weather conditions.

Rob Richmond

> ***By harnessing the power of biology, farmers can build resilience into their farms."***

The benefits to agriculture and the environment of rebuilding soil carbon:
https://qrco.de/bgiHXu

TALKING POINT 7:
Maintaining living roots

Chris Taylor NSch 2022

> ***To maintain living roots in the soil is to feed the soil food web and particularly the mycorrhizal fungi populations with a carbon source."***

These living roots release exudates into the soil, which help maintain a healthy, functioning soil to support plant growth. Achieving year-round cover also ensures maximum sunlight interception, particularly post-harvest during the long days of summer, where photosynthesis can still function on cover or catch crops.

Woody and Catherine Van Arkel in Ontario are real pioneers who under-sow various crops with living mulches of clover species. The clover understory reduced the nitrogen requirement throughout the rotation, ensured living roots were in the ground all year round and gave ground cover to capture sunlight through the summer months post-harvest. Through a combination of no-till, cover cropping and a diverse rotation, they have achieved organic matter levels on their farm of 2.5 to 4.5%.

Frederik Larsen in Denmark operates a similar approach with lucerne, established with winter oilseed rape. The lucerne as an understory is cut over the summer months for animal feed, before the autumn crop is established, keeping the understory alive. It is hoped the living mulch will survive and feature in the rotation for several years. This type of approach isn't without its challenges, but Frederik believes this living mulch can replace the need for cover cropping on his farm over time. He will retain the associated benefits of cover crops but with one seed purchase, one establishment cost and year-round soil cover.

Clover understorey in wheat

> ***Achieving year round cover also ensures maximum sunlight interception."***

Do regenerative farming practices pave the way for UK agriculture to meet net zero? https://qrco.de/bgiHZg

TALKING POINT 8:

Livestock in the arable rotation

Tom Chapman NSch 2011

> ***From a holistic viewpoint, proper mixed farming is, to my mind, the holy grail, the natural fertility from the cattle feeds the soil, providing nutrients for the ensuing cash crops."***

The dung is converted into soil organic matter, stabilising the soil and improving its structure leading, in turn, to soils with greatly improved water infiltration rates and water holding capacity. By-products from the arable crops can be utilised by the cattle and converted into valuable proteins. It is the reason why, for hundreds of years, UK farms were mixed farms.

In recent times, however, all this has changed. The profitability of artificially-fed cereal crops coupled with the declining skill base needed to keep animals has led to specialisation on a vast scale. By and large, land that can be ploughed has been ploughed and vast tracts of the UK, especially in the drier eastern side of the country, have nary a ruminant animal on them.

It is different in other parts of the world and I was desperate to find out why. What makes other countries able to include cattle within their arable rotations and how and why do they do so? I met a couple of excellent practitioners, Gabe Brown (see p7) and Jay Fuhrer in North Dakota, who gave me real insight into combining mob grazing and arable rotations.

Tom Chapman

> ***What makes other countries able to include cattle within their arable rotations?"***

Are mob grazed cattle the perfect arable break?
https://qrco.de/bgiHcK

TALKING POINT 9:
Integration of livestock

Chris Taylor NSch 2022

> ***Livestock inclusion relates well to diversity, particularly in the cycling of nutrients and the array of food sources the soil food web can draw upon."***

Livestock are considered an integral part of circular farming and mutual benefits and synergies can be realised for all enterprises involved in the farming system. The option to graze crops, cover crops and include perennial plants in the rotation is not to be overlooked and the ability to improve fertility and organic matter is integral.

Jamie and Ian Sculthorpe were a fantastic example of fertility-building in an organic system. They utilise a mixed species herbal ley for four to five years of fertility building prior to entering back into a combinable crop rotation featuring cereals, soybeans and corn. They rotationally ploughed two years in seven and had pushed organic matter levels up to 4% across the farm.

The integration of livestock can be a hard aspect for arable farmers to invest in; it requires capital expenditure in stock, fencing and equipment and the skills that come with livestock management. If livestock farming isn't for you, then this is a perfect scenario for bringing the benefits of livestock into your farm business through a partnership. Whether this be 'tack sheep' on cover crops and winter cereals or giving a keen young farmer an opportunity to partner with you, there are endless individual circumstances here but also a lot of opportunities to explore if you're receptive to change.

Grazing an organic herbal ley

> ***There are... a lot of opportunities to explore if you're receptive to change."***

Do regenerative farming practices pave the way for UK agriculture to meet net zero? https://qrco.de/bgiHZg

In practice: Derek and Lisa Schwanebeck, Cornerstone Grazing, Nebraska, USA

Geraint Powell NSch 2017

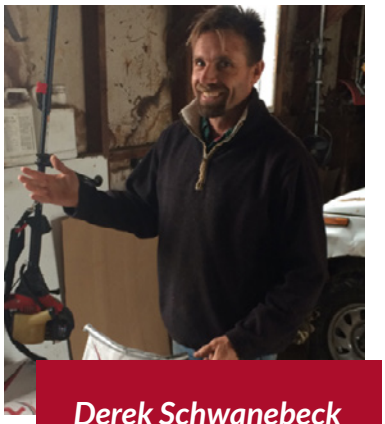
Derek and Lisa ranch in the Sandhills of Nebraska running various classes of stock (cow/calf pairs, yearlings) and custom-grazing other ranchers' cattle in an extremely fragile ecosystem where forage management is critical. The business "Cornerstone Grazing" has been built over 25 years, focussing on regenerating and enhancing their rangeland while maintaining a profitable bottom line. Utilising free solar energy and harvesting plants by intensively managed grazing is the backbone of what they do. This approach has increased plant diversity and the carrying capacity of the land. The vision at Cornerstone Grazing is "to best utilise and enhance every asset to create profit that will support their family, employees, environment and community".

While touring the ranch in a beaten-up Suzuki jeep, Derek explained that observing, recording and adding layers of actual information to his ranch inventory was critical to his decision-making and future planning. Matching forage with demand was an art, that by his own admission was as much down to his instinct as the data he had collected over time, but it took both elements to make it work properly. The inside of the windscreen was covered in black marker notes and diagrams. "I don't forget things when they are right in front of me," he explained. During our ride he wrote a lot of notes on his windscreen, I am glad we weren't on a busy road!

Derek took his inventory further in that he constantly ran a balance sheet, valuing cattle and quantifying forage stocks, always planning and always adapting. This information was always accurate and decisions could be made quickly with conviction. The two most important resources were cash and grass. The stock numbers were constantly fluid, increasing and decreasing to match grass growth patterns and market fluctuations. This information and flexibility allowed him to avoid "wrecks". He referred to his rangeland as the "real" bank which, if treated badly, would remind him for years into the future with ecosystem failure and production losses. He cared little for comparison or benchmarking. His bank account and individual rangeland situation were his responsibility but if a neighbour had a good idea he was always keen to listen.

