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The Golden Hoof: Why Cropland Needs Livestock

Sally Bernard

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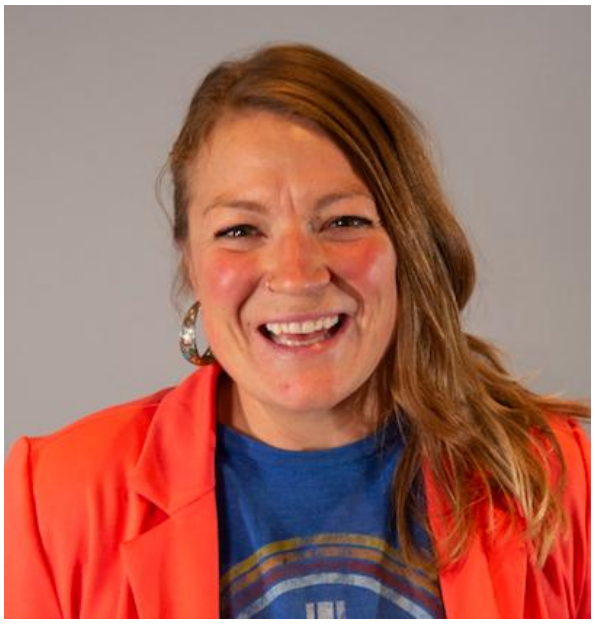
SCHOLAR PROFILE



Sally farms with her partner Mark, and her four kids in Freetown, PEI, on their farm Barnyard Organics Ltd. While she grew up on an idyllic family farm in West Branch, NB, when they met at agricultural college, she and Mark decided to move to his family farm on the Island and make the switch from potatoes to organic grains. That was in 2006, and by 2010, the entire 550-acre farm was certified organic and producing grains for wholesale markets. While organic markets remained strong, it became clear that diversifying markets would be an important priority moving forward. Mark and Sally added an organic soybean roaster, various seed-cleaning capabilities, and eventually a feed mill, which was important for value-adding. The feed mill grew to have its own brand, East Coast Organic Grainery, and mills the only organic feed east of Quebec, sold through feed stores throughout the Maritimes.

In 2019, the realization that the tillage used in organic grain production and the lack of readily available fertility were resulting in soil that was not thriving, out of balance, and depleted. A pivot was needed, and a decision to move to a more regenerative model was adopted. They purchased a no-till seed drill, altered and extended their crop rotation to include more intentional cover crops, and decided to incorporate grazing into the rotation. Having grown up with cattle and sheep, Sally was keen to manage a small herd of beef cattle and chose Belted Galloways. This was an exciting challenge but not one without a learning curve and new infrastructure needed, like fencing and water. Learning more about forage mixes, crop rotations, grazing equipment and management was the impetus for her Nuffield topic and this journey.

Sally has been actively involved in various boards and organizations within organic agriculture, both provincially and nationally. She was president of the Atlantic Canadian Organic Regional Network and the Certified Organic Producers Cooperative of PEI. She sat on the Canadian Organic Roundtable and has chaired her children's school Home & School committee. She is passionate about local food and regional food communities. In the winter, she loves to play hockey, and in the summer, when not moving her cattle, she can be found bombing around the Maritimes on her motorcycle or playing Scrub with her family in the front yard.

Sally, Mark, and the farm have received several notable awards and recognition, including Farmer of the Year from PEICOPC, the Gilbert R Clements award from the PEI Federation of Agriculture, Atlantic Outstanding Young Farmers, and Soil Conservation Farm of the Year from the Soil & Crop Association. Sally also received the After Party award from her roller derby league three years in a row.

ACKNOWLEDGMENTS

Rather than saving the best for last, I want to first and foremost acknowledge my partner, Mark, for being the roots of the great tree that let this seed take flight. Without your unwavering support and encouragement, none of this would have happened. May our children learn from you what support for a partner looks like and model it in their own lives. Speaking of which, Lucy, Wilson, Thayne and Sol, you have all played important roles in this journey and I am so grateful for your understanding and enthusiasm for my big ideas. You all worked to hold down the fort while I was away, from gathering and grading eggs to feeding cattle and helping pack feed. I couldn't have done any of this without each of you and frankly I was a little disappointed at how well everything went in my absence due to your extreme competence. For Mark, Lucy and Wilson, for travelling with me; thank you for talking me off the ledges, for navigating and debriefing and laughing and making memories that will last a lifetime. I am grateful for each of you.

My parents have encouraged me, supported me, and shown me what lifelong learning and giving back to the community look like. I am infinitely thankful for everything they've done for me.

For those who hosted me while I was in your country, thank you! I am more convinced than ever that farmers truly are the best people on Earth, and that was proven to me again and again everywhere I went. A special thanks to Dan and Ellie Smith, Sophie and Tom Gregory, Rich Thomas, Geraint Powell, Oli Chedgey, Mark Anderson, Alistair Bird, Matt Iremonger, Rachel Baker, Russel and Charlotte Heald, Greg and Rachel Hart, Pete Templeton, Bill Keener, Russ Israel, Ryan Boyd, Josh & Patricia Bishop, Lauren Park, Donald Kilorn, & Steve Larocque.

To my fellow Nuffield Canada 2024 Scholars, Lauren Benoit, Tatum Claypool, Cheryl Haskett, Renny Grilz and Matt McIntosh, from Agribition as wee disruptors to Brazil as a literal pressure cooker that cemented some of the most important relationships of my last year. Your support spanned the globe, and I'd be a sopping puddle on the ground somewhere without y'all.

INDIGENOUS INFLUENCE ACKNOWLEDGEMENT AND THANKS.

While regenerative agriculture is growing in popularity for a variety of reasons, it is important to recognize that many of the core practices have been a part of Indigenous land stewardship for countless generations, long before settlers arrived and colonized most areas. Indigenous people were intercropping, maintaining cover crops, practicing no-till and managing animals as stewards of a natural landscape. They lived what we now label “permaculture” and “agroecology” before it needed a name.

With this report I recognize that, yet again, settlers have taken the knowledge and many of the practices that already existed, given them a new name, and claimed them as our own. As such, please recognize that when using the term “regenerative”, I am keeping in mind that it was Indigenous knowledge first. I am grateful that the learnings were shared and passed on, and I endeavour to share them in the spirit of generosity and desire for soil that endures for seven generations from mine.

SPONSORSHIP

I am so grateful to live in a province that recognizes and supports the endeavours of farmers like me, and my thanks to the PEI Department of Agriculture cannot be overstated.

I would also like to thank Russ Israel at Timeless Fence for supporting this little beef farmer with big dreams.

General Seed has provided high-quality seeds for our farm for years, including the diverse forage cocktails that I've been dreaming up and expanding on as a result of these travels. Thank you for supporting my journey.

McCain Foods has done and continues to do groundbreaking work in regenerative agriculture at the Farm of the Future. I was thrilled to partner with them to explore how livestock can contribute to this important work.

Lastly, thank you to our farm, Barnyard Organics, for supporting my travels and to my parents, Fred and Winnie Wilson, for insisting on backing me as well, as they have all along. :)

EXECUTIVE SUMMARY

While the original question of this report was based on a somewhat selfish pursuit of how to successfully incorporate livestock into crop rotations, it rather quickly became a discovery of all the benefits of grazing management in cropping systems. Incorporating livestock was initially seen as a challenge to be overcome but soon became an invaluable tool without which cropping would be more difficult and less profitable. Given the advancements and availability of accessible and easily manageable permanent and portable infrastructure, as well as robust government support programs, the challenge for cropping farmers to incorporate livestock is not one of 'how', but one of 'why bother'.

While it is challenging to assign a consistent monetary value to the many benefits of integrating livestock grazing into an operation, given their complexity and variability, the natural capital inherent to any farming operation can flourish and grow with the addition of grazing livestock. The integration can bring new bird species, add invaluable dung beetles to the soil, increase soil life diversity as a result of manure, and expand carbon sequestration potential by incorporating perennials into an otherwise annual system. Perhaps most notably, these changes foster resilience. Resilience in farm income, in ecological stability and in the mental well-being of those managing the land.

Farms around the world have found success by including livestock on their crop land, either for grazing cover crops, to terminate a crop, to control fungus, for diversified income streams, or, most commonly, for fertility and soil health. The potential challenges of incorporating livestock can mostly be mitigated with grazing management and are far outweighed by the benefits.

This report was written not with graziers in mind, nor with crop farmers in mind, but rather the kind of farmer who might identify themselves as soil farmers first. Within it, you will not find a breakdown of the financial gains or losses of integrating livestock, nor a cost-benefit analysis that proves the bottom line. Every operation, every farmer is unique and the modern world of agriculture has not been able to define the value of natural capital or place a price on the bacterial fungal ratio of a vibrant soil. While it may be easy to add up the costs of fencing, water pipe and labour, the return on investment when integrating livestock will be years in coming. The return is dependent on so many factors that chasing a clear value would be an exercise in futility. And perhaps most importantly, grazing crop land has benefits that cannot be defined in dollars alone, such as positive mental health, community vibrancy, and a greater diversity of wild birds. So if you're coming to this report with the expectation of being convinced to add livestock, anticipating a spreadsheet of debits and credits and a final tally, you will be disappointed. But perhaps you'll find herein something much richer and deeper, and an inherent knowing that your farm, your heart, your family would flourish in the idea of getting livestock back to where they came from, on the land.

