



Farming Connect Management Exchange

Will Sawday

England and Scotland

Regenerative livestock farming

1 Background

I farm with my brother and mother near Hay-on-Wye, where we run a flock of 1400 NZ Romneys on a forage-only, low-input system. The farm is 560 acres and split across several blocks, of which 225 acres is owned and the rest is rented. Most of the land is permanent pasture; however, we grow some forage crops for winter, which we reseed with herbal leys.

The core of the business is the 600 ewe stud flock of Romneys and RomTexs, for which we regularly import genetics from New Zealand. These rams enter our breeding programme, which enables us to sell rams to commercial producers across the UK.

Having always been interested in low cost farming models and utilising grazed grass, the regenerative farming concept grasped my attention and seemed like a natural progression for our business. I hoped that applying to the Management Exchange would help me develop my understanding of this area and subsequently help implement some positive changes to our farm at a financial, environmental and social level.

Applying to the exchange in November 2019, I had big ambitions of touring Europe. Fast forward to a pandemic, and this idea was kiboshed. Thankfully, though, Farming Connect extended the exchange by a year and permitted UK travel, allowing me to visit some fantastic places and people closer to home.

The aims of the exchange were to better my understanding of:

- The core principles of regenerative farming
- The benefits of farming regeneratively
- The optimal and desired outcomes of these systems
- The dynamic between soil, plant, animal and human health and how to improve these



2 Itinerary

01/09/2020

Alex Brewster, Rotmell Estate, Dunkeld, Perthshire

Alex is a Nuffield Scholar, and winner of the 2020 UK's Soil Farmer of the Year Award; he farms with his wife, Jane, at Rotmell, Perthshire. Rotmell is an 1000 ha upland farm of which 130 is improved, and the rest is hill. The farm carries 900 Blackface Composites and 300 Aberdeen Angus cows. They also run a 4000 bird organic laying unit, as well as an electric fencing company called Powered Pasture.

The main reason for visiting Rotmell was to learn about the impressive grazing system that Alex has managed to set up, which is not only on a large scale but also in a challenging, upland topography. Alex has been experimenting with rotational grazing for many years, and has implanted a fine-tuned mob grazing system facilitated by extensive farm subdivision with permanent and temporary fencing as well as investing in a water system that now takes water from a loch at the top of his land and supplies the whole farm.

Alex explained about his form of cell grazing which is based on the American, regen, tall grass grazing system which allows around 90 days' rest and complete plant recovery before grazing. Alex thinks this method is the reason behind his success in improving his soil structure and rooting depth, which has subsequently improved plant nutrient availability and livestock performance, all the while increasing stock carrying capacity.

Alex took me to see his cattle out on his hill, mobbed up and demonstrating what he preaches. I helped move them into their next section, where they were quiet, content and had full bellies, even



before a move. Alex explained that when he's tall-grass grazing, he aims for 30% utilisation, 30% trampling and 30% left. This is not only a great way of feeding the soil microbes through root exudation and foliage trampling, but it is also leaving a large amount of leaf and root structure for a rapid regrowth. The cattle are also only picking out the very best from the pasture, so productivity is not compromised, whilst the entire paddock has had animal impact either through grazing, trampling or deposit of urine and dung.

Another advantage of tall-grass grazing method is that it can be hugely more resilient to weather conditions. In drought conditions, soil moisture is better withheld due to a greater mass of plants insulating the soil. Then in wet conditions, greater root structure allows better drainage and also helps minimise poaching.

Alex took me to see his sheep, which were rotationally grazing some fields on a section of his lower ground. He doesn't expect the same grass utilisation percentage from the sheep on this system but he is still rotationally grazing them on covers in excess of 4000 kg/dm/ha.

Much of the farm is has rough terrain, and has poor access. As a result, getting sufficient grazing pressure has been historically challenging and consequently bracken covered a lot of the farm. In his younger years, Alex tried a lot of chemical treatment to get rid of this affliction, which included using a helicopter. All of which was to no avail. However, since applying his grazing strategy, Alex is breaking the back of the problem, and has already reclaimed vast areas of the farm. He took me to an area which was until recently chest-height bracken, and now is lush, productive grassland. I was astounded by how a combination of sufficient grazing pressure, nutrient cycling and rest can transform that land into not only productive farmland, but also a thriving soil and grassland ecosystem.



Land that was previously engulfed in bracken, and is now productive grassland.