Very little of his time was spent worrying about what he couldn't control nor influence e.g. climate, market fluctuations, policy disruptions (USDA Farm Bill) and societal demands. Instead he put his efforts into building resilience and transparency into his business, ignoring the noise going on around him. It was his knowledge and information that led ultimately to his decision-making processes that afforded him the luxury to do this, not any form of external financial advantage. Cornerstone Grazing knew exactly what their resources were and the best way to allocate them.

Victor Eldred, a pioneer rancher of the Sandhills, wrote: “The Sandhills are inhospitable to most species. Drastic changes in temperature, sandy soils and powerful winds mean that anything living here must be strong-willed yet flexible”. That statement summed up very well both the Schwanebeck family and the cows they had bred.



Derek Schwanebeck

> ***“Cornerstone Grazing knew exactly what their resources were and the best way to allocate them.”***

Sustainable grazing strategies that meet ecological demands:
https://qrco.de/bgiGzx

In practice: Landscape design for livestock health and welfare

Claire Whittle NSch 2021

> ***Travelling in Australia brought the question of landscape design for animal welfare into sharp focus. Erosion gullies are a common sight due to overgrazing, high rainfall and low levels of vegetation."***

I met Martin Royds of Jillamatong Farm in 2022. Martin farms in the Southern Tablelands of New South Wales, Australia. Martin's lightbulb moment came during a drought as he watched topsoil blowing off the land. And, when the rain did come, most of it ran straight off the land via the severe erosion gully that had formed in the centre of his farm.

Holistic management training at this point was vital to improve the ecological and economic health of his farm. Martin started his transition towards resilience by building a weir in the gulley to hold water on the land. As a result of this Martin no longer faces drought problems.

The erosion gully at Jillamatong has been transformed into a chain of ponds

Credit: soils4life.org.au

Martin had a consistent problem with flies in the summer months while grazing the lower pastures on the farm. This made him reliant on chemical parasiticides or he would have issues with mastitis and eye infections which were his largest antibiotic inputs.

On hearing that flies hated wind, Martin changed his entire farm layout to farm 'in the vertical' rather than horizontally. He divided his 12 paddocks into over 50 and ran them lengthwise up the side of the slopes surrounding his farm instead of along the contours. Cows could now move to the top into the wind to avoid flies if they wanted to. Martin also observed that cattle grazed the higher parts of the farm later in the day, where it was both cooler in summer and warmer in winter. This ability to express natural behaviour is an important welfare concern and Martin could see this in action. Also, by allowing his cattle access to different altitudes, he reduced overall fly worry and subsequent disease.

There was an uplift in biodiversity, as the cows brought seed and nutrients from the lower valley up to the top of the hill. He also no longer required antibiotics.

> ***"Martin changed his entire farm layout to farm 'in the vertical' rather than horizontally."***

Can regenerative agriculture improve the health and welfare of livestock?
https://qrco.de/bgiHjZ

In practice: Will Harris, Georgia, USA

Dan Burdett NSch 2019

In the field of regenerative agriculture (RA) there are a few that stand out from the crowd, the superstar farmers that have helped to influence others and I was lucky enough to meet one of them. Will Harris farms around 3,000 acres of land around the small town of Blufton in southern Georgia. White Oak Pastures has become synonymous with RA, as it has pushed the boundaries of what is possible on a much bigger scale than most other farmers.

In an area of the country dominated by cotton and peanut, he is using different types of livestock to restore highly degraded land back to health again. He does this by firstly rolling out round hay bales through the winter for his herd of cows, a process he calls 'hay bombing'. This adds a large amount of organic matter onto the soil surface. He then uses the chickens, ducks and pigs to break this down further and help to incorporate within the soil, whilst adding more manure. Only then will he sow grass seed and use the sheep and cattle to manage this by mob grazing throughout the year, leaving long periods of rest in between. With his own on-farm slaughterhouse, he is able to sell a finished product completely reared and processed in one place.

It wasn't always this way though. The ranch has been in the family since before the American Civil War and had been run traditionally, with set stocking and only cattle there. Will himself wasn't able to earn enough money just from farming so chose to make a living as a chemical salesman. By 1995 Will had witnessed enough of the degraded land around him and decided that only radical change to RA would secure the future of his land but also the ever-shrinking community around him. He left his job and came back to farm full time, introducing the increased levels of livestock and began to see a great change happening to his farm

With the goals of de-centralising, de-commoditising and de-industrialising the farm, Will now has a business that employs 150 staff, is able to buy up neighbouring land no longer able to produce a crop and has inspired a whole new generation of people to move towards RA. In a part of the state which has suffered from an exodus of people leaving rural towns and villages, Will has been able to reinvest his profits to buy up rundown properties in the town and begin to rebuild the community once more.

Dan Burdett (left) and Will Harris

> ***"It has pushed the boundaries of what is possible on a much bigger scale."***

Regenerative agriculture: Making the change happen: https://qrco.de/bgiHof

TALKING POINT 10:

Cover cropping

Toby Simpson NSch 2022

- Cover crops are the keystone to the biological, chemical, and physical function of the soil. They form part of a wider system that works to build healthy soils, this change takes time and patience.

- Growers need to understand the carbon and nitrogen cycles in the soil for successful outcomes. Avoid nutrient immobilisation while better managing artificial inputs. Feed the soils, and they will feed the plants.

- When growing cover crops, think FDD; functionality, diversity, and density. Set out with clear objectives and a management plan. Treat the cover crop with the same care and attention as any cash crop.

- Build resilience into a farm business by farming layered, not naked. If cover crops are part of a broader system change, then the opportunities that come through changing the system are only limited by our imaginations.

- Always consider individual context as it varies between farms and fields.

When planning a catch or cover crop, first identify where it can be grown in the rotation, then plan the objective you want to achieve as it will determine the subsequent management strategy.

For example, if nutrient cycling for the following crop is the objective, the cover crop might be a mix of legumes and scavengers, aiming for fast-growing biomass, terminated while the C:N ratio is low, usually around flowering. Timing of the termination should be planned so the residue has time to break down and release nutrients to the following crop.

If building soil organic matter and sequestering carbon is the main objective, a dense rooting, high C:N ratio residue with predominantly grasses would be preferable. However it is not straightforward as the following crop might suffer nitrogen lockup, so a legume or combining cereals with a starter fertiliser might be appropriate in this situation.

Pest reduction is another matter. In Germany, I visited the seed breeders P.H. Petersen. Matz Petersen showed me the breeding process, where they specialise in radish cover crops that reduce specific nematode populations in the soil. I learnt that in targeting a specific nematode, nothing planted in a cover crop should be a multiplier; variety selection is critical.

When grazing livestock, a cover crop needs to supply adequate palatable forage. Martin Lines in Cambridgeshire aims to have something for the sheep to stand on (clovers) and something to graze.