DISCLAIMER

This report has been prepared in good faith but is not intended to be a scientific study or an academic paper. It is a collection of my current thoughts and findings on discussions, research and visits undertaken during my Nuffield Farming Scholarship.

It illustrates my thought process and my quest for improvements to my knowledge base. It is not a manual with step-by-step instructions to implement procedures.

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TABLE OF CONTENTS

INTRODUCTION

No one wants to return to the laborious and arduous agricultural methods of the Middle Ages, but the phrase "the golden hoof" was coined at that time to acknowledge the invaluable contributions of having sheep on crop land (Groundswell, 2024). While the science behind the many benefits may not have been well established at the time, it is worth noting that, even then, farmers and shepherds noticed differences in their soils and yields from this one management decision and deemed it worthy of a quirky catchphrase.

Over time, agriculture grew more specialized. Tools and technology created the illusion that specialization was more efficient and more manageable. Rather than managing several diverse income streams at once, many farmers left the mixed farm behind. They gave way to the tide of commodity-oriented management, specializing in cereals, or beef, or perhaps corn and soy. And for decades this proved to be a winning recipe for success. Focus and technology, along with inputs and guidance from experts in their fields, enabled profits and efficiencies they could never achieve with a mixed farm. However, some farmers began to question the health, longevity, and sustainability of their soil. As early as 1935, the USDA created the Soil Conservation Service following the devastation of the Dust Bowl years. The 1980s saw a huge movement toward no-till agriculture as a way to reduce erosion and build soil structure previously damaged by conventional tillage (Bayer Crop Science, 2021). Farmers began to wonder if they were exploiting and damaging this very valuable piece of natural capital in favour of payments on bills for their less-natural capital expenditures.

Numerous phrases, iterations, and even national standards were created and introduced to give these burgeoning soil health concerns a structure and to set them apart from "conventional" methods. 'Sustainable', 'natural,' and 'organic' gave some loose and not-so-loose frameworks for various ideas to take hold and be marketed to those with matching values. "Regenerative" is the most recent term used to describe a farming method with specific management practices, albeit more fluid and less rigid than "organic". Whether there are five or six pillars of regenerative agriculture is up for debate, but no one argues that one of them should be the incorporation of livestock on the land, in some form. Given that other pillars are things like "maintain soil cover" and "minimize soil disturbance", the idea that livestock should be an integral part of any farm operation can be a challenging one for farm businesses that have never seen a hoof, let alone a golden one.

How farmers and ranchers integrate a hoof or foot on their land varies from region to region, farm to farm and even field to field. In recent years, it has become more widely accepted that rotational grazing carries significant benefits over the conventional 'set stock grazing' in permanent pastures that most are familiar with. Rotational grazing involves a higher density of animals in a smaller area for a short time, then moving them to another small area, giving the grass and soil time to recover before re-grazing. This has shown improved grass growth and better water-holding capacity during drought, and higher soil organic carbon and organic matter. Some pioneers are really pushing the limit on just how dense the population can be and are moving the flocks/herds several times a day to maximize animal impact and grass production (Savory Institute, 2015).

Generally, rotational grazing is achieved by having a strong perimeter fence and using temporary, movable fencing within that perimeter. The size of the paddocks and rest period is dependent on the operation and the management priorities of the farmer. In the growing season, the cattle will need to keep up with the grass growth and their movement will be adjusted accordingly. The phrase “adaptive multi-paddock grazing” (AMP grazing) emphasizes several elements of this management and requires flexibility that allows paddock size and herd density to change as needed to maximize productivity (Williams, The 6-3-4 Explained, 2025). For the purposes of this report, AMP grazing will be the term used to identify various forms of non-continuous grazing as is conventionally recognized.

One of the other pillars of regenerative agriculture is “context”, recognizing that every farm and farmer is different and as such, every pillar and practice will be unique to that operation and property. Livestock integration looks incredibly different for every farm and every climate and is practiced in a wide variety of ways. From chickens prepping corn fields to sheep in winter wheat, to cattle swath grazing and pigs intercropping, each farmer tackles the challenges and celebrates the successes of livestock integration in their own way.

The physical ‘hows’ of moving cattle and intensive rotational grazing are unique to each operation, but essentially come down to very similar tools and technology around the world. While this report initially sought to explore the infrastructure and management of AMP grazing (and does so briefly at the end), the greater question quickly became ‘why integrate livestock’ and the benefits of doing so. Cropping operations should be challenged to consider what irreplaceable benefit livestock could bring to their businesses, families and communities.

Stacking Enterprises

Canadian farmers have seen their input costs rising and farmland value climbing, making it difficult to pass the farm along to the next generation (Statistics Canada, 2022). While this loss can and should be attributed to many things, each unique to the farm itself, there is an argument to be made that specialization is a contributing factor for some farms experiencing closure and sale. The loss of a variety of income streams makes any business vulnerable to fluctuating global markets and political upheaval. The warning in the idiom of the risk of putting all of your eggs in one basket is based on the experience of losing an entire enterprise and the wisdom of having a backup income stream to cover the loss. Adding livestock to a crop farm is stacking an entirely new enterprise on top of an existing one, achieving a second income from the same piece of land.

If farmers can move away from the conventional thinking that yields are the primary metric of success to focusing on profit per acre, they would prioritize differently and achieve better results. If sheep, for example, can graze some cover crops and then some intercropped grass behind a combine, besides the crop itself, the farmer now also has some lovely, grass-fed lamb to sell, off the same land as those bushels of grain.

Diversity is a strength in agriculture in general, but diversity in income streams is the best insurance in a world of uncertain climate, economic, social and global pressures. Even without any of the other benefits, incorporating livestock into a cropping system offers enterprise stacking that helps to offset any of the additional management or small infrastructure costs that may come with their presence.

Perhaps the most extreme example of this in North America is found with Zack Smith in Iowa, a corn and soybean farmer who has been trialing for nearly a decade now, with various mobile structures that house grazing animals between his rows of crop. Beginning with chickens in his Stock Cropper shelters, he now has self-propelled units that move slowly up and down the cropland, between the rows of corn, while the chickens eat and lay eggs and leave their fertility behind for the crop the following year.
He also has units that house sheep, cattle and pigs, separately as well as together in one unit. The sheep or calves go out front and eat the fresh grass, while the pigs go out the back and gently root up the soil and stir in the manure from the ruminants at the front. The unit is moved at a rate that keeps up with the grass and leaves significant amounts of fertility and specific soil disturbance that stimulates incredible growth for the cash crop the next year. Zack boasts 10x biodiversity both above and below the soil compared to conventional, monocrop neighbours, 30% increase in corn yield due to edge effect and improved soil health, and a 75% reduction in synthetic inputs. To top it off, Zack then has 5000lbs per acre of grass-fed proteins to sell to his community that diversifies his income (Smith, 2024).

Figure 1The stock cropper in action at Zack Smith's. Iowa.(photo credit to Zack Smith)

Fertility

The addition of livestock to a farm immediately results in added fertility in the form of manure. If there is one thing that livestock can be relied on to do, it is defecate, and fortunately, manure carries valuable, available nutrients that the soil can turn into crop yield.

This was proven by researchers at Agriculture and Agri-Food Canada in trials on Prince Edward Island, comparing the use of cover crops as plowdown fertility for potato crops compared to cover crops and manure combined .

> "When grading the harvested potatoes was done and dusted, the actual potato yield for this years' AAFC Plowdown Challenge field was a whopping 293 hundredweight per acre. That compares to 169 hundredweight from the challenge in 2023 when no manure was used. This yield comes close to 2024's estimated Prince Edward Island average of 304.7 hundredweight per acre for potatoes.
>
> "Adding manure put the potato plant growth into hyper speed when combined with the soil nutrients left over from the previous red clover crop," says Scott Anderson, head researcher of the trial at Harrington AAFC research station.

While the yield may not be "whopping", relative to the conventional yield for the region, the idea of eliminating synthetic fertilizer cost does give some food for thought. The "hyper speed" referenced by Anderson may be plain old fertility in the form of nitrogen but is more likely a combination of factors that manure brings to the soil, with the main factor being carbon. (Benites, 2005) There is a lot of chatter in agricultural and environmental circles these days around soil carbon and making use of agricultural soils to sequester some of the carbon contributing to climate change (Tellatin, 2018). Soil Organic Matter (SOM) contains up to 60% carbon and any debate about climate change can be ignored in favour of acknowledging that increased carbon in the soil is better for the farmer and the crop, whether climate is of concern or not (EU Commission on Soil, 2011)

Dr. Jerry Hatfield is a retired laboratory director with the USDA's Agricultural Research Service and a thought leader on soil health. "Like water, carbon also cycles through ecosystems as a vital component of soil structure, crop health, nutrient exchange, microbial activity and soil health. Without carbon, we would have no soil aggregation. It would remain as sand, silt and clay. There would be no living component. Carbon is also the energy source for all soil microbiological activity. We are — and we process — carbon. That's where our energy comes from" (Krueger, 2023).

Manure in and of itself carries valuable, stable, rich and ecologically diverse components that go beyond simple nutrients offered by synthetic fertilizers. Besides building soil carbon, manure feeds biology, which in turn increases soil aggregation, water-holding capacity and protects soils from erosion (Koelsch, 2017). Even without the fertility benefits, manure brings benefits to the table that take much longer to achieve than without it.