Alex was also very interested in carbon sequestration, and how increasing soil carbon content can help everything, from forage production and quality, to drought and poaching resilience and much more. He reckons that this grazing strategy is doing just this, by establishing healthier plant-soil microbe relationships, where plants are able to request nutrients from the soil via these microbes in exchange for liquid carbon for food. These relationships offer huge plant nutritional resources, which can increase yields, but also offer disease and even pest resilience. Alex spoke about how a big part of establishing these networks boils down to stopping cultivation, chemical and fertiliser applications. In particular, he was very concerned about the damage fly sprays and anthelmintics are doing, which he thought was monumental and is taking every action to reduce usage of these products.

Also on the carbon theme, Alex had teamed up with Dundee University in a project which explored how spreading quarry dust on land might sequester carbon and store it in the soil by a process called enhanced rock weathering. Actually, it is quite a simple concept, where the dust is broken down by chemical weathering, in a process that uses carbon dioxide from the atmosphere to produce a solution, and it was thought this carbon would get stored in the soil. The study unfortunately showed no changes in soil carbon or minerals but it did greatly increase soil micro-biology levels.

17/06/2021

Regenerative grazing course (online) conducted by NielsNiels Corfield

This was a three-day online course run by Niels Corfield, independent adviser and educator. The course was made up of presentations and workshops that covered the basis of regenerative grazing systems and their outcomes. These were very informative sessions that helped me build a better picture of the benefits of regen grazing and how to set up and manage such a system.

The first session concentrated on the pasture health principles. These are a list of management principles that optimise best balance of financial and environmental gain from a grazing system. The main principles included:

- Pasture rest is key. Lengthening grazing rotation, allowing full plant recovery before grazing which improve plant and (subsequently) soil health.
- Shorten grazing duration. Keep mobs stock tight and constantly moving. Regrowth cannot be grazed. All pasture must have impact. Otherwise, undesirable species will be favoured.
- Aim to trample 30%. This protects the soil and will be great soil microbe food.
- Only plant tips should be eaten. This is the most nutritious part of the plant and much less likely to have any worm contamination as most worms sit at the bottom of the pasture.
- Encourage pasture species diversity. This makes a far more nutritious meal for animals as all plant will bring something unique to the table. Also, the soil microbial community is greatly improved, as is soil health.
- Eliminate or at least minimise all chemicals and fertilisers.

Niels also talked about the benefits of integrating trees and Silvopasture systems into farms. The main benefits being modifying microclimates through shade and shelter by creating a more pleasant environment for animals to live. He used the example in beef where each 1°C below the critical temperature = a 2% increase in maintenance requirement. The benefits of tree leaf foliage for ruminants are apparently vast, and can be extremely nutritious particularly in important micronutrients like selenium in Willow. Certain tree leaves can also contain condensed tannins, which can reduce worm burdens. We also discussed how trees positively impact soil health through their immense root structures, pulling all sorts of nutrients out of the ground and building and supporting vast microbial networks.

Day 2 was firstly about creating and implementing a grazing plan. Niels took us through how to create a grazing ration, and budget for stock classes and feed availability using a spreadsheet. You would then use this to calculate paddock cell sizes and the time animals spent in each cell. Then he showed us how to input the information into a grazing chart where you plan and visualise which stock group will be in which paddock and for how long.

We also discussed how to set up grazing infrastructure. Niels stressed how high investment infrastructure is a killer for a lot of farms, and that flexible infrastructure that can be used every day has a much better return on investment. Electric fences and portable water troughs are key to this system, ensuring adequately pressured water is piped to all of the farm.

Day 3 was about piecing the system together, paying particular attention to performance indicators and problem shooting. Some overlooked animal performance indicators were discussed such as:

- Dung scores (too wet: due to diarrhoea, nutrients being lost and/or health issues. Too dry: due to constipation and/or excess fibre.)
- Body condition score
- Rumen fill
- Shiny coats
- Daily liveweight gain

Pastoral indicators were looked at such as weeds and what they tell us. Dandelions, Fat Hen, buttercups and Yorkshire fog indicate bacterially-dominated soils for example. Bacteria is an early coloniser of depleted or damaged soils. This could be from compaction or poor aeration and trying to move the soil back to a fungal-dominated soil is the ultimate aim. Niels talked about the idea that weeds only germinate for a reason and that their seed has probably been lying dormant for a very long time, waiting for the right conditions. We as managers should be addressing the reason they are germinating, so simply destroying the weed with chemicals and machinery isn't going to fix the problem. In fact, through natural plant succession, the weed was probably encouraged to germinate, often in order to fix that problem so by only destroying the weed and changing nothing else you might be making the problem worse.