Erosion and run-off prevention requires covers to have multi-layered root architecture and some above-ground canopy protection for weed suppression, where a dense cover including allelopathic plants such as buckwheat or oats could be used.

These examples show different management approaches; objectives don't need to be exclusive, a well-established cover crop will add multiple benefits to the soil and environment, but the primary objective should always be considered when planning a cover crop.

Enterprise-stacking cover cropping

Toby Simpson

> ***"A well-established cover crop will add multiple benefits to the soil and environment."***

Catch and cover cropping opportunities in UK arable agriculture:
https://qrco.de/bgiHmL

TALKING POINT 11:

No-till and rotations

Russell McKenzie NSch 2014

> ***Rotation was a subject that came up regularly in the countries I visited during my Nuffield, and was absolutely crucial for just about every farmer I encountered."***

Certainly a defining moment for me was during my time in New Zealand when I visited several farms that had direct drilled peas. Not only did this go against everything that I would have expected to be optimal conditions for pea growth, but it was the position within the rotation that made me take a step back and reassess how a rotation should change.

I met with Mark Scott who as a no-tillage contractor was undertaking a range of different jobs, but explained how no-tillage peas had really evolved. Instead of traditionally following a short term grass ley with wheat, a lot of growers turned the rotation on its head and put peas into this slot. The benefits were better weed control and competition but if you think more deeply and consider the soil condition logically, the structure post-grass from increased root and worm activity will potentially be as good as anything that could be cultivated.

With the size of some of the stones in New Zealand, one can clearly understand why no-tillage is so advantageous by not bringing them to the surface through cultivation. Crop performances are recorded as being better which is fairly impressive for a country that doesn't have a massive requirement to undertake no-tillage because of its favourable weather conditions.

No-till peas in New Zealand

Russell McKenzie

> ***Certainly a defining moment for me was during my time in New Zealand."***

Success with no-till under any conditions: https://qrco.de/bgiHqg

In practice: Nestor Canali, Rio Grande do Sul, Brazil

Russell McKenzie NSch 2014

Nestor Canali was possibly the most inspiring no-tiller I met. Along with some other growers in the Rio Grande do Sul region of Brazil he shied away from the use of cultivation to deal with compaction and felt they could achieve the same with the use of cover crops. He has some terrific points about how he has dealt with compaction and no-tillage since its introduction in 1994.

- Observe the problem compaction areas in dry conditions to be aware early on.
- Avoid using cultivation to correct the issue.
- 'Red flag' compaction - always keep it in mind and deal with it when it occurs.
- It may take two seasons to override the problem.
- Employ robust cover crops instead of cultivation (his choice was black oats and vetch).
- Properly managed no-tillage reduces the likelihood of compaction over time.
- If possible avoid harvesting in wet conditions.

It may sound simple, but Nestor had some of the most outstanding no-till crops I have seen anywhere in the world and it was from this and visits in the United States that the role and use of cover crops became a greater focus.

Nestor Canali (left) in no-till soya

> ***"Nestor had some of the most outstanding no-till crops I have see anywhere in the world."***

Success with no-till under any conditions: https://qrco.de/bgiHqg

In practice: Regenerative agriculture and business resilience

Claire Whittle NSch 2021

A highlight of my UK Nuffield travels was visiting Leigh and Neil Heseltine in the Yorkshire Dales. Neil was historically a prize-winning Swaledale breeder and proud of it. But his high-input business came at a high price with bought-in feed, fertiliser, labour and veterinary and medicine costs. Also his sheep, being selective grazers, were steadily grazing out valuable species in the floristically diverse, calcareous grassland.

In 2003 Leigh and Neil joined the Limestone Country Beef project which aimed to restore this habitat to a favourable condition by encouraging appropriate land management practices. To do this, they established a herd of hardy Belted Galloways. Large herbivores were originally responsible for creating and maintaining the mosaic of habitats in the species-rich pastures of Malham tarn and as the years passed, Leigh and Neil began to see the return of nature where the cows were grazing, outwintered, with no inputs. This, compared to their conventional sheep system made them start to question their farming methods and in 2012 they took a deep dive into their farm finances. That year, in their intensively managed sheep flock, their profit was just 0.7% of their turnover. However, with the cattle their profit was 50%.

The costs for the sheep flock were eye-wateringly high and yet, the cows had not received a single medical intervention or other input. If that's not an argument in favour of regenerating the land for livestock health, I'm not sure what is!

An example of diverse calcareous grassland at Leigh and Neil's farm

Claire Whittle

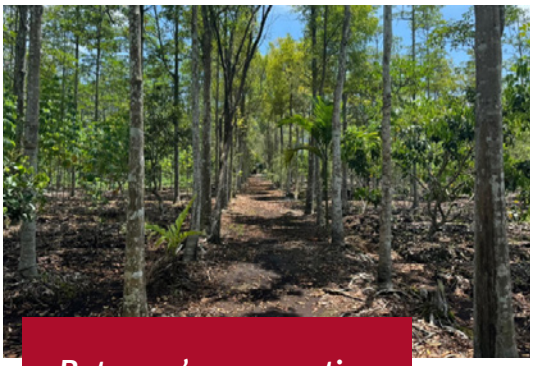
Can regenerative agriculture improve the health and welfare of livestock?
https://qrco.de/bgiHjZ

In practice: Regenerative agriculture in peatlands

Harry Winslet NSch 2024

Maybe the greatest hope I took from my travels looking at new approaches to peatland comes from where regenerative approaches can also help reduce the subsidence of peat. In Borneo's transmigration area, a farmer I visited, Bataman, has been trialling novel agroforestry techniques, combining tree crops such as Julutung Latex and Agarwood for herbal medicine with intercrops of tomatoes, chillies and local green-leaf vegetables called Kankung.

By maintaining canopy cover and forgoing the requirement for cultivation, exposing a smaller proportion of the peat to oxidation, his small two hectare farm sits a metre proud of the remaining landscape, despite open ditch drainage and no control of water tables. Using root exposure to measure land subsidence, his soil surface has receded just 10cm over the previous 20 years.



Bataman's regenerative forestry farm, Borneo

Furthermore, his peatland farm is far more resilient than that of other local growers. He is able to produce crops far earlier in the dry season, and far later after the onset of seasonal rains, where he's able to recoup much more than his share in the marginal downturn in yield that his farm accepts.

In Estonia, Airi Külvet, Baltic Farmer Of The Year 2023, demonstrated the use of natively vegetated meadows, dismissed by many as unproductive, to graze her herd of Wagyu cattle.

At a land rent of only €5/ha from the state, and deemed worthless by many conventional grazers, the system providing diverse 'unimproved' forage produced high-value beef carcasses worth €12,000 each, showing how regenerative grazing techniques can turn low-input peat meadows into valuable production systems.