Because context is so important, and uptake by the plants so variable, evaluating the monetary

nutrient value of manure compared to synthetic fertilizers is a futile undertaking. Everything from the species of animal, to the crop to be grown, to the soil type, the topography, and the grazing management changes the data and skews the comparative results. But some generally accepted realities exist in comparing manure versus synthetic fertilizer. While synthetic fertilizers can be tailored more specifically to what a soil test determines to be lacking, manure offers soil organic matter, food for the microbiome, and a broader range of nutrients, both macro and micro (Goldan, 2023). While both manure and synthetic fertilizers can leach, the latter is much more prone to high solubility and potential for rapid leaching through groundwater channels. Manure may have slower plant uptake, but that also means slower nutrient release, helping mitigate the dangers of excess nutrients in groundwater (Beef Cattle Research Council, 2023).

Mariana de Aragão Pereira is a researcher I met in Matto Grosso de Sul, Brazil, specializing in crop and livestock integration trials with Embrapa, Brazil's highly regarded agricultural research body. She advocates for the importance of maintaining the existing fencing and water infrastructure from Brazil's pastoral history in the new push for corn and soybean commodities, to include grazing after corn harvest, on underseeded grasses (Pereira, 2024). In a large, burgeoning country like Brazil, where exporting commodities is the primary driver of the economy, intentionally making space for the opportunity of grazing after corn speaks volumes to the yield benefits that farmers see from that livestock integration, compared to synthetic fertilizer alone. Ms. Pereira recommended some further research to me, and the following is an excerpt from that:

"Integrated crop and livestock systems (ICLS), which couple crops and livestock production through in situ animal grazing, hold formidable promise to meet the needs of farmers to produce high levels of food and farm revenue and reduce risks to climate change and market fluctuations, while also reducing agriculture's water and climate footprints" (Garrett, 2020).

Often, the benefits of manure are considered isolated from the animal producing it. It is worth comparing fresh manure, dropped by the animal to the costs associated with spreading stored manure. There are of course, the infrastructure costs of the housing and/or manure storage itself, the costs of bringing the feed to the animal in the structure or yard and the time involved with all of the above. And then there are the direct costs associated with handling the manure, moving it from the storage to the equipment, from the buildings to the fields, and then onto the land. The cost of fuel, labour, equipment and repairs varies around the world. Still, there is no denying that leaving those costs to the animal to distribute the manure themselves is an easy comparison if money is the question. Of course, winter feeding and watering challenges play a large role in management. Many decisions have to be weighed for each operation's context, but in general, letting the livestock do the feeding, hauling, and spreading offers financial benefits that are hard to dispute.

Chemical input reduction

Incorporating livestock is not solely an exercise in fertility management. They can be used to reduce chemical inputs as well. Ed Horton, a grain farmer in England, has been using sheep to graze fungus-infected winter cereals and has eliminated the need for fungicide sprays, even in a

damp climate like the United Kingdom. His winter cereals often emerge and show signs of significant yellowing on the leaves due to septoria. He releases sheep into the field in early spring and allows them to graze it down quite severely. Year over year, when the significant growth that comes in later spring begins, the fungus is completely gone and the plants grow up stronger and more vigorous than the control plants beside. The stress of the severe grazing stimulates the plants to focus on growth and vigour. It breaks the septoria fungal cycle after winter, reducing its ability to establish in a strong plant (Horton, 2024)

Ungrazed, control winter cereal at Ed Horton's farm.

Side by side comparison, same year, same field. Note increased yield and vigour.

Grazed winter cereal, free of disease

Figure 2 Grazing for fungus control at Ed Hortons, UK. photo credit Ed Horton

Similarly, Ed also uses grazing in managing his winter oilseed rape crop. In the months following fall planting the plants put out large leaves that are susceptible to phoma and leaf spot, common fungal diseases in brassicas. The size of the leaves also makes the plants very top heavy and smaller root structures make for plants that do poorly under wind pressure or heavy rain events and are susceptible to being pulled out or bent over completely. The tight grazing pressure results in plants that are triggered to build stronger, deeper root structures to access more nutrients in an effort to put out a higher yield of vigorous seeds.

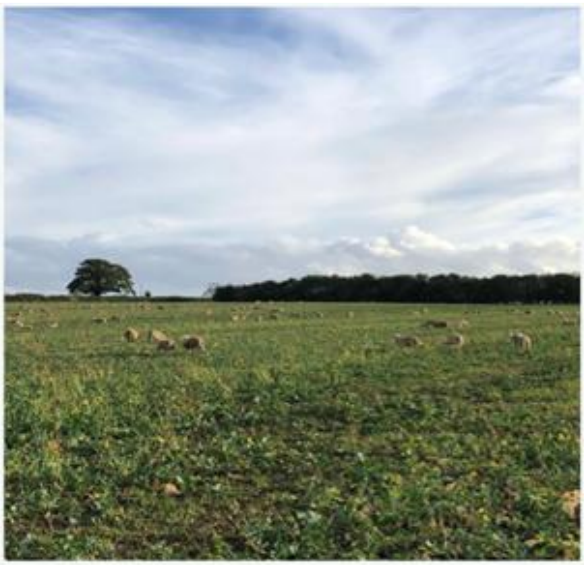
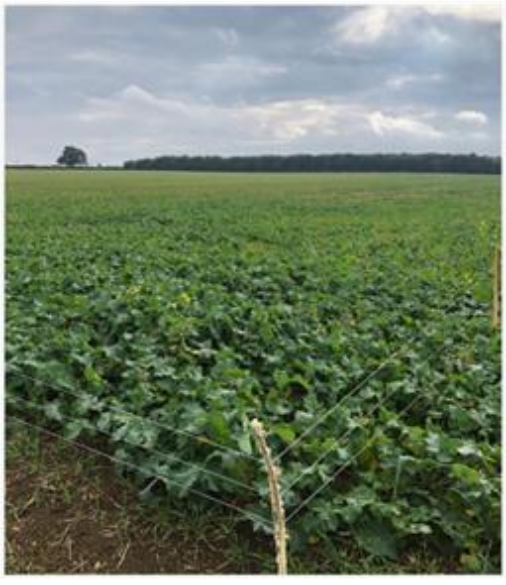


Figure 3 Input reduction, before and after at Ed Horton's, UK.

Photo credit Ed Horton



Fungicide may achieve the goal of controlling specific diseases, but grazing does that as well and provides growth regulator goals of boosting general plant health by shocking the plant into stronger production that is seed-oriented.

Every input that is eliminated is a ledger entry in the farmer's favour. When that positive ledger entry also results in increased yield, it feels like a foolishly missed opportunity not to consider it.

Feed cost savings

From a livestock producer's perspective, grazing cropland helps to reduce expenses that would otherwise likely be coming from stored feed in the form of hay or silage, or for non-ruminants, in the form of grain. Pastured hens on our farm reduce their feed consumption by 15% when they move from barn to pasture, making use of legumes, insects and grasses.

Bill and Kelsey Keener of Sequatchie Cove Farms in Tennessee manage a flock of 8000 pasture-raised laying hens. Bill claimed that his chicken feed bill dropped by almost 30% when his hens were pastured following beef cattle, due to the added protein from the flies and worms associated with the herd. The price of purchased feed can often be the highest expense for someone considering poultry production, and a 25-30% cost reduction could be enough to make the difference between profit and failure (Keener, 2024).

Rodrigo Navarro, manager of Wandering Feathers, a regenerative egg business in Hampshire, England, found similar feed savings. As part of the 'circular economy' of Kingsclere Estates, the larger farm entity, the hens follow the dairy herd, which is moved every two days. It was an important part of Navarro's pitch to Kingsclere Estate's owner, Tim May, that the hens be able to follow the cattle to help reduce feed costs. As fuel costs continue to climb, reducing the amount of stored feed needing to be made, it is a significant savings for all livestock farmers and often makes the downsides of moving herds/flocks worth it (Chedgey, 2024).

