Success with ALUS Regenerative Agriculture Projects: A Farmer's Guide

A practical guide to implementing regenerative agriculture practices

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Introduction

Where Agriculture and Nature Meet

Regenerative agriculture generally refers to a set of farming practices that focus on enhancing soil health and function - in a literal sense, regenerating soil. These practices follow a set of principles, which can be adapted and applied to a wide range of farm and landscape contexts.

In addition to on-field management rooted in the regenerative principles, ALUS' approach to regenerative agriculture includes edge-of-field stewardship of nature and biodiversity as well as community building.

This whole-farm approach integrates the regeneration of soil with the regeneration of the biodiverse life that relies on it; from the microbial community that inhabits the space between healthy soil aggregates to the rural community whose livelihoods are tied to sustaining agriculture to the global community of life that depends on the cyclical ecosystem processes taking place in the soils beneath our feet.

How to Use This Guide

The first principle of regenerative agriculture is **context**, which means that no guidebook or approach to regenerative agriculture applies to every situation. This guide is intended to provide information on the principles of regenerative agriculture and how they fit within the ALUS model but is not intended to be a prescriptive formula. For more information on ALUS programming available in your region, contact your local ALUS Coordinator or visit ALUS.ca.

Laying the Foundation

Success with regenerative agriculture depends on the goals and context of the individual producer. Although the underlying principles of regenerative agriculture apply across landscapes, there is no "one size fits all" approach to applying them. Laying the foundation for successful integration of regenerative practices includes gaining an understanding of the ecological context through observation, goal setting, trial and error, and connecting with peers and experts to share and learn as a community. The end goal is not static, it is dynamic - integrating lessons learned and adapting to changing landscape conditions and resource concerns.

Observation and baseline establishment

A regenerative producer's main tool is their own observation – take a shovel and a notebook to visit the project site and ask yourself:

- What does the soil feel like? Is it compacted and hard to dig into or are you able to get a good shovelful?
- How does the soil smell? Is it acidic or does it smell like good garden soil?
- Is there evidence of wildlife in the area? When you look at the soil, can you see soil life?
- What does the area sound like? Can you hear multiple species of birds or pollinators?
- What is your main concern or motivation?

Taking baseline observations will allow you to note changes moving forward.

Over time, this allows you to determine if what you are doing is addressing your resource concern or needs to be modified. ALUS' regenerative agriculture programming offers flexible contracts; participants are encouraged to modify project plans to accommodate lessons learned from previous years.

Soil testing can be an informative tool for establishing a baseline understanding of field conditions. Before collecting samples, the target field should be divided into zones based on soil type, slope or landscape position, and past management or crop history. Representative zones will make future comparisons more meaningful. Samples should be taken at a consistent depth, at the same time of year, and, when possible, sent to the same laboratory for analysis.

Use a notebook, your phone, or GPS system to record the location of each sample to ensure you are visiting the same location in the future.

A note on soil testing

There are several soil tests available that move the needle beyond traditional soil testing to integrate both chemical and biological soil health parameters. When used alongside conventional soil testing, these soil health assessments provide a more complete picture of the soil ecosystem - its condition, functionality, and capacity for nutrient cycling and availability.

To select the most appropriate soil test, it is important to understand what question you are seeking to answer:

1. What is my soil's condition?

The Haney soil health test is widely used in regenerative agriculture to evaluate both chemical and biological soil health indicators, including soil biological function and nutrient availability with a focus on carbon and nitrogen. This test provides insight into the soil's ecological functioning, including its ability to cycle nutrients for uptake. It identifies not only what nutrients exist in the soil, but whether the soil biological community is present and functional to meaningfully cycle these nutrients [1].

2. How abundant and active is my soil microbial community?

A Phospholipid Fatty Acid (PLFA) test provides a practical and cost-effective indicator of the soil microbial community structure – a snapshot of soil life and a critical component of soil nutrient cycling. A PLFA test measures microbial biomass and identifies types of microbial life present in the soil, such as fungi and bacteria. This test can be used to assess how different management practices impact the soil ecosystem, thus impacting overall soil health and function [2].