Harry Winslet

> ***"Diverse 'unimproved' forage produced high-value beef carcasses worth €12,000 each."***

For peat's sake! Do we need a new approach to peatland agriculture?
https://qrco.de/bgiHwh

TALKING POINT 12:

Crop diversity and agroforestry

Samuel Smith NSch 2020

> ***Nature has introduced great variety into the landscape but man has displayed a passion for simplifying it."***
>
> **Rachel Carson, Silent Spring**

It is said there are around 300,000 species of edible plants, yet just 20 species account for 90 percent of the world's food. And of these 20 species, just three crops – wheat, maize and rice – supply more than half. We are heavily reliant on a tiny handful of crops and a similar simplification exists within livestock too. For example, 99% of cows are a single breed: the Holstein. Many campaigners suggest our future resilience depends on increasing crop and genetic diversity.

An interest in crop diversity was a reason for my visit to Eric Toensmeier in Massachusetts and conversations with Josiah Meldrum of Hodmedods in the UK. Toensmeier is the author of several books focused on perennial cropping systems, biodiversity, and nutrition. He stressed how nature has given us a remarkably rich tapestry of edible plants and that so many of the most promising solutions in ourfood system are biological, not technological.

Understanding the role of trees in farming systems is also an important aspect of Toensmeier work. Promoting how they can be best incorporated on farms to maximise benefits, such as the provision of timber, fibres or nutritious foods, as well as other roles, such as beneficial shade, shelter and improving soil health, not to mention carbon sequestration and storage.

In the tropical climate of Columbia, he spoke passionately about the intensive silvopasture systems, some of which, he suggested, have been able to operate on a similar carbon footprint as intensive feedlot systems in the USA. Dense plantations of trees are browsed down by the animals – and some types of leaves in these systems have been identified to reduce methane emissions, while the pasture grasses in the genus Brachiaria have been found to capture nitrogen in the urine of grazing livestock before it can off-gas a N_2O.

As we discussed the RA movement, there was a frustration in his voice: "...all we hear about is holistic and adaptive grazing, yet there are so many examples of tropical farmers doing a better job, and not getting the climate finance, recognition or markets for 'climate-friendly' meat".

Toensmeier believes that tropical silvopasture systems can achieve intensification, emissions reduction and carbon reduction all in one package. Yet, these agroforestry systems are not getting the attention and investment they deserve from food companies. Rather, some of the most inspiring examples of low-carbon farming are getting overlooked or ignored, perhaps due to cultural biases, language barriers, or because the good case studies simply get overshadowed by more mainstream agricultural narratives and popular figureheads.

Eric Toensmeier

> ***"Some of the most inspiring examples of low-carbon farming are getting overlooked or ignored."***

Regenerative agriculture: A shared ambition for the future of farming?
https://qrco.de/bgiGxG

In practice: Agroforestry in China

Stephen Briggs NSch 2011

So why are trees and agroforestry important in China? Agroforestry has been practised in China for several thousand years, dating all the way back to the Han Dynasty (206 B.C.- 220 A.D). At the same time as the introduction of the household responsibility system (HRS) in 1978, it was recognised that significant soil degradation was occurring in central and northern China, especially in the main wheat producing provinces adjacent to the Yellow River (Shandong, Henan, Shaanxi, Shanxi etc.). Soil degradation was resulting in millions of tonnes of topsoil being washed into the yellow river from wind and water erosion. Agroforestry was seen as a land use system which could halt and reverse soil degradation while simultaneously allowing the production of food and timber crops.

With an increasing population and multiple pressures on land from food production, industry, housing and the effects of soil degradation, China has lost the use of approximately 8 million ha of agricultural land in the last decade, or 6.6% of its arable land. The per-capita arable land in China is now 0.1 hectares, less than 40% of the world average. Consequently, land use has become the most important problem for agricultural development. In order to maximise the potential of land resources, farmers are continuing to use agroforestry on their land, in order to meet the demand for not only food, but also timber, fodder, fuel and income. In recent decades, agroforestry has undergone rapid development, with intercropping of trees and cereals (wheat), particularly in central and northern China. The two most common types of trees used in intercropping systems in China today are paulownia (Paulownia spp.) and poplar (Populous spp.).

On visits with farmers and government officials in Henan and Shaanxi provinces, I learnt that agroforestry has significantly reduced the level of soil degradation occurring and what was in the 1970s eroded, barren land, not capable of supporting crop production, is now productive land producing timber and cereal crops and supporting many rural households with a viable and sustainable income. Timber is used for construction and furniture, plus burnt as a renewable energy source. Flowers and nutrient rich leaves are harvested and used as livestock forage for cattle, pigs and sheep. One 8-10 year old paulownia tree can produce 100kg of fresh leaves per year. With a density of 100 trees per ha an agroforestry system has the potential to produce a not inconsiderable 10t/ha/year of fresh forage from leaves. Crops of wheat are grown underneath the trees, which are protected from the hot summers and which outperform wheat in monoculture situations.

Paulownia trees intercropped with wheat in China

> ***"To maximise the potential of land resources, farmers are continuing to use agroforestry."***

Agroforestry: a new approach to increasing farm production:
https://qrco.de/bgiHzr

TALKING POINT 13:

Agroforestry recommendations for farmers

Stephen Briggs NSch 2011

1. Agroforestry can make your farm bigger and more productive, using deeper soil layers and the air space above the farm and make better use of the sun, air, soil and water than monoculture (it's also cheaper than buying more land) - so crop the extra dimension - above and below ground.
2. Agroforestry is a practical, viable form of agriculture which can be as profitable as monoculture, especially when high value timber trees are included. Annual crops maintain the annual farm income, while trees provide capital for the future.
3. Modern systems are compatible with present-day agricultural techniques and machinery and, with tree densities c. 100 trees/ha, allow alley crop productivity to be maintained. Combine short season grain crops i.e. cereals, with long season tree crops i.e. later leafing trees, for best results. Precautions must be taken to protect young trees from birds, deer etc.
4. Agroforestry systems modify local microclimatic conditions (temperature, air, water vapour content, evaporation and wind speed) and provide benefits to crops which are grown with the trees by reducing soil degradation and enhancing biodiversity, pest and disease control.
5. Use agroforestry to locally reduce wind speed by 30-50%, lessen crop thermal stress during critical growing periods, reduce the irrigation requirements of alley crops and protect catchments from sediment and nitrogen loss.
6. Plant 10-20% of cropped land into agroforestry to increase productive output and long term farm profitability.

Stephen Briggs

> ***"Agroforestry can make your farm bigger and more productive."***

Agroforestry: a new approach to increasing farm production:
https://qrco.de/bgiHzr

In practice: Coonabar Station, Queensland, Australia

Jimmy Stobart NSch 2020

Approaching Coonabar Station in central Queensland it is obvious that a very different approach to land management has been undertaken here. The lush green grass and tree cover is a stark contrast to that of the neighbouring dry arid countryside. This is all due to Murray and Wendy Gibson's forward-thinking mindset from day one after taking over the ranch in 1988. The whole area was covered entirely in thick virgin-standing scrub, and while watching their neighbours' clear, fell, slash and burn tactics, they had different ideas. Building that native scrub into their farming system has allowed them to retain soil moisture, increasing plant diversity and creating shade for animals. Now 30 years down the line their 6,781 hectares of land is thriving.