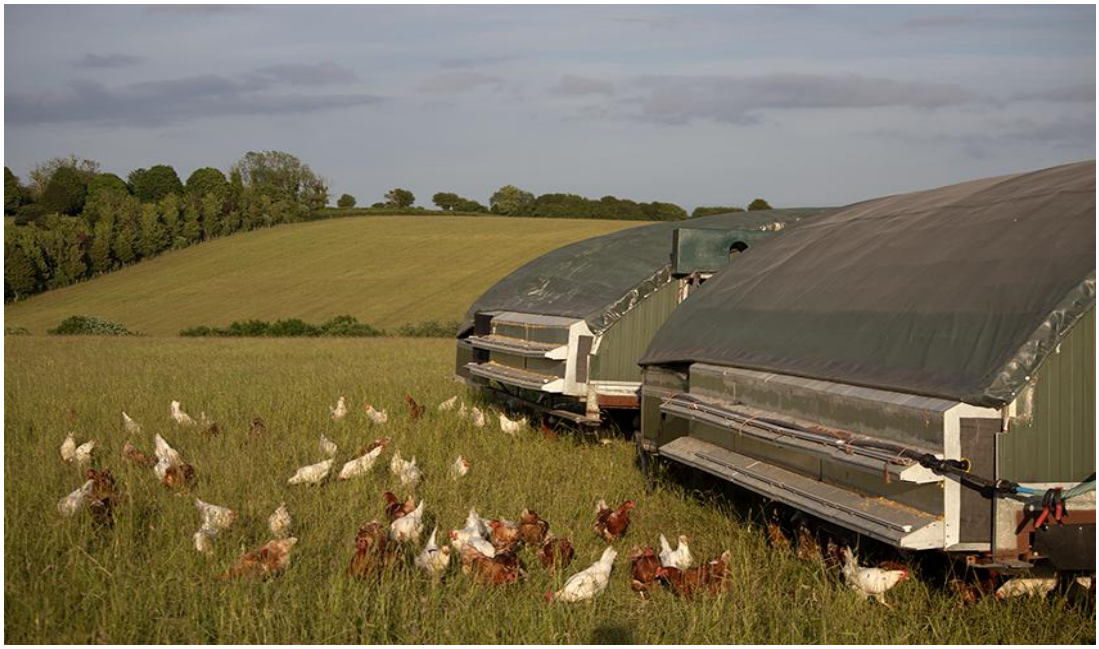


Figure 4 Feed savings at Wandering Feathers, UK

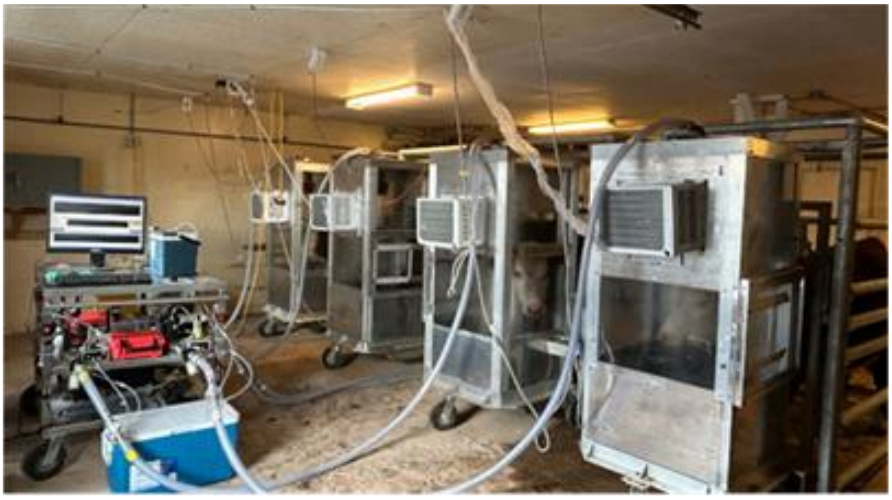
GHG Reduction and Carbon Sequestration

The race to reduce fossil fuel use may serve a broader purpose for the planet, but ultimately it is a significant benefit to farmers' bottom lines. Reducing the multiple tractor passes to make dry hay, or the plastic involved in silage production can make a dent in the annual costs of keeping livestock. Even in northern climates, ruminants can be out wintered or at least the grazing season extended to reduce the need for stored feeds.

Using grazing animals to control fungal diseases and reduce the need for growth regulators means less frequent use of tractors and diesel fuel. The well-recognized fertility value of manure reduces the amount of synthetic fertilizer used and, in some cases may eliminate the need for a tractor pass. Reduction in synthetic fertilizer use can have a significant impact on nitrous oxide emissions, the most potent and long-lasting greenhouse gas (EPA, 2025).

There are even ways to reduce the methane produced by ruminants as proven by studies involving feeding various seaweed formulations. The Living Labs team in Nova Scotia ran a trial that fed kelp meal to beef heifers and measured emissions of cow burps. Head researcher and farmer, John Duinsveld utilized special chambers to gain accurate readings of methane emitted by cow burps.

“Over the winter, John and the team analyzed the impact of kelp supplementation on the beef heifers and their methane emissions. Preliminary results from the team indicated that heifers who received the higher amounts of kelp in their diet led to a 11 to 15% reduction in methane emissions compared to the beef heifers that received little to no kelp” (AAFC, 2024).



Four of the beef heifers in the measurement chambers. John and his team use these chambers to measure the output of methane.

Figure 5 GHG emissions reduction in Nova Scotia, Canada. photo credit John Duinsveld

Similar efforts in Australia, using a red seaweed meal there, from the native species Asparagopsis has proven to reduce methane up to 90% when fed in small quantities (Innovation Network, 2025)

Soil Carbon

Even more important than reducing GHG emissions is the value of sequestering carbon that grazing offers. Increased soil carbon can result in greater capacity to hold nutrients in plant-available forms, higher moisture-holding capacity, more stable soil structure and more stable growth of crops, particularly in stress years (Reid, 2023). These are all significant benefits for the farmer and worth pursuing for those reasons alone, but it is increasingly apparent how vital sequestration is for the future of the planet (Zomer, 2017).

While carbon sequestration and GHG emissions can be quite difficult to measure accurately, a meta-analysis of grazing in China found that overall, the influence of grazing on soil organic carbon storage varied by intensity, but overall found it crucial to SOC (Hao, 2024).

"Herbivore grazing significantly impacts soil carbon storage by altering plant carbon input, root biomass, microbiome, and the soil microenvironment. … Due to the grazing effect of livestock, plants allocate more resources to sustain the belowground root growth, and the increased root biomass is incorporated to soil carbon" (Hao, 2024). The intensity of the grazing plays one of the most significant roles in how successful carbon storage is. Grazing management goes hand in hand with forage management, and keeping the forage vegetative and not allowing overgrazing, and ensuring a sufficient rest between grazing is vital.

The Beef Cattle Research Council has several resources that prove the significance of grazing on grasslands (BCRC, 2025). A more varied forage stand with a mixture of deep-rooted, nitrogen-fixing, warm and cool season crops will lead to better sequestration and generally contribute to greater resiliency in a changing climate. "Grasslands store up to 30% of the world's organic carbon, and perennial grasslands are particularly effective carbon sinks, storing up to 97% of their carbon below ground. Beef production in Canada helps preserve 1.9 billion tonnes of Carbon, and land used for beef production in Canada is estimated to store nearly 40% of the total soil organic carbon stock on Canada's agricultural land" (BCRC, 2025).

While forests are an important carbon sink, the prevalence of wildfire increases the potential for significant and sudden carbon release into the atmosphere, while native grasslands tend to be a more stable and deeply rooted carbon sink. While, admittedly, overgrazing can negatively impact soil health in many ways, including the storage of soil carbon; it is specifically well-managed grazing that can greatly improve soil carbon storage.

Without the use of additional inputs, burgeoning science on methanotrophs, a soil bacterium which oxidizes methane, is proving what farmers suspected all along; there is a natural balance that occurs in healthy soils to help counteract the methane released by healthy, grazing ruminants. The Savory Institute, which pioneered Holistic Management, published the following research: "Healthy, well-aerated soils harbour bacteria called methanotrophs, which break down methane. Soil-based decomposition of methane may be equal to or greater than ruminant methane production, depending on animal density, soil type and soil health" (Savory Institute, 2015).

This kind of research continues to grow and confirms that grazing benefits extend beyond the ruminant, the farmer or the farm. Indeed, grazing may be the only tool in the box that can not just slow, but actually reverse the climate change freight train.

Biodiversity & Ecological Benefits

Soil Biology

While the finances may be the deciding factor for many producers, there are other benefits of incorporating livestock that are harder to quantify with hard numbers at this point. Nitrate leaching from fertilizer has been documented across North America and affects the waterways, livelihoods, recreation and ecology of the communities that farmers live in, as well as gives bad press to the industry (Van Cappellen, 2016). Reducing fungicide use or even eliminating it entirely by using sheep in winter cereals for example, eliminates the risk of a chemical spill or fish kill from that agricultural pesticide. The sheep tell a nice story about a farm but also help maintain a clean and happy community.

Perhaps the benefit most difficult to quantify but potentially the most important, is what livestock give to the soil. While the published science behind the microbiology in the soil is burgeoning, the benefits of managed livestock impact on soil health are visible in the short term. Adding manure is good, but having the animals spread it themselves is better for the bottom line, saving a lot by not having to handle it, but also significantly better for the soil life. With no heavy machines and the unique hoof patterns of livestock, the soil receives the fertility with optimum uptake to longer-term crops. On our farm, we saw a change in our weed profile as the manure and trampling added more carbon and increased the beneficial fungal/bacteria ratio.

In virtually all previous studies that considered grass growth and grazing, the grass was removed manually, by researchers, using tools, in order for a perfectly controlled trial. It was discovered that in fact, there are important things that happen when the grass is removed instead by cows. The saliva on a cow's tongue, that touches the grass, carries growth hormones that encourage cell division and elongation, as well as sufficient concentrations of thiamin to influence plant growth (Parnell, 2024). Additionally, the tugging motion of grazing, as opposed to the clean cutting of machinery can stimulate increased activity in the biology within the soil, improving exudate release and nutrient exchange (Judy, 2025).

Perhaps the most common complaint about grazing cropland is the potential for pugging or compaction. Keeping wet weather in mind, carefully managed, adaptive grazing can help soil structure by turning trampled forage into organic matter that feeds soil microbes, provides cover that reduces soil temperature and helps capture rainfall and increase filtration by slowing down impact.