3. How much of each nutrient exists in my soil in total?

Similar to looking at how much money is in your bank account, a total nutrient digestion (TND) test measures all nutrients available in the soil, regardless of availability for plant uptake. This test provides an overview of the nutrient potential of your soil [3]. Some regenerative practitioners use TND results as a baseline to determine which, if any, nutrients are deficient in the system, and which are present but in a form that is not available for plant uptake. By improving soil health and soil food web function, producers can access and cycle nutrients that are otherwise unavailable [4].

Identifying the Resource Concern and Goal Setting

Once your baseline observations are established, you can begin to identify your resource concern. A resource concern can be defined as the “weak link” in your system. Examples of resource concerns may include:

- **Physical soil properties**
- **Water management**
- **Nitrogen capture/cycling**
- **Grazing**
- **Weed suppression**
- **Beneficial insects**
- **Carbon:nitrogen (C:N) ratios**
- **Finances**

Flexibility and adaptability are key components of regenerative agriculture. Your resource concern might change annually, or even more frequently, depending on your individual context. Planning a project based on your current resource concern allows you to first identify the why and then start to think about the how.

Building a Support Network

Peer-to-peer knowledge transfer and shared learning are an essential component of regenerative agriculture on a local and/or regional scale. Local factors such as soil type, water availability, and climate play a role in the successful adaptation of regenerative practices. You can accelerate your own learning by connecting with like-minded peers to share lessons learned, resources, and insights.

There are several ways to access or build community in your area:

In-person

- Join a local organization - your local ALUS program can connect you to like-minded peers, resources, and technical experts
- Attend local field days, workshops, and demonstration farm events - your local ALUS Coordinator can inform you of upcoming events in your region
- Connect with educational and/or research institutions - colleges and universities often seek producers interested in being involved in research studies
- Reach out to your neighbours - informal peer groups are an effective way to spark discussion and share ideas
- Attend a regenerative agriculture conference – conferences conveniently offer learning and networking opportunities

Online

- Participate in webinars or other online events - online events allow you to learn from a wider range of experiences
- Seek out regenerative agriculture groups on social media - informal engagement and resource sharing online is a powerful way to connect with a broad network
- Take a regenerative agriculture course - various organizations offer online learning opportunities that come with access to peer networks and technical experts

Building a support network benefits more than the individual producer. Community connections through organizations like ALUS help foster coordinated action across regions - turning individual management choices into meaningful, landscape-scale outcomes.

Start-up Costs and Project Funding

Regenerative agriculture is not a single practice or prescription so project costs can vary depending on scale and scope. Regardless of project details, it's generally recommended to start slow before scaling a new practice. Start with small plots and incorporate check strips, designated areas left under previous management practices for comparison. Field trials, trialing a practice on a field scale to evaluate outcomes, are also an effective tool when feasible. An investment in baseline soil testing will allow you to evaluate the impacts of a practice before scaling up.

ALUS provides funding for on-field projects rooted in the principles of regenerative agriculture as well as edge-of-field stewardship that supports nature and biodiversity. Contract lengths and payment rates vary by community and project type. To discuss funding available in your community, reach out to your local ALUS Coordinator or visit www.alus.ca.

Regenerative Agriculture with ALUS

ALUS' regenerative agriculture projects combine on-field management rooted in the regenerative principles with edge-of-field stewardship of nature and biodiversity. This whole-farm approach produces complementary ecosystem services across working landscapes. Participants are supported with funding, technical assistance, and other resources and invited to attend field days, workshops, and other continued education opportunities to network with peers and share lessons learned.

Regenerative Agriculture Principles and Practice

Regenerative agriculture takes a systems view of the land under management. An understanding of the underlaying principles of regenerative agriculture is critical in adapting a practice to your landscape and operational context and ensuring that the practice is linked to soil health benefits.

Understanding the Context

Practices must be tailored to the unique conditions of each farm and landscape. Rather than applying a "one size fits all" approach, the principle of **understanding the context** encourages producers to consider their unique landscape, economic, social, and community contexts. This principle is foundational for long-term success in regenerative agriculture. By understanding the broader context, producers can make decisions that work with natural systems instead of against them. This leads to multiple benefits, including improved soil health, increased biodiversity, and increased resilience to climate variability, extreme weather, and economic pressures.