Originally the ranch was split into two large paddocks; well-planned rotational grazing infrastructure was put into place, and this has now evolved to 104 paddocks in total. Meaning that over this period the carrying capacity has gone from 600 LSU (Large Stock Units) up to 3,000 LSU.

Bucking the trend with his high-risk approach put a lot of pressure on the business in the early days. Murray admitted it was challenging to commit to changes, as so many conflicting opinions existed. However, since then, gradual improvements and highly flexible management strategies have maximised their agroecosystem and business profitability.

I think of all my Nuffield visits this was the one that left the biggest impression on me. To see what had been achieved over 30 years by applying a holistic approach and how the environmental was thriving alongside it was amazing.

They run a fully trading stock system and coupled with the extend grazing season the ranch allows stocking rates to match pasture growth and the ability to buy and sell ahead of volatile market prices, creating a very resilient and profitable business. Alongside the impressive beef production system, opportunities are now beginning to open for the Gibsons who are working to generate income for from their natural capital. For example, they have one of the first farms in the country which aims to become accredited for biodiversity credits.

The Gibsons at Coonabar Station

> ***The lush green grass and tree cover is a stark contrast to that of the neighbouring dry arid countryside."***

Effective monitoring methods that measure ecological outcomes in grazing systems: https://qrco.de/bgiH6H

TALKING POINT 14:

Key principles for companies

Samuel Smith NSch 2020

For those working with companies who are attempting to support or influence farmers on a RA journey, the following principles were suggested through interviews:

1. Properly acknowledge the scale and impact of what's being asked of farmers

We are often reminded that the transition towards more regenerative practices is not a one-off project. It is a long-term, knowledge-intensive journey on which farmers embark, and then continuously seek improvement. It is also going to be different for each farm. Yet for many farmers, transition means change, and change means risk. In one webinar I attended, Ian Matts from Brixworth Farming commented that if we add to this a message that the journey of transition is of an unknown length, to an unknown destination, where the benefits may not be realised quickly, farmers may start to feel panicky. Transition is no small ask and it's understandable that some farmers will want to carry on as they have been, accepting some of the risks each year. So, for success in scaling RA, it's important for companies to carefully design their programmes to provide good support, understanding, and incentives over the longer term to help mitigate the risks for farmers.

2. Understand the payback and invest

The initial costs for adopting some RA practices can be significant (and can come with uncertainty), but over time, business resilience and profitability per hectare should increase. Companies wanting to see the scale-up must consider how they financially support farmers to overcome any large, initial costs, as well as how the risk of transition could be shared.

3. Be adaptive to local conditions and needs

This applies both regionally and based on scale. Smallholders have very different challenges from large-scale farms. This was a clear message from large companies I spoke to, such as Olam and Mars.

4. Don't get stuck in pilots: be brave and scale-out

It's common for companies to have an approach of running pilots (or creating demo or reference farms) to validate a new technology or approach before scaling out to a wider community through a peer-to-peer approach. For example, Nestlé do this through their Farmer Connect programme, and this approach makes logical sense. However, there are many who feel increasingly frustrated, perhaps impatient, by the prevalence of this approach. This was a clear message for companies to move on from the treadmill of just doing pilot projects at the Regenerative Agriculture Summit.

5. Don't assume Citizen buying habits will drive significant change

The prevailing approach of most major food brands and retailers is to be consumer-driven and pro-consumer-choice, meaning that if a product ticks the boxes of being legal, safe and desirable, it will be stocked and sold. Some business leaders I spoke with believe that having positive messaging around sustainability and RA will help motivate buyers towards pro-22 'Citizens' rather than 'consumers', being the preferred term, as explained here.

At conferences, there is often at least one speaker that advocates this approach, with the hypothesis that 'educating buyers' or 'the next generation', will transform buying habits and drive change, giving businesses the clear signal to 'embrace regenerative'. One senior business leader from a major plant-based drinks company believed that just providing the carbon footprint data at the check-out till would be enough to drive a major change.

The research does not back this up, often suggesting that communications on their own tend to have a very modest impact on behaviour change. And many of my interviewees felt it complacent and indeed risky to expect that more enlightened consumer buying habits will drive a RA shift. There is clear support around communicating RA and engaging buyers with it, but many believe it should not warrant a price-premium - and if we're trying to make regenerative agriculture the mainstream, then it should be treated like the mainstream now. The combination of public policy and a more ambitious value chain will need to absorb any additional costs.

6. Show up on the farm

Elizabeth Reeves at the Sustainable Food Lab (SFL) explained to me that the most successful supply chain projects are those when the companies they work with show genuine care about the farmers they source from. To build trust and create real change, many companies are now learning the importance of engaging directly with farmers, rather than working through intermediaries in the supply chain. "Companies that take time to show up in the farming communities they source from and show why they care, help build a higher level of trust and buy-in for new initiatives." While it's not unusual for food companies to visit farms to learn more about the challenges and opportunities that farmers are facing, it's not always facilitated well. One of the skills an organisation like SFL brings is helping companies to show up on farms and for everyone to get the most out of the experience.

7. Build trusted advisor networks

For large food companies, showing up to every farm is not practical. Companies such as Nestlé and Pepsico source from thousands of farms. As such, those who are serious about scaling RA are investing in the capacity of trusted advisor networks to operate at scale. An example of this in the USA is the North Dakota Trusted Advisor Partnership. Through this, skilled crop consultants who are focused on soil health can provide a trusted and valuable communication link between the food company and farmers. Elizabeth Reeves suggests that each single advisor can reach around 20-30 farmers, covering 30-70,000 acres.

Samuel Smith

Regenerative agriculture: A shared ambition for the future of farming?
https://qrco.de/bgiGxG

TALKING POINT 15:

Overwhelmed with ideas....

Dan Burdett NSch 2019

There can be no doubt that a lack of information isn't what holds farmers back from RA. The online world is awash with podcasts, webinars and social media posts. Books written on the subject are released on a weekly basis and local and national conferences offer the chance to meet and exchange ideas with others from a diverse farming background. So, what's the issue? "The confused mind says no." For many people, myself included, this could be a major issue. Reading up on a subject, watching YouTube and attending conferences can become addictive, as one subject within RA leads swiftly onto another and before you know it you are in a rabbit warren and have lost your way.

Among those I spoke to who were well established and who knew their core purpose, over-information wasn't really an issue. Steve Slape, a beef, sheep and pig farmer in South Australia, was a great example of how to use the plethora of knowledge to the best of his advantage. He would set himself the goal of three hours a day of self-training, mostly internet based and was really focussed on what he wanted to learn and about the direction to travel.