It does require a complete mind shift and a willingness to forego the status quo of clean and tidy monocultures. Livestock will inevitably cause the kind of disruption that will change a crop rotation that would otherwise not exist without animal impact. Embracing change and unpredictability can be scary in an industry in which margins can be thin and straying from the well-worn path can be intimidating. But even more worrisome is staying the same in a changing world and hoping that stubbornness will be enough to carry you through

At Kingsclere Estates in Basingstroke, England, Oliver Chedgey owns The Roaming Dairy, in cooperation with landowner Tim May. Tim wanted to grow organic grains and quickly realized in his pursuit of a circular economy and an effort to regenerate soil he would receive the best return and results using intensive grazing. So, Oli entered the scene with his 450 organic dairy cattle and his mobile milking parlour that meets the cattle in the pastures as they rotate through the fields. With 2500 acres to manage, the cattle graze on a 14-specie cocktail that is designed for cattle maintenance, milk production and soil health. There is no barn infrastructure, so the cattle stay out year-round and are occasionally fed via bale grazing as needed in dry periods or in winter. The cattle are only milked once daily which is uncommon in the UK and as Oli said, "I'm not really a dairy farmer. I'm building soil and the milk is just my preferred by-product. It could have been beef or lamb or something else."
Tim is a share partner in the cattle and owns the land, while Oli owns the innovative infrastructure of the parlour and other equipment. They both share in the milk income, depending on many factors. This partnership emphasizes the priority placed on soil, for both farmers. Grains and milk are simply the by-products by which they make enough profit to continue building soil and they've identified that cattle are the fastest and best way to do that (Chedgey, 2024).

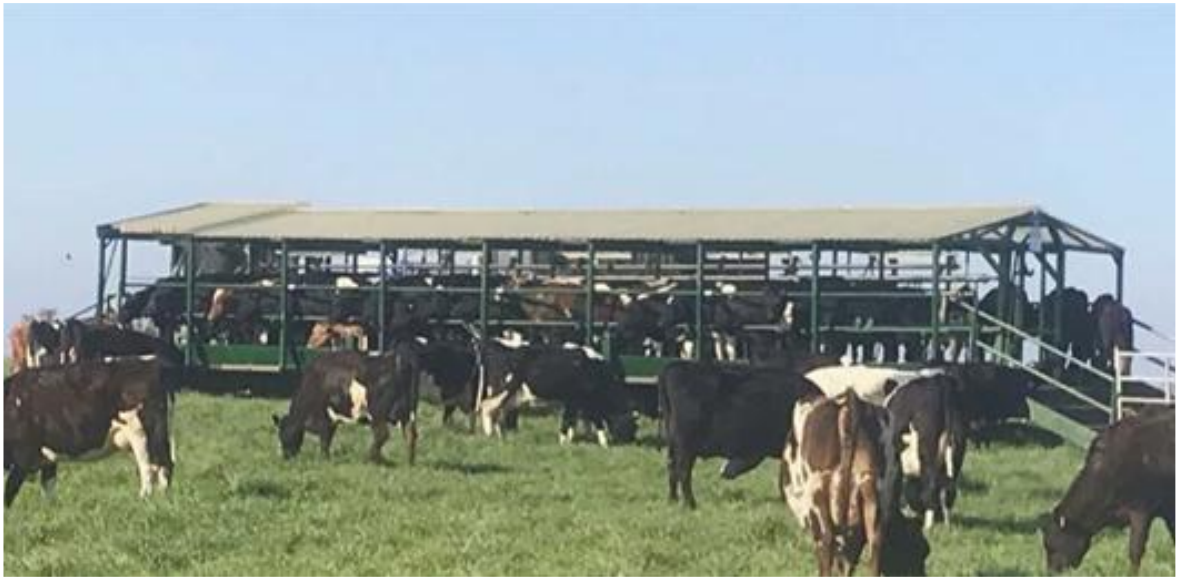


Figure 6 Soil Biology at Roaming Dairy, UK Photo credit Oliver Chedgey

When the inevitable wet weather does result in the rare case of unavoidable pugging or mud, Rich Thomas, a purebred Hereford breeder in Herefordshire, chooses to see it as an opportunity rather than a liability. When I visited him in November of 2024, he was intensively grazing his herd of 50 cows on one quarter acre per day of stockpiled grass and an unrolled round bale. Even in warm and sunny weather, this density resulted in some bare ground and moderate to severely trampled and manure-covered ground. The day after a 19mm rainfall event left the ground a muddy mess of hoof prints, but Rich was not deterred. He was keen to see what that level of disruption would spur the soil to produce. He anticipated needing to "give the ground a light scuff in the spring and throw in a few seeds" but was keen to see what the dormant seed bank might shoot out (Thomas, 2024).

On the Heald Farm in Norsewood, New Zealand, Russel and Charlotte Heald, on their 350-cow organic dairy farm are looking to build their soil carbon, above all else. They plant a multi-species cocktail of mostly annuals and allow it to grow until everything has flowered. They then utilize their dairy herd to graze and trample the significant amount of biomass back onto and into the soil. They move the entire herd into a very small section of the crop for a couple hours after milking, ensuring every plant is either eaten or trampled, leaving a flat, green mass of lush plant material and manure that will break down and feed the soil. They then move the cattle again, into a fresh grazing paddock until evening milking (Heald, 2025).

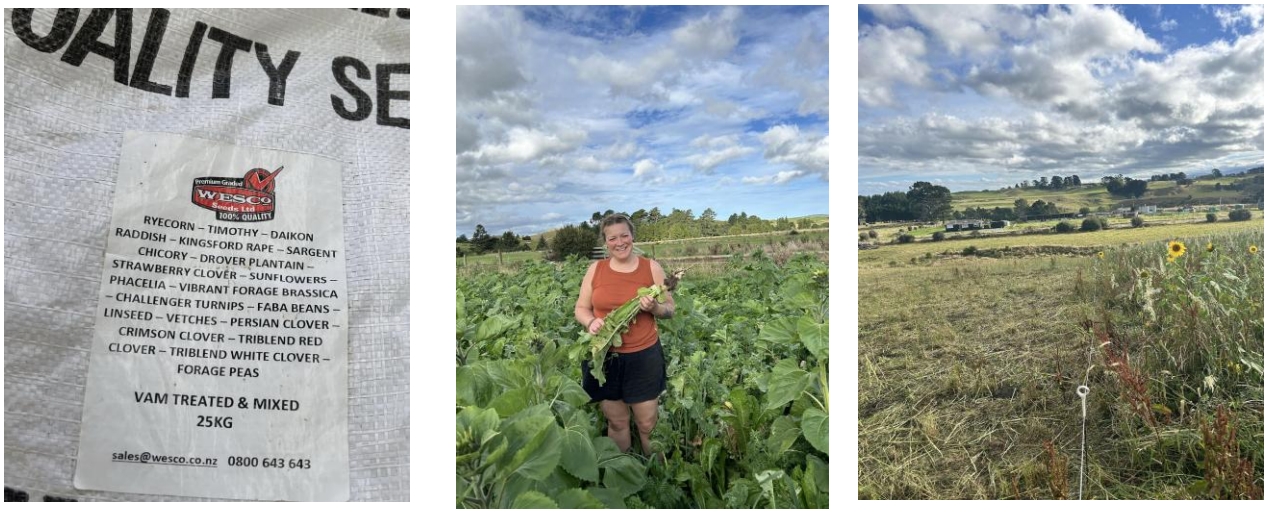


Figure 7 Soil biology at Heald Farm, NZ photo credit Sally Bernard and Wilson Bernard

The effects of trampling are what is known as ‘disruption’ in regenerative agriculture. While many argue that the risks of damage to the soil are too great to implement intentional trampling practices, AMP graziers appreciate that intensive disruption can, and in fact will sometimes be the best way to ensure a flourishing soil going forward. “Without frequent, planned and purposeful disruptions we will not see positive compounding effects or increasing diversity **“** (Williams, Adaptive Grazing Rules-Part Two: A Closer Look at the 'Rule of Disruption', 2025).

The grazing itself is the primary objective when adding livestock to a forage, but no animal will ever consume every single plant or every part of a plant. Mowing off the leftovers is one option, but a better one is having the animal density high enough that the plants get trampled and incorporated into the soil by hooves, which are uniquely designed to have the least negative impact while the most effective plant to soil contact. Of course, this practice must be closely managed, taking weather, soil type and animal size into consideration. But when managed well, trampling is an important part of disruption that stimulates old seed beds and promotes a greater diversity of regrowth (Winkel, 1991).

Dung Beetles

Earthworms are often heralded as the saviours and benchmarkers of soil health, and certainly their ideal pH castings do help balance the soil and process organic matter, but dung beetles are emerging as equal, or dare I say, superior powerhouses in soil vitality. The tunnelling species of

dung beetles can pull manure down up to 2 meters deep in the soil (Whittle 2023)! This is good for nutrient movement and carbon storage in the soil, but also positively impacts soil compaction and water infiltration, opening new channels. Additionally, dung beetles help suppress and manage dung-breeding insects that bother grazers, like cattle. By drying out the cow pat, they make an inhospitable habitat for insect pests, and in many locations, the beetles carry symbiotic phoretic mites. The mites benefit from the dung beetles in terms of transportation from pat to pat and underground, where they breed in the dung beetle tunnels, and the beetles benefit from the mites due to a resulting reduction in maggots in the pat that leaves more dung for the ever-hungry dung beetles. This is a great benefit to grazers who are searching for ways to reduce insect pests that bother their herds and flocks (Whittle, 2023).

In New Zealand, where there are no native mammals, dung beetles had no reason to exist and are now being imported by farmers eager to have the benefits on their farms. At a price tag of $3800 NZD for just two species at 150 beetles per species, the value of these manure-loving creatures has not gone unnoticed (Landcare Research, 2013). One such importing company estimates the value of dung beetles on the US economy at 380 million annually (Dung Beetle Innovations, 2017).