Breed selection was also looked at and Niels explained how smaller framed, more robust animals tended to be more efficient and better fit into this style of system.

The three sessions proved hugely helpful for piecing together my understanding of what a regen livestock farm looks like. A wealth of knowledge was shared and ultimately demonstrated to me that

the biggest investment in this type of system is your own knowledge and understanding, not infrastructure. Harvesting an income from land that supports flourishing ecosystems is not easy, but with the right mindset, it is achievable.

30/08/2021

Paul and Nic Renison, Cannerheugh Farm, Renwick, Cumbria (Renison's Farm)

I spent a superb day with Nic and Paul Renison looking at how they have changed their farm over recent years to be in their minds more environmentally and financially sustainable, but also a more pleasant place to live and work. Up until 2015, the pair ran 1100 crossbred and Swaledale ewes on a traditional system of set stocking, feeding cake pre lambing and lambing indoors. Feeling the pressure financially, and not finding fulfilment in what they were doing, they decided to change things up.

Cutting sheep numbers back to 300 was the first step and then adding in a beef herd of 25 Stabilisers put to an Angus. Adopting some tall grass mob grazing was a natural progression and out-wintering the cows in a bale pod system followed suit. They explained that bale podding is where hay bales are placed during summer in the field which will be shut up for winter. The field is then divided with electric fence into cells big enough for the group for one day with several hay bales inside. They then move the cows from cell to cell, unrolling the bales each day. Apparently, it's an incredibly cheap and easy system to manage, and to their surprise, the cows make minimal mess, even in their wet



Egg mobile in action



Chicken tractors which rear their pasture-raised broiler chickens

environment. They pointed out that there is a small amount of spoilage on the outside of the bales, but it is still food for the soil and the cost of the wastage is minimal in comparison to the endless list of costs of housing cattle.

Nic and Paul also set up an egg mobile; a small egg laying unit built on a caravan chassis capable of housing 200 hens. They move the egg mobile every couple of days, and try to follow the cows and sheep in their grazing rotation. Apparently, the chickens graze a phenomenal amount of grass as well as scratching around the sheep and cow manure for all the bugs and beasties. They sell the eggs directly to local consumers who notice a massive difference in quality compared to shop-bought.

Another new enterprise was the pigs. They bought a couple of sows and a boar, and they rear their own pigs to slaughter, which again, they sell directly in the local community. The pigs are kept in rougher parts of the farm, such as wooded areas, and are moved to new cells before they make too much mess. They then rest that area a year before returning to it. I could see the pigs had really cleared up the area they had previously been in, and apparently, the subsequent flush of vegetation is great whilst it's being rested. The pair thought it was a great was of attributing a revenue stream to a part of the farm that was previously neglected.



Pigs being pigs in a wood



5-meter-wide hedge with multiple lines of trees.

Adding to the list were their broiler chickens, which were being reared in what they called 'chicken tractors'. These are small pens that can be moved daily onto fresh grass. Like the layers, they graze a massive amount, which is what give the meat a fantastic flavour. The birds are reared from chicks in batches, then slaughtered and sold privately.

As well as selling boxed lamb and beef off-farm, they also have an extended garden, from which they sell vegetable produce to accompany their meat and eggs. Lastly, they had just built two shepherds'

huts when I was there, and are now having visitors staying on the farm and soaking in some Cumbrian scenery.

The pair now have a diverse farm business, with multiple and very different income streams, all of which has added financial resilience to the farm. What's more, each enterprise was very low start-up costs, and had very little reliance on infrastructure or machinery. They certainly have a lot going on, but I could see that the work was very variable, and they are convinced it is a more enjoyable setting for their family to live in.

Paul also showed me his grand agroforestry project, where he had planted several parts of the farm with mixed-species broadleaves, with the aim of coppicing the trees for wood chip. Before chipping, they will let the stock eat the foliage, and then the wood chip will be used for bedding. A great way of producing your own carbon and then sequestering it in your soil once it's composted and spread on the fields. In addition to these plantations, several 5-metre-wide hedges have been planted as wind breaks and also with the aim of producing livestock feed and woodchip.



Mixed tree species planted as a part of their agroforestry plan

24/09/2021

Ben Taylor-Davies, Townsend Farm, Ross-on-Wye

Ben is a farmer, an agronomist, a Nuffield scholar and a self-proclaimed bioagroecologist. I originally met and heard Ben speak at a farm discussion group meeting, where he spoke at length about soil health, along with all the crazy things he was doing at his farm, all in the name of regen ag, so I couldn't help asking for a visit.