The key part to me was his not using social media, meaning that he didn't have a large number of voices urging him to shift focus elsewhere. Steve then backed this up by working alongside consultants who were able to maintain the direction with him. One of these was Dick Richardson, who has his own grazing consultancy called Grazing Naturally. Originally from South Africa, Dick was a holistic management trainer with the Savory Institute before moving to Australia. With Dick's help, Steve has been able to build up both soil and plant diversity by setting up a seven-year grazing plan which varies the length of rest each paddock receives during the course of a year. What really struck me whilst walking the farm with Steve and Dick was the focus on observation as Steve discovered new plant species beginning to thrive under the new management plan.

Steve also uses a local soil scientist, Matt Ballantyne, not necessarily for looking at his soils but as someone independent to bounce his ideas off and as an additional challenge to Dick Richardson. The key is that Matt is a free thinker and isn't driven by sales targets so is able to offer completely independent advice to Steve. The results speak for themselves. The stocking rate in the last year increased from 7.25kg/ha to 10.15kg/ha at the same time that grain fed dropped from 70 tonnes to zero! Where Steve used to struggle to find an earthworm he now finds them in every shovel, with this apex predator a sign of the increasing levels of soil biology.

Steve Slape and Dick Richardson

> ***"The results speak for themselves."***

Regenerative agriculture: A shared ambition for the future of farming?
https://qrco.de/bgiGxG

Action that can be taken immediately (Do now)

Putting it into practice: Regen and net zero

Chris Taylor NSch 2022

1. Addressing climate change and tackling greenhouse gas emissions is imperative for keeping our planet healthy and inhabited by the diversity of life.
2. Meeting net zero in UK agriculture isn't going to be realised by one large innovative idea or solution. It will be a lot of incremental gains, that amount to realising the overall goal.
3. Regenerative agriculture principles should be fully integrated into a farming system, as these principles don't fulfil their potential used in isolation.
4. In tackling the two big emissions factors on farms (fuel and fertiliser), regenerative agriculture provides solutions to mitigate their impact and offset through sequestration.
5. When implemented correctly, regenerative agriculture offers wide ranging benefits including profitability, productivity, resilience and environmental gains.

Recommendations:

1. The best time to sample fields for organic matter was 20 years ago, the second-best time is now!
2. Carry out a whole farm carbon audit to identify areas to target for mitigating greenhouse gas emissions and understand your current sequestration potential.
3. A transition to regenerative farming should be planned thoroughly with a phased approach that you and your business are comfortable with.
4. Seek guidance and advice from practitioners of regenerative farming to help implement practices that will help your business move forward in a more sustainable manner.
5. In selling carbon credits off the farm, ensure you're not undermining your potential to hit net zero in your own right in the future.

Chris Taylor

> ***"A transition to regenerative farming should be planned thoroughly."***

Do regenerative farming practices pave the way for UK agriculture to meet net zero? https://qrco.de/bgiHZg

Talking point: Shifting our mindset

Jimmy Stobart NSch 2020

One of the biggest lessons from my journey has been the importance of shifting our mindset. This isn't just about adopting new technology or reinventing the wheel, it's about going back to what previous generations of farmers did naturally: observing the land, understanding its signals, and using that knowledge to guide decisions.

For too long, we've been locked into a production-driven mindset, focusing almost entirely on yield-based KPIs. But the reality is, environmental indicators, things like soil health, water retention, biodiversity, and overall land resilience, are just as, if not more, important. These simple, low-cost observations can tell us so much about how our land is responding to daily management. And, over time, they give us a clearer picture of its long-term health and sustainability.

This isn't about rejecting progress; it's about blending old wisdom with modern knowledge. We have more data, better tools, and greater opportunities than ever before to make informed decisions. But at the core of it all, we need to relearn the observational skills that generations before us relied on. Farming isn't just about maximising production, it's about optimising and working with the land, not against it. By shifting our mindset and embracing a more holistic, long-term approach, we can build an adaptive and resilient future, one that benefits not only our farms and businesses but the environment and communities around us.

For too long, agriculture has viewed nature as something to be controlled or managed in isolation from production. But the reality is that nature and farming are intrinsically linked. Trees, soil microbes, pollinators, and livestock all play a role in nutrient cycling, water retention, and productivity. Once we recognise that nature isn't an obstacle to farming but rather its foundation, the way we approach land management changes entirely.

> ***"By shifting our mindset... we can build an adaptive and resilient future."***

Effective monitoring methods that measure ecological outcomes in grazing systems: https://qrco.de/bgiH6H

Think ahead: Resources for further information

There are a range of organisations and establishments who can help with adopting regenerative farming practices, and many businesses have set up to assist farmers with the transition.

This list (which is not exhaustive or in any particular order) may be able to provide help and support in terms of researching regenerative farming and implementing it on-farm.

LEAF (Linking Environment and Farming)
LEAF has a focus on integrated farm management (IFM) and has a network of demonstration farms and innovation centres. It is also developing the LEAF Regen Academy, a community-led platform focused on application, evidence and learning – rather than advocacy – helping farmers explore regen practices in ways that work for their businesses.
https://leaf.eco/farming/resources

Agricology
Set up in 2015 by a range of industry organisations, Agricology is an independent knowledge platform supporting all farmers and growers to transition to more sustainable and resilient farming systems. It is free, open to everyone and brings together research from the field and farmer experiences on using practices that restore the farm ecosystem. It hosts open days as well as its online platform.
https://agricology.co.uk/

BASE-UK
An independent, farmer-led knowledge exchange network dedicated to regenerative agriculture. BASE stands for Biodiversity – Agriculture - Soil – Environment and the UK group was founded in 2012. Funded by members, it encourages active participation through presenting experiences and hosting farm visits, fostering a collaborative and innovative community. It also hosts an annual two-day conference.
https://base-uk.co.uk/

Innovative Farmers
Innovative Farmers is a not-for-profit membership network, for farmers and growers who are running on-farm trials to test innovative new practices. This farmer-led research allows them to collect robust data which is relevant to the real-world farming environment and easily transferable to their businesses.
https://www.innovativefarmers.org/

The British On-Farm Innovation Network (BOFIN)
BOFIN was founded in 2020 on the belief that farmers should be at the forefront of agricultural innovation – helping to shape research and development for the future of the industry. The BOFIN model is based around a 'Knowledge Cluster' which engages farmers and shares learning and insight from its projects. Joining BOFIN is free and includes membership of its Knowledge Clusters.
https://bofin.org.uk/

Innovation for Agriculture
Helping farmers put innovation into practice, Innovation for Agriculture connects farmers with farming research. It works with leading agricultural researchers, businesses, landowners, and farmers to develop the knowledge and technologies that will make modern farming more sustainable, resilient, and productive. Through practical and interactive workshops, farm walks, and on-farm demonstrations, it helps farmers put this knowledge into practice.
https://www.i4agri.org/