What is significant to note about dung beetles however, is that they are only attracted to fresh manure and not manure piles or compost. They will fly several kilometres to reach fresh manure and, with a diverse and active population, can reduce a cow pat to very little within a day or two. They cannot tunnel through concrete however, so will not survive in sheds or feedlots. Requiring fresh manure on soil means that they are partners of graziers and a key partner in regenerative grazing (Whittle, 2023).

Birds

Every farmer I spoke to about implementing managed grazing, without exception, mentioned a visible and audible increase in bird populations in the areas where they had introduced some form of managed grazing. On our own farm, we noticed two new species of birds in the first two years of introducing cattle. The first year, it was tree swallows who swooped in and eagerly feasted on the flies that arrived with the cattle. In our fourth year of bringing ruminants back to the farm, out of a dozen tree swallow nest boxes we had put up, more than half were being used as nesting sites! The second year, it was a pair of American Kestrels, which are not rare, but in this area of PEI, where the predominant crop is potatoes, they found haven on a farm with livestock and fence lines on which to perch and hunt.

A recurring theme in my overall Nuffield travels was the recognition of a chasm between the global south and the northern hemisphere in their respective priority on biodiversity. While the north has been pouring resources into mitigating climate change and carbon policy, the south has been campaigning and heralding the importance of biodiversity. From economic benefits to human well-being, to sustainable development goals and yes, climate change adaptation, biodiversity holds a solution to all of these things, and more (FAO, 2025). The UN's Biodiversity Conferences recognize the importance, globally, of halting and reversing biodiversity loss. While they fail to explicitly list grazing as a potential tool for increased biodiversity, the science is stacking up to support such a concept.

A peer-reviewed study on bird populations, published in the journal Ecosphere, found that “both the AMP (adaptive multi-paddock) and CG (continuous grazing) paddocks attracted obligate grassland birds during the breeding season; however, AMP-grazed paddocks supported significantly higher detection of four obligate grassland breeding bird species” (McGraw, 2024). Further, published research found that adaptive multi-paddock grazing resulted in higher insect diversity without increasing pests (Schmid, 2024). While it showed that it was, in fact, the increase of plant diversity that gave the arthropods a boost, the increased plant diversity was a direct result of managed grazing, encouraging a diverse seed bed to germinate and flourish (Schmid, 2024).

From new plant species that appear due to a disturbed, previously dormant seedbed, to new insects that arrive as a result of livestock, to bird species, to soil fungi and microbiology, increased biodiversity is inevitable when introducing animals, like ruminants to crop land. And increased biodiversity means better resilience and ecological health.

Earthworms

A study done on a farm near the site of Groundswell, the world’s largest regenerative farming festival, compared three different regenerative practices to evaluate earthworm populations. ‘Ley’ is a term commonly used in the UK to differentiate a permanent pasture from a temporary crop that will be used for hay or grazed. Permanent grassland was compared to conventional zero tillage/grass/clover ley rotation was compared to zero till, ley and mob grazing. Three different types of earthworms were differentiated, but across the board, the third treatment, which included the mob grazing, had over twice as many worms present as the next closest site of permanent grassland, which didn’t have a significantly higher population than the zero till/ley site. The scientists attributed the significant populations in the mob grazing treatment to the trampling of the cattle, laying fresh worm food onto the soil surface. The addition of dung to the site also positively influences the earthworm population through increasing the diversity of diet, adding moisture and habitat as well (Trickett, 2022).

Why would farmers want more earthworms? Quickly, it seems that earthworms help soil in a myriad of ways, from soil structure and water management due to their tunnelling, nutrient cycling, breaking down organic matter, and helping roots break down deeper into the soil. A surprise benefit, however, is that their castings are nearly perfectly neutral, helping to balance soil pH, if populations are significant enough. Earthworms will also consume harmful nematodes that would otherwise damage plant roots, which is a significant savings to the arable farmer.

Farm(er) and Community Well Being

Farmer well-being and mental health are topics that have only recently begun to be commonplace in agricultural circles and deemed worthy of consideration in farm planning. One of the most common phrases heard from farmers when they make a shift to regenerative

practices is that “farming is fun again!”. Regenerative agriculture relies less on inputs and more on management, problem-solving, and being proactive with potential challenges.

Ben Taylor-Davies, is a UK farmer and well-known thought-leader who has spent a lot of time considering neurodiversity in farming. He references the hypothetical but also very real potential of farm families historically having 10 kids and 9 of them go off to school and off-farm jobs while the one who struggled the most at school happily stays back to farm. He suggests that person may have likely had a learning disability that caused them to struggle at school but excel on the farm. If those traits are passed down, it would suggest that neurodiversity is more common in agriculture than some other communities and is perhaps an advantage in the ever-changing and challenging world of food production. Those types of learners are best served by navigating and troubleshooting new challenges each day, stimulated by the need to figure out a tangible problem. Modern agriculture has from input experts. Regenerative agriculture requires outside-the-box thinking, creative responses to new challenges that come with knowing land and their farm-specific ecosystem. Adaptive Managed Grazing requires constant consideration, thoughtfulness, and evaluating; traits that were somewhat discouraged by the addition of input agronomists with a chemical answer to every problem. Farmers using their creativity and thinking are finding joy and satisfaction in their farms again, after years of being advised on what to do and handed ‘easy’ solutions (Taylor-Davies, 2025).

Incorporating livestock requires an entirely new set of skills, and while the challenges are many, the rewards are so evident and present. Having a new calf born on lush pasture that bounds around its mother during paddock moves does something for mental wellness that watching grain grow just isn’t capable of. Planning out intricate paddock formations, water movement and moving cattle frequently across the fields creates a relationship with the land and the animals that observing from a tractor seat just can’t replicate. Seeing a manure pat disintegrate over the course of a few days due to the presence of so many thriving dung beetles has an element of thrill for hands-on farmers that top dressing granular fertilizer just doesn’t carry.

Beyond human well-being, there’s also evidence of improved animal well-being for pasture-raised livestock. According to a Department of Agriculture of Ontario publication (Ontario , 2022), the following benefits come with calving on pasture vs in confinement:

-Reduction of neonatal diseases
-Less need for calving assistance/intervention
-Improved cow-calf bonding
-Higher calf survival rate
-Slightly higher weaning weights

If cattle are managed intensively enough, they are separated from their manure pats by enough distance to prevent the flies from reproducing at rates that negatively impact them. By skipping paddocks, the cattle can get far enough away that flies that hatch in the patties cannot reach the cattle to continue the lifecycle, thus reducing the discomfort for the animal as well as the need for chemical control. Provided with shade, fresh water and sufficient space, grazing on pasture is the superior place to raise animals in the right context, if their well-being is the priority (Judy, 2025).

The well-being of a community is not to be undervalued when considering the benefits of adding livestock to a farm. Neighbours love to bring their kids and grandkids for a walk along the road that goes by the pastures. Having fresh eggs, lamb chops, beef or bacon to sell serves a local economy and leads to new relationships with folks who might otherwise have never stopped by the farm. Being a central pillar of a community harkens back to a time when farmers were more than just the people with the slow equipment on the road. It brings a level of mutual respect and appreciation for food production and the value of having a relationship with the person who grows your food. Many rural communities are shrinking and suffering from human resource exports but having vibrant, connected farms that can become food and culture hubs can play a fundamental role in revitalization.

Public Trust and Social License

It's well established that when it comes to information about agriculture, consumers trust farmers above all else (O'Farrell, 2024). As the general population becomes further removed from its agricultural roots, the desire to be connected to a farm is proven by the explosion of agritourism and on-farm experiences that bring city folks to the country (Kaiser, 2024). Robertson Farm in Canaan, NS routinely sells out of their Highland Cow Meet and Greet events, which allow visitors to learn about the farm and see the cattle grazing in the fields (Robertson, 2025). It stands to reason that in a world set on blaming cattle belching methane for our climate woes, seeing contented cattle grazing in lush pastures, managed carefully by considerate farmers, calves bounding along in pink clover, and birds swooping through the herd, even the hardest heart will struggle to place the world's problems on ruminants. When the multiple environmental benefits of managed grazing are explained to a thoughtful listener, even one far removed from meat or milk or fiber production, the pieces will click into place in a way that reading about it from a beef lobby group pamphlet can only dream of. In a time when cattle are the scapegoat, connecting people with a field of cud-chewing, patient and contentedly fat cattle or sheep tells a different story that lingers in the hearts and minds of those who eat and want better for the world.

Canadian Context

As a northern nation, Canadian graziers struggle to achieve year-round grazing, but even the federal government has recognized the significant value of grazing from an environmental standpoint. In contrast to other countries, like the Netherlands, that are paying farmers to reduce their livestock numbers, Canada has put forward thoughtful programming designed to increase grazing across the country. The On Farm Climate Action Fund (OFCAF), as part of the 2021 budget, included $704.1 million towards three initiatives, one of which was rotational grazing practices. The program was expanded with another $300 million for the 2025-2028 fiscal period.

As the program guidelines state for the Improving Grazing Management best management practice under PEI's OFCAF program, "Managing pastures to control the timing and intensity of grazing animals can mitigate greenhouse gas emissions by maintaining healthier, younger grass that is more digestible for ruminant livestock. This increases feed-use efficiency in grazing ruminant livestock, and subsequently, reduces CH_4 emissions from enteric fermentation processes. It also improves the soil and grass's ability to sequester CO_2 emissions from the atmosphere and reduces compaction and overgrazing" (PEI Federation of Agriculture, 2025).