Having started his career as an agronomist Ben spent much of his time supporting systems that operated using heavy cultivation and liberal applications of synthetic fertiliser and chemicals. Watching yields plateau and sometimes fall and weed, pest and disease problems get worse, Ben couldn't help but feel there was a better way of doing things. This spurred on a Nuffield scholarship, from which stemmed a fascination for the ways nature can manipulate productive agriculture. Having ditched the agronomy job, Ben is now a regen farming consultant, and he walks the talk by putting the methods to test on his home farm.

Townsend Farm is a 550 acre arable farm on the banks of the Wye. The main crops being grown are potatoes, oilseed rape, spring barley, winter wheat and winter rye. Very little cultivation takes place here, with most crops being sown by direct drill. Ben has slowly weaned himself off most fertilisers and chemicals, and says that yields are barely below what there were when he started the journey.

In recent years Ben has brought livestock back to the farm in a bid to restore fertility, the main enterprises being a flock of 80 sheep, 10 Hereford cross cows, an egg mobile (similar to the Renison's) and broiler chickens. For these enterprises, he has taken a small number of fields out of the arable rotation to put them into herbal leys.



Ben's flied. Sheep and cows mixed and rotationally grazing tall covers of herbal leys.



Egg mobile made from a stock box.

Ben told me about the 5 principles of soil health – principles which have restored the health of his farm:

- Minimise soil disturbance. Tillage destroys soil structure and the ecosystems that depend on that structure.

- Armour. Always keep the soil covered to protect it from the environment. Bare soil is an anomaly.
- Diversity. Establish the richest diversity of plants and animals as possible. Everything feeds off everything. Monocultures don't exist in nature.
- Living roots. Living roots are feeding soil biology by providing carbon. This biology, in turn, fuels the nutrient cycle that feeds plants.
- Integrate animals. A healthy ecosystem needs animals. They are a key link in the chain for maintaining healthy plants and soil biology.

Applying these principles have been fundamental to the success of Ben's farm. A testament to this was a field of potatoes that Ben grew this year, which yielded the same as his previous conventionally grown fields and received no nematicide, insecticide, blight spray, phosphate or irrigation. It just received ¼ rate nitrogen and compost extract. It was sown with a 1 pass ridger and a companion crop. In the end, it cost £1880/ ha less to grow. A very hard crop to grow organically without major yield reductions, but Ben thinks that a properly functioning soil can provide the necessary nutrients to combat the crop protection pitfalls. Ben now believes that taking his farm to an organic, no-till status is well within his reach.

A major change Ben has made is planting cover crops. Once a field is harvested, if it isn't going straight into another crop, Ben will plant a cover crop, even if it is for a month before the next crop goes in. He believes that it is worth it, because not only are those plants hanging onto soil nutrients, they are also harvesting the sun's energy and pumping carbon back into the soil. He plants a huge mix of species from as many different plant groups as possible. This then gives a great opportunity to be utilised by his livestock.



A mixed-species cover crop, of which the main components were buckwheat and vetch.

Like the Renisons, Ben is trying to stack enterprises into his farm. Glamping, a shoot, bees, goats, a vineyard, self-service farm shop in a horsebox and a wedding venue are the additional enterprises he is running at the moment, with ambitions of setting up more. He aims to have 20 enterprises earning at least 20K in profit. He doesn't run them all himself; most of these he runs as joint ventures with friends and locals.

Ben also showed me two interesting projects he had on the boil in his bid to encourage even more fertility onto the farm: a Johnson-Sue bio reactor and a wormery. A Johnson-Sue is essentially it is a static compost bin that aerobically decomposes carbonous materials such as woodchip or leaves to produce a clay like material that can be used as a seed treatment or as a straight application to soil. The main advantage of this product is its high concentration of fungal populations, which means a small amount goes a long way. It is a great way to introduce new fungal species to

your soil, or to aid seedling germination. Ben set his up on an old trailer but most people make theirs in IBC's. The wormery was in a home-made metal box with an open top to put the material in and a grid on the bottom, where the worm casting could be extracted. Ben then makes worm teas to spray on fields, which, a bit like the Johnson-Sue, are not only great for nutrients, but also pack a valuable fungal punch. It is Ben's aim to only use the wormery, Johnson-Sue and animals for fertiliser on his farm.