Pasture for Life
A non-profit membership organisation started in 2009 by farmers, it supports any farmer — no matter where they're starting from — to move towards profitable, pasture-based farming through on-farm events, peer-to-peer learning, evidence, a community of like-minded individuals, online learning, mentoring and consultancy.
https://pastureforlife.org/

Groundswell
Groundswell is a two-day regenerative agriculture festival that provides a forum for farmers, growers and anyone interested in agroecological systems to learn about producing food and fibre while regenerating the soil and land. Hosted by the Cherry family on their farms in Hertfordshire, the event has a practical focus, with in-field demos and safaris alongside the main talks and workshops.
https://www.groundswellag.com/

Nature Friendly Farming Network (NFFN)
A membership organisation led by farmers, it aims to support farmers at every stage of their journey towards nature-friendly farming. It says it showcases the experiences of farmers, sharing knowledge that empowers those in transition to produce plentiful food, mitigate climate change, reverse biodiversity decline and safeguard the future of UK agriculture.
https://www.nffn.org.uk/

Soil Association
Working with all farmers and growers, not just organic, who are interested in farming using agroecological principles, the Soil Association facilitates on-farm research, farm walks and demonstration events. Its website offers useful resources on regen techniques including no- or min-till approaches, herbal leys, companion cropping, cover crops, livestock in arable systems and soil health.
https://www.soilassociation.org/farmers-growers/farming-events/

European Agroforestry Federation
The European Agroforestry Federation (EURAF) is the primary organisation promoting the use of trees on farms across Europe. Representing more than 500 members from 24 countries, EURAF works with policymakers, researchers, and farmers to advance sustainable, high-productivity agriculture through integrating trees on-farm.
https://euraf.net/

Climate Farm Demo
A European-wide network of 1,500 pilot demo farmers and their advisors who are implementing and demonstrating climate smart solutions for a carbon neutral Europe. This EU-funded project aims to increase knowledge exchange with a view to adapting agricultural production systems to climate change and to achieving a carbon neutral agricultural sector by 2050. Its website includes lists of relevant events across Europe, and reports from previous visits/events.
https://climatefarmdemo.eu/

The Royal Countryside Fund
The 'Routes to Regen' project is testing a blueprint for cross-industry collaboration to support farmers to move towards regenerative farming, providing resources and free on-farm advice to help identify the best options for sustainability on each farm. A detailed report has been published on the first year of the scheme, which is now seeking farmers in the East of England for Phase II.
https://www.royalcountrysidefund.org.uk/how-we-help/on-your-farm/routes-to-regen/

Monitor Farm Scotland
Scotland's Monitor Farm initiative has pioneered new ways of working, experimented with new ideas and measured the inputs and outputs of host farms to improve their productivity and profitability. The current programme launched in November 2022 running to 2026 and features nine farms. The programme is managed by Quality Meat Scotland with support from AHDB and is fully funded by £2 million secured from the Scottish Government's Knowledge Transfer and Innovation Fund.
https://www.monitorfarms.co.uk/

AHDB Strategic Farms
AHDB's Strategic Farms, part of its Farm Excellence platform, deliver sector-specific improvements, with a focus on technical performance (as opposed to the whole-farm business performance focus of AHDB's Monitor Farms). The network of strategic farms across the UK encompasses arable, dairy, and beef and sheep, with meeting topics being based on demand from those who attend.
https://ahdb.org.uk/farm-excellence-strategy

Regenerative Farmers of UK
This organisation connects farmers and consumers who are looking to restore soil and nature. Set up by a group comprised mostly of West Somerset farmers, it is independent, aiming to scale up and speed up the regenerative movement in the UK. Its website includes book recommendations and relevant events and courses.
https://regenerativefarmersofuk.com/

The Allerton Project
The GWCT Allerton Project researches the effects of different farming methods on wildlife and the environment on its 320ha demonstration farm in Leicestershire, sharing its results through advisory and educational activities. Its work covers natural capital accounting, agri-environment schemes and regenerative farming systems.
https://www.allertontrust.org.uk/

Farm Carbon Toolkit
Created by farmers for farmers, it works to further the understanding of greenhouse gas emissions in agriculture. It provides tools and services to measure environmental impacts, training and events, and runs projects with farmers that inspire action on the ground, as well as offering advice and action centred around measuring and improving soil health, regenerative agriculture, greenhouse gas emissions and other ecosystem services.
https://farmcarbontoolkit.org.uk/

Farm Advisory Service (Scotland)
FAS has brought together much of the work done in Scotland looking at climate/soils including links to The Net Zero Arran , Hoddom and Kinmount Estate and Farming for a Better Climate projects. These showcase case studies of practical actions on farms, and how these have positively impacted business performance and profitability.
https://www.fas.scot/environment/climate-change/

Farming Connect (Wales)
Farming Connect has a range of resources on regenerative agriculture, including specific projects on soils, herbal leys, catch cropping as well as a network of demonstration farms. Its Ear to the Ground podcast also covers regen topics, while its Try-out fund offers up to £5,000 to put towards an on-farm trial to try-out ideas with the aim of improving efficiencies and profitability within agricultural businesses while protecting the environment.
https://businesswales.gov.wales/farmingconnect/

FAI Farms
While it runs a consultancy business, FAI Farms uses data and e-learning to offer FAI Academy courses (some free) and expertise to support positive change in animal-based production. Its focus is on regenerative agriculture, responsible farming practices, and ethical food production. By partnering with farmers, food brands, and industry leaders, it says it helps drive the transition towards systems that restore nature, enhance animal welfare, and ensure long-term resilience.
https://www.faifarms.com/

Nitrogen Efficient Plants for Climate Smart Arable Cropping Systems (The NCS Project)
This farmer-led research programme involves 17 industry and research partners and over 200 farmers. PulsePEP is the farmer-led community for the NCS Project and is free to join. Its aims include reducing carbon emissions, increasing pulses and legumes in arable rotations and reducing imported soya meal.
https://ncsproject.co.uk/

Soya UK
A commercial seed merchant, Soya UK deals in a range of crops including soya, white, blue and yellow lupins, mammoth millet, spring triticale and wholecrop mixtures. It is also involved in seed production, crop trading and exporting, as well as farming in its own right. Its website offers a range of information booklets and videos.
https://soya-uk.com/

Processors and Growers Research Organisation (PGRO)
As the UK's centre of excellence for peas and beans, the PGRO has a track record of providing authoritative, up to date information (including practical agronomy guides) and research. A non-statutory levy body, it is supported by grower members, the UK trade and outside funding for research work carried out on its own and in partnership with other organisations.
https://www.pgro.org/