This kind of funding available to farmers shows a clear dedication to the idea that grazing animals are not an emissions problem, but rather a real, grounded solution for carbon sequestration. This acknowledgement sets Canada apart and lends credibility to farmers who have known all along that cattle are part of the solution, not the source of the problem.

The timing of this kind of support, often bolstered by adjacent funding from provincial governments or environmental organizations, is important to help fill some of the gap between being able to quantify the costs and benefits of adding or expanding grazing on a crop farm. From an organic perspective, when fertility options are somewhat limited, it can be difficult to place a value on all that grazing brings to a farm. The added costs of specific infrastructure needed for grazing can add up quickly. As OFCAF provides up to 75% reimbursement of the overhead related to infrastructure costs, it becomes an essential factor in the successful implementation of livestock integration and regenerative agriculture.

The technology and equipment available for managed grazing is a fast-growing sector, and there are new products and companies every day. The following list is by no means comprehensive but includes some of the more interesting ideas that I saw on my travels and felt worth sharing.

Infrastructure

Water

Ensuring access to clean water is one of the key pieces to hosting livestock. Winter is the greatest challenge to year-round grazing in Canada, and there are no easy fixes to address the problem. Many farmers claim that cattle can do just fine on snow but also admit that it is specific types of snow that are accessible to livestock. As the climate changes, snowfall is not as consistent as it once was. There are a plethora of winter watering options which can be found on farms across the country and explored in detail online.

On every farm I visited, having lengths of flexible pipe, more durable and larger than a typical garden hose, that could be moved around a field or a farm, was a key piece of portable infrastructure. Typically, here in North America we see black PVC pipe which works fine, but other regions have different options that are better suited to a less varied climate and that are easy to manage in lengths of roughly 150m. Garden hoses can be used over shorter distances.

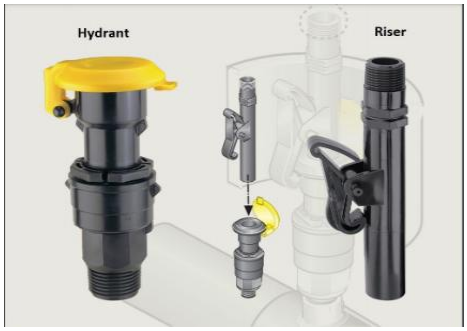


Figure 8 Plasson quick connect coupler.

Quick-connect couplers, like those from Plasson, make connecting to water sources incredibly quick and easy, without spraying or spilling water. These work well on portable options as well as part of a more permanent riser.

It is easy to source smaller, movable rubberized water tubs that can be easily dumped and moved. Many are equipped with floats that cannot be disturbed by cattle rubbing, but that have enough water readily available at all times. Water can be kept fresh by frequent dumping and cleaning or by adding an appropriate ratio of hydrogen peroxide to keep algae at bay.

Figure 9 Kiwi tech portable water tub

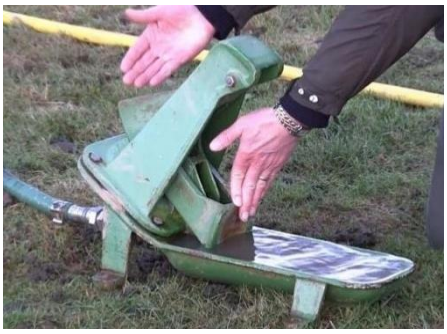


Figure 10 solar nose pump

Solar, nose-activated pumps that bring water to a small reservoir have the advantage in areas without easy access to electricity. The drawbacks of this style is the training required to ensure livestock are using them effectively, and the generally lower pressure of water available. They are very tidy, easily moved and function anywhere there is sufficient sun.

Watering posts are a permanent option so not for intensive grazing unless sacrificing an area to return to for watering, but a clever idea for more confined housing, such as in winter or during storms. Buried below the frost level, the post has a paddle at the top in a small bowl, which is activated by the cow's nose. Water rises from below the frost level until the cow leaves, allowing the water to return below until the next time. While the downside is that the system is permanent and requires power to run a pump at the well, the significant upside is that the water is always there, even in the coldest winter temperatures. There is no ice buildup or sloppy mess around the pipe.

Figure 11 Drinking post in winter

Fencing

Portable fencing companies in Canada were perhaps the greatest beneficiaries of the OFCAF Grazing program, and the options are growing with each year. While geared reels were new within the last decade, they are now commonplace and the popular choice by more graziers. A single line of poly wire with an effective energizer and sufficient grass will keep in the feistiest herd while a two-strand high tensile fence is still recommended for a more permanent perimeter.

Setting up a strong perimeter fence can feel like a major hurdle in terms of time for an arable farmer looking to add grazing. Timeless Fence is a company out of Tennessee with distribution across North America. They have developed a PVC T-post that drives easily into the ground, has holes pre-drilled to eliminate the need for insulators and withstands the rigours of all the weather that a Canadian winter can throw at it. After building our first cedar post fence, we switched to Timeless posts. We built a fence with one person in an eighth of the time it took two of us to

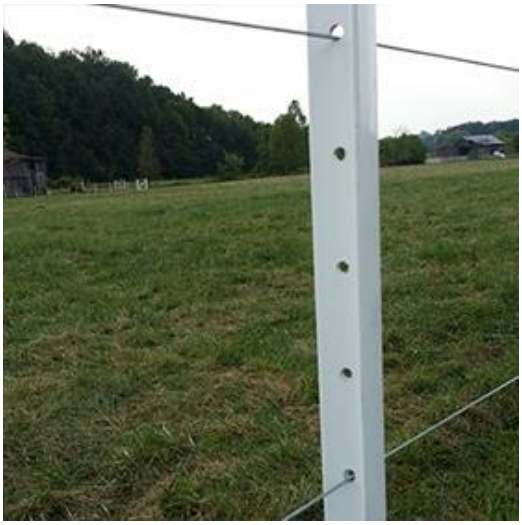


Figure 12 Timeless PVC fence post.

build one using wooden posts. Hurricane Fiona dropped several trees on fence lines and the Timeless posts simply bent over until we cleared the trees, at which point they popped right back up. Timeless posts have been a time-saving, convenient and high-quality option that our farm couldn't do without at this point.

That said, more dairy herds and the occasional beef herd are turning to electronic, solar-powered collars for their fencing needs. Controlled by a cell phone, the grazier can move the fence line by drawing it on their screen. The cows are alerted by first a noise, a buzz and finally a small shock if they persist past the invisible line. They are quickly trained to respect the sound and are content to get their allotment of forage. In New Zealand, many farmers have collars without the fencing option to benefit from the significant amount of data that comes from having a live feed of information that is specific to each animal. Pete Templeton, a dairy farmer of Riverton in Southland, New Zealand can determine information about the quality of his forage based on how long his herd is ruminating because the collars can tell him when the cows are lying down or moving. The program has satellite imagery which evaluates the quality of grass in all of his paddocks and can make recommendations on which should be grazed next. The collars share information with a reader in the milking parlour, announcing health data like recommendations for a hoof trim, for example. Most of all, Pete appreciates the savings he's enjoyed as a result of the collars alerting the cattle with a unique combination of sounds when it's time for milking and encourages them to head towards the parlour. This removes the need for a person to be there to coax them along, removing invisible fences along the way. The milking staff arrives at the same time as the herd, saving up to 90 minutes of walking behind a slow-moving group of cattle, per milking. When fields can be up to 3km away from the milk shed, this is valuable staff time saved.

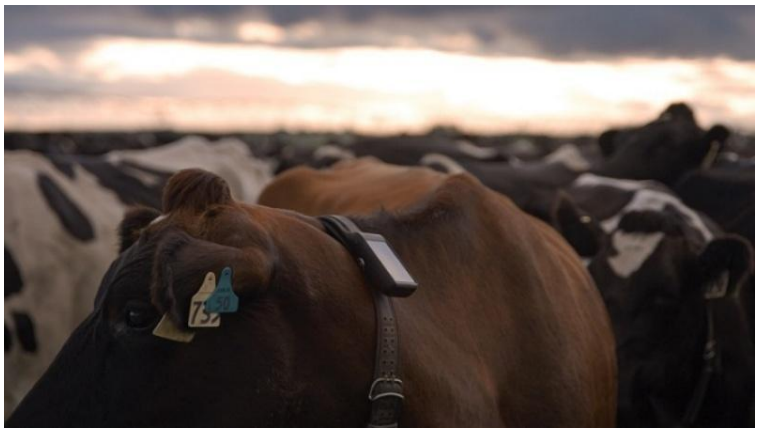


Figure 13 Halter solar powered smart collar

Tumble wheels, unique to Gallagher Fence supplies, work incredibly well for quick fence moving. A single polywire fence line can be moved in a matter of seconds by one person. They do require a relatively square sided, flat field without trees so can be limiting for many farms with varied landscapes but are the height of efficiency under the right circumstances.

Figure 14 Gallagher tumble wheel

Shade

While some regions prioritize shade more than others, and some climates and some breeds require shade more than others, it is worth considering shade options in cropland that may not have any natural shade available. Portable shade structures are, in some ways, even better than trees in that they can be moved to areas of the field that could use extra fertility since the cattle tend to congregate under them. Additionally, it means that all the fertility is not confined under a tree as is usually the case in wooded areas of pastures.