I was impressed by Ben's vision and his disregard for convention. His curiosity led him to try anything and everything. His farm was his playground, and if there was a right or wrong way of doing something, he wanted to find both of those out. As a result, his farm is flourishing and his soil, crops and animals looked great.



Worm farm. Material and food goes in the top and extract falls into the tray at the bottom.



Farm shop in a horse box

3 Next steps

Over the course of the Management Exchange, I've had some fantastic conversations with some inspiring people who have ultimately shown me how regenerative agriculture can derive a prosperous farming business. It has really made me question some of the things we do on our farm, and how this topic can find solutions to some of our challenges. I have now got the bug, and am eager to put some of the ideas to test on my farm, and in fact, we already have. Last winter, I actually built an egg mobile and took delivery of 100 hens in March, with grand plans to move the house around the farm, following the sheep and producing pasture-raised eggs to sell off-farm. We

approached a couple of shops, restaurants and bakers, and it was an immediate success. So this summer we built another one, housing 180 hens, to keep up with the demand.



My egg mobile.

Another change is our forage crop establishment. Normally we spray, then plough and cultivate, and used bagged fertiliser. Following Niels Corfield's and Ben Taylor-Davies' advice, we used half rate glyphosate mixed with fulvic acid (improves the effectiveness of glyphosate at low rates, but hugely buffers the damage it does to soil microbiology), then spread chicken muck and direct drilled a mix of swedes and kale. The results have been overall good. A couple of great crops that have cost us very little. But also, a couple of poor ones, but we think we know why, and what we could have done to improve them. It's certainly a learning curve, but definitely a direction we should be heading in.

Looking to the future, however, at the top of our list must be to concentrate on improving soil health and function. The benefits of this are endless, both financially and environmentally. Closely linked should be resilience building to safeguard us from market and climatic variations. I think reduction of costs and improvements in plant and animal health would be outcomes that allow this to happen.

Specifically, the changes we need to make are as follows:

- Eliminate fertiliser and chemical usage, including anthelmintics.
- Stop cultivations
- Encourage diversity to our pastures through seed introduction but also grassland management.
- Tall grass grazing. The benefits of allowing grass to mature are undeniable, managing and profitable flock of sheep on it though might (in my mind) be tricky. Either way it must be tried.
- Cattle. I think cattle's grazing pattern would be a huge asset to our pastures and would massively help to develop soil and pasture health. Further, they might help to utilise all that mature grass I will be growing.
- Agroforestry. I realised that this didn't used to be a term, as forestry and farming have coexisted for millennia. We now have to give it a name to make it seem less weird, because we have extracted ourselves so far from the models of farming that dovetail with nature. Apparently, it takes 50% canopy cover to reduce pasture growth by 20%. So the notion that trees massively hinder farm productivity is untrue. The benefits of trees in fields are huge, and would be a big step in getting some resilience back into the farm. I would like to plant willow, poplar and a few other fast-growing broad-leaved tree species, which I could then pollard for tree fodder and biomass.
- Fertility building. I would like to make a Johnson-Sue bioreactor, because it doesn't require a large investment, and it would be a great way of adding fungal populations to our soil.

4 Key Messages to the industry

- Profitable livestock businesses can certainly be maintained under these systems. In most cases overall production can be less than traditional high-input, high-output systems, but regen operators go by the mentality of 'yield is vanity, profit is sanity'. And with escalating input prices, I should think more people will turn to these types of lower-input systems as high-input, high-output systems become increasingly volatile.
- Soil health is the driver of all financial, environmental and social outcomes. It will make or break us.
- Mixed species permanent pastures are king. Not only are they more resilient than rye grass leys, but they can be just as productive and can offer better animal nutrition.
- Mindset and approach. As Einstein once said, 'If you change the way you look at things, the things you look at change'. Redefining what is good and bad will help us visualise what is financially and environmentally worthwhile (two factors that I am now convinced are intrinsically related). Most of all, we shouldn't be farming to impress our neighbours.

I am under no illusion that there isn't much that is new about regen farming. Most of the concepts are as old as farming itself. It is, however, bringing together a lot of the science and understanding as to why these concepts did, and indeed, still do, work. Before destructive inputs were around, crop and animal yields were maintained for millennia without depleting the soil and environment, and I think we are now having to re-learn these skills.

In addition to the financial and environmental benefits, there is interestingly a lot of work being done comparing soil health with human health and unsurprisingly when you grow food in healthy soil it has greater nutrient density and will offer better health to the consumer. When you add all these elements together, I would not be surprised if the public and government imminently start asking for their food to be grown under regenerative farming systems.