UK Agri-Tech Centre
An independent organisation, it aims to deliver solutions to agriculture's most complex challenges by accelerating innovation through expert insight, advanced facilities and strategic support. In collaboration with farmers, the agri-food industry and some of the best research institutions and most innovative companies in the world, it provides leadership and guidance to progress change.
https://ukagritechcentre.com/

Nuffield Farming Scholarships Trust - Scholarships
NFST aims to inspire passion in people and develop their potential to lead positive change in farming and food. It awards about 25 life-changing scholarships each year that unlock individual potential and broaden horizons through study and travel overseas, with a view to developing the farming and agricultural industries. More than 1,000 Nuffield Farming Scholars have completed their studies and travel.
https://www.nuffieldscholar.org/

Nuffield Farming Scholarship Trust - Next-Gen Scholars
The Next-Gen Scholarships are focussed on young people aged 18-24 as part of Nuffield Farming Scholarships Trust's initiative to develop young talent. They aim to help young people establish themselves in agriculture, using the Nuffield Farming network to link successful applicants directly to farmers.
https://www.nuffieldscholar.org/scholarships/nuffield-farming-next-gen-scholarship

Think ahead: Academic resources

Universities, research centres and other academic institutions can be a useful point of contact if you are considering regenerative agriculture. They may be able offer a research project with an undergraduate or postgraduate student or help with other queries. Again, this list is not in any order and is not comprehensive:

University of Leeds
The university's farm is home to a unique regenerative agriculture research trial, testing and measuring the impact of combinations of regenerative agriculture farming practices on soil health, crop production, greenhouse gas emissions, biodiversity and farm business profits. It is also one of 10 farms across Europe involved in a research project aiming to reduce their carbon footprint by 55% compared to a 1990 baseline over the next five years.
https://www.leeds.ac.uk/global-food-environment-institute

University of Cumbria
Researchers are collating and analysing the evidence for regenerative farming, focusing on carbon storage and agricultural yield. Project outputs will include a searchable database of evidence, an open-access scientific paper and a set of policy briefs (including farm economics) summarising the project findings aimed at farmers, farm advisors, policy makers and researchers.
https://www.cumbria.ac.uk/

University of Oxford – Leverhulme Centre for Nature Recovery
Research includes a project looking at the role of regenerative farming for biodiversity and ecosystem functioning. Based on two farms, it is focussing on pastureland under different management regimes from passively restored and regenerative practices to intensively (mob) grazed grasslands. The main goal is to determine the role that regenerative farming plays for nature recovery.
https://naturerecovery.ox.ac.uk/

University of Gloucestershire
Its researchers are key in a £12.3 million EU-funded TRAILS4SOIL project to discover how regenerative and conservation agriculture could help reverse soil degradation. Working with farmers, they will provide hard evidence from 100 sites across nine European countries on regenerative and conservation agriculture's impacts on soil health, crop yield, farm income and farmer wellbeing.
https://www.glos.ac.uk/

Rothamsted Research
Rothamsted Research is a world-leading, non-profit research centre that focuses on strategic agricultural science to the benefit of farmers and society worldwide. This includes being part of the £13.8m 'AgZero+' five-year research programme. This aims to support the UK's transition towards home-grown food production that is sustainable, carbon-neutral and has a positive effect on nature.
https://www.rothamsted.ac.uk/

Harper Adams
Harper Adams University has departments, curricula and research specialisms in a wide variety of subjects, including technology, science, environment, engineering, entomology, plant science, animal wellbeing, veterinary science, sustainability, digital, data science and policy. It is home to The School of Sustainable Food and Farming, and has a practical focus on regen agriculture, including running courses on topics such as regen for beef producers.
https://www.harper-adams.ac.uk/

SRUC
SRUC has a focus on education, research, and consultancy (through SAC Consulting). Working in partnership, it focuses on solving the 'wicked challenges' facing the planet, including climate change, biodiversity and access to nutritious food and clean water. Its Challenge Centres focus on critical areas to generate solutions and share research that delivers impact that brings about change.
https://www.sruc.ac.uk/research/challenge-centres/

Royal Agricultural University
The RAU's approach to research is formulated around collaborations between scientists, farmers and innovators. Running its own farm, which it is transitioning to be fully regenerative, it leverages collaborations and develops innovative research projects, embracing farmer-science and farmer-led innovation networks. Its six research clusters include sustainability, regeneration and biodiversity in agriculture, livestock health and welfare and food policy, quality and security.
https://www.rau.ac.uk/research/research-at-rau

Newcastle University
Newcastle's agricultural research strengths are in production systems and food systems, and it also has its own farms which cover 800ha and are looking at areas including no-till. Its work focuses on enhancing productivity and sustainability in livestock and arable agriculture and addressing sustainable development issues in relation to food.
https://www.ncl.ac.uk/nes/our-research/agriculture/

The James Hutton Institute

The James Hutton Institute's research projects drive agricultural innovation, environmental sustainability, and biodiversity conservation, with research spanning crop resilience, soil health, land use studies, and climate change adaptation. It also runs projects on its own farms.

https://www.hutton.ac.uk/research-projects/

Cranfield University

Cranfield has a soil science specialism and is also part of the AGROMIX project. This aims to drive a transition to more resilient and efficient land use in Europe, looking at synergies found in mixed farming (crop + livestock) and agroforestry (trees + crops and/or livestock) systems and the associated value chains. The initial research is on 12 contrasting pilot sites across Europe and involves 10 universities, 7 research institutes and 11 other partners.

https://www.cranfield.ac.uk/research-projects/agromix

SPONSORS

Central Region Farmers Trust

Central Region Farmers Trust's mission is to provide funding for education that benefits agriculture and horticulture in the central region. It strives to support farmers in adopting sustainable farming practices and enhancing their skills for a thriving agricultural sector.

www.centralregionfarmerstrust.org

Gloucestershire Agricultural House Foundation

Helping agriculture in Gloucestershire by supporting the education, development and needs of people in the industry.

Elizabeth Creak Charitable Trust

The Elizabeth Creak Charitable Trust is a grant giving body that invests in people who will advance healthy, fair and sustainable UK food production. Grants finance projects that help farmers innovate to survive and thrive while scholarships support and encourage individuals to innovate sustainable practices in farming.

www.elizabethcreak.co.uk

Royal Agricultural Society of England (RASE)

The Royal Agricultural Society of England (RASE) is an independent charity and membership organisation dedicated to supporting the progression of knowledge and innovation within the agricultural community.

www.rase.org.uk

IN SUMMARY

This Bitesize Guide, from the Nuffield Farming Scholarships Trust and RASE, provides a snapshot of the breadth and depth of reports available at

https://www.nuffieldscholar.org/reports

The website also features reports from global Nuffield Farming Scholars, including Australia, New Zealand, USA and Brazil. The reports are a rich source of inspiration, case studies and thought-provoking recommendations for farming, food, horticulture, forestry and ancillary industries.

Please get in touch at info@rase.org.uk if you have questions, comments or feedback.

RASE

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