Shade Haven is a company in Wisconsin, founded in 2012, to address heat stress in grazing animals by manufacturing portable, foldable shade structures for grazing animals.

A cheaper version was fabricated on our farm, Barnyard Organics Ltd using an old hay escalator, a wooden frame and shade cloth. It is moved by the front winch on an all-terrain vehicle. We added pieces of metal to the frame to make a scratching area for the cattle, imitating the other important element of a pasture tree which is scratching. Taking it a step further, this year we built the mineral box into the shade-mobile so it would move daily, with the shade. We also incorporated an organic-approved oiler for fly control, attaching a pool noodle wrapped in old towels, soaked in garlic juice and citronella oil.

Animals

As a crop farmer, perhaps the greatest challenge of all will be finding the cattle to join your land. For many, the ideal situation would be to have cattle join the fields during the active grazing season, returning ‘home’ for the winter. While bale grazing in the winter can add incredible carbon and nourish soil biology in a field, winter grazing does require a different set of skills. It also requires cattle that can withstand harsher conditions and different watering requirements in freezing seasons. For many crop farmers, hosting a herd on cover crops or forage through the summer and then bidding them adieu is the preferred setup. In turn, many cattle and sheep farmers are looking for additional grazing acres in the summer, in order to grow stockpile grass, make hay or increase their herd/flock sizes on their own farms. In some cases, there are new entrant farmers who do not have access to any land but are keen to get started with livestock and need to rent land. Farmers can be isolated and challenged for time to find a good, nearby match for their animals or land.

Organizations like the South Dakota Grazing Exchange host an interactive map that shares the location of cattle, sheep, goats, as well as pasture, rangeland, crop residue, cover crop and other options (South Dakota Grazing Exchange, 2025). Each site specifies size, existing fence, water availability, herbicide use and grazing history. Some locations come with management and herd moving with a stated fee attached. The livestock listings include the number of head, the distance willing to travel, the willingness to install fence and water systems and preferred seasons. Searchable with a variety of filters, the listings are as thorough as the host cares to make them and contact info is made available with registration for a free account. While it was started in South Dakota, the map has listings across North America. It has provided a great connection point for farmers and ranchers on both sides of the grazing coin, as well as being an exemplary model of what a smaller, more localized hub could look like for other regions.

Conclusion

For the sake of illustration, pretend for a moment that you are a bird. You fly over large tracts of open cropland, hunting insects, seeds, and small animals. One day, you notice fence posts in one of the large fields you often fly over. You land on a fence post for a rest and notice that hunting, static, from the fence post is even easier than hunting from the air. The next day there is a wire running between all the posts and more birds have come to enjoy this novelty of rest and communion. Soon, there is a water trough from which to snag a quick drink, and the constant evolutionary nudge in your brain to always know where water is, quiets. The crop mixture that the farmer planted in this field has a greater diversity of plants, and some of the flowering crops are attracting pollinators and different insects than the singular grain crops typically have. You delight in these new developments.

Then one day, there are cattle in the field. The cattle have brought a whole host of new insects with them; dung beetles, horn flies, face flies, juicy horse flies and more. As a result, there is an even greater diversity of birds than before, all feasting on different species and thus drawing in more birds of prey and mammalian hunters, intrigued by the increased bird population. Due to increased soil cover and an abundance of a diversity of food, the small rodent population is thriving and providing good food for you and your avian friends.

This year, the farmer doesn't apply any pesticides, so the insects taste like they should, and you notice more of them. Maybe you're a ground-nesting bird and you manage to fledge a full nest without a tractor coming through. You overhear the farmer talking to someone about carbon credits and the carbon sequestration potential of perennial crops. You notice the young mother who lives nearby brings her small children to watch the cattle. The too-cool teenagers at the farmhouse somehow find themselves going for walks by the field, laughing at the calves' curiosity. The farmer hosts field days and barbecues, using their beef and sharing the joys and experiences of adding livestock to their rotation.

You notice the farmer spending more time in the field moving the herd, evaluating the forage, watching the calves, quietly listening for new birdsong, noticing different pollinators, and enjoying the biodiversity flourishing in her midst.

You're also there the day the cows get out, and the day one of the mama cows has a difficult birth and her calf doesn't make it. You're there when a hurricane drives the herd to one corner of the field for a day, and it leaves a huge mud hole where they sheltered. You fly over the shoulder of the farmer as she's doing calculations on her phone about what the herd is worth and how quickly she can sell them off.

But the next week she's back to smiling at the calves and checking the plant stand and flipping cow pats over with her boot to count the dung beetles. This time on her calculator, she's figuring out how much she saved on fertilizer and diesel fuel. And then she's texting the families who signed up for a quarter beef for the winter and adding that income. Well-fed and content, you fly off for the winter, already anticipating returning to this bustling farm next year.

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When the shepherds of the past acknowledged the Golden Hoof, they may have been referring directly to the fertility gained from having the sheep on the land. And while there certainly is

value there, clearly, there are a myriad of benefits and immeasurable advantages that come with livestock integration. Considered individually, the benefits are perhaps not entirely convincing. PEI's Living Lab trials looking at grazing in potato rotations have come back with early results from the first three years. The results are not stunning one way or another and while some areas show small benefits from grazing, others are less conclusive (Barrett, 2025). It is worth noting however, that the results are based entirely on soil samples and potato yield data. The trials do not take into account any benefits seen in increased natural capital, increased biodiversity, enterprise stacking, public trust or farmer well-being. The carefully measured data does not consider what a single fence post can offer to a bird in a wide swath of tree-less land. Nor does it calculate what a perennial forage mix offers in the way of carbon sequestration. The dung beetle cannot weigh in on the value of a fresh manure patty for their procreation and tunnelling, taking nutrients deep in the ground.

Expanding the capacity of a farm may feel like a step too far for some operators who are stretched to their maximum. Stacking enterprises may feel difficult and even unnecessary in a world that rewards specialization. But there may be a small, neglected corner of a farmer's heart and land that will bloom with the addition of grazing animals. And that blossoming may end up answering the calls to reduce pesticide use, increase biodiversity, build public trust, and foster an enthusiasm for farming that was dwindling or lost.

It is said that the best fertilizer is a farmer's shadow. Due to increasing farm size and the abilities of growing technology to monitor and provide valuable data from sensors, particularly on arable farms, the farmers' shadow is required less and less. On our farm, adding livestock, their fencing and water and moving them daily, has meant that our footprints have crossed every acre where the cattle have been. Previously, we would have observed a wide swath of land from a tractor seat, rarely actually stepping onto the soil and usually with reluctance and necessity due to some equipment breakdown. Moving a new mama cow and her fresh calf onto a lush paddock that sends up fluttering insects, smells of warm clover, and sounds like bees and a chorus of birds can't help but soothe the tired heart of a weary farmer. Knowing that an entirely separate enterprise and income stream is being built on the same land that will grow a cash crop the following year soothes the balance sheet of a stretched accounting software. Reducing or eliminating the input bill of fungicide and fertilizer soothes the anxiety of that farm loan. Playing a key role in intentional carbon sequestration soothes some of the worries of thoughtful citizens who feel hopeless in the face of climate change.

Gabe Brown, an unofficial spokesperson for regenerative agriculture in North America says, "the greatest compaction on most farms is not in the soil but in the imagination" (Brown, 2025). As stewards of the land, considering the possibility of getting grazers back to grazing can pay dividends for your broader farm as a whole, financially, environmentally and emotionally. The first important change is perspective.

Call to Action

- For Arable Farmers and Landowners: Give thoughtful consideration to how you may be able to incorporate grazing in your arable rotation. Maybe you custom graze a cover crop or connect with a local livestock producer to have them bring their flock to graze off a diseased winter cereal in the spring. At the very least, you seek good quality manure to feed your soil biology a diversity of foods.

- Establish baseline soil health with visual assessments:
  Using water infiltration tests, aggregation scoring, soil horizon observation, rooting depth, smell, feeling, etc., record benchmarks of soil health by visual assessment that can be reassessed at regular intervals that make sense for your operation. In some cases, this may be at the same time in the rotation each round, or every two years on permanent grassland, or after a change in management practice. Use an assessment guide from resources like AHDB in the UK (AHDB, 2025).
  This will help to build a familiarity with your soil and provide an added level of assessment beyond yield. Soil health tends to be measured and improved over a longer period than an annual yield and will contribute to the capacity of your farm to continue operations in the long term.

- Pick the same day and time each year to visit a specific spot on your farm in which you spend intentional time taking note of birds, insects, sounds, smells and anything else of note that you record. Note even small things, like increased piles of worm castings on the soil, a piece of garbage that flew in from a neighbouring property, an extra pair of swallows, etc. Notice how your nervous system reacts to a slow moment in a busy season. Make it a family affair, have a picnic and take note of everyone's observations, large and small.

- Acknowledge and celebrate that soil is a living thing and should be treated like any livestock. Covered in winter, scratched thoughtfully, fed a good-quality and diverse diet, and monitored for health problems. Use proactive management to reduce disease and ensure a robust microbiome.

- Trust yourself to try new things. Making an agreement with a neighbour to custom graze your cover crop may feel entirely foreign and risky, until you do it. Buying a few sheep of your own to put in on your nurse crop could feel wildly unpredictable, but the results could be wildly successful. Or not. You won't know until you give yourself permission to try a new and scary thing. Perhaps your greatest takeaway will be that you are capable of more than you thought.

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