Minimizing Soil Disturbance

The principle of **minimizing soil disturbance** focuses on reducing activities that impact the soil's physical structure, nutrient cycles, and food webs. Soil disturbance can be classified three ways:

1. Physical soil disturbance: the destruction of soil structure through physical means such as tillage, heavy machinery compaction, and overgrazing.

2. Chemical soil disturbance: the disruption of soil cycles and food webs due to introduction or over-use of synthetic fertilizer, fungicides, and pesticides.

3. Biological soil disturbance: the depletion of soil micronutrients needed to support a healthy soil food web through monoculture. Soil food webs are reliant on the variety of inputs that a diverse system has to offer. Continuous monocropping impacts the balance of soil food webs.

For example, a continuous monocrop that does not add nitrogen back to the soil will lead to low soil nitrogen as microbial life depletes it.

Minimizing soil disturbance supports the formation and retention of soil structures called aggregates. Soil aggregates are formed when inorganic soil particles like sand, silt, or clay are bound together with plant roots, fungi, and "biotic glue" - organic compounds secreted by soil microorganisms that are attracted to nutrients excreted by plant roots. The porous structure of healthy soil aggregates enhances water infiltration, improves nutrient cycling, and allows roots to penetrate more deeply, ultimately supporting healthier, more resilient soils.

DIY soil aggregate testing

Stable soil aggregates resist erosion, allow roots to penetrate the soil, and retain water and carbon. A Slake Test is a simple way to evaluate soil aggregate stability at home and can be used to evaluate the impact of different management practices on soil structure. To conduct a slake test, air dry a soil clump and drop it onto a piece of fine mesh suspended in a glass. Ensure the clump is fully covered by water. Unstable aggregates will break down in water rapidly – if a large portion of the soil clump remains after more than 10 minutes of submersion, the soil is likely well aggregated [5].

Keeping the Soil Covered

Exposed soil is more susceptible to erosion and run-off. **Keeping the soil covered** using living plants, crop residues, mulch, or cover crops helps prevent erosion, improves water retention, moderates soil temperature, suppresses weeds, and enhances habitat for soil life, beneficial insects, and wildlife.

This principle can be easily combined with other regenerative principles to maximize soil health benefits. For example, strategies like bale or swath grazing incorporate livestock while maintaining soil cover. Bale or swath grazing maintains soil nutrient cycling by encouraging nutrient retention and replenishment at the field of origin instead of feeding offsite.

Relay cover cropping is another strategy used to establish a shoulder season cover crop before the cash crop is removed to maximize the soil moisture and sunlight available while maintaining soil cover and keeping living roots in the system. For example, a slower-establishing legume such as red clover can be seeded into a quick establishing cereal crop prior to harvest with co-benefits including increased nitrogen fixation and an improved soil C:N ratio without leaving the soil bare between harvest and establishment of a fall seeded cover crop.

A note on C:N ratios

An optimal C:N ratio for soil life is approximately 24:1 – that is, soil microorganisms require (on average) a diet that consists of approximately 24 parts carbon for every 1-part nitrogen to live and thrive in a soil habitat. A soil C:N ratio that is lower than ideal (e.g., nitrogen surplus) leads to a faster breakdown of aboveground soil residue, which can result in less protection from erosion and runoff. A soil C:N ratio that is higher than ideal (e.g., carbon surplus) leads to a depletion of soil nitrogen stores which can impact nitrogen availability for subsequent crops. For example, a low C:N ratio cover crop containing legume and brassica species following a high C:N cash crop such as wheat or corn will allow soil life to break down crop residue and cycle nutrients.

Conversely, a high C:N ratio cover crop following a low C:N ratio cash crop will provide soil cover while sustaining soil life to continue cycling nutrients. Making management decisions based on specific resource concerns with an understanding of biological balance and soil nutrient dynamics allows for system optimization based on specific goals while saving on synthetic input costs.

Material	C:N Ratio
Rye straw	82:1
Wheat straw	80:1
Oat straw	70:1
Corn stover	57:1
Pea straw	29:1
Mature alfalfa hay	25:1
Ideal microbial diet	24:1
Rotted barnyard manure	20:1
Legume hay	17:1
Beef manure	17:1
Young alfalfa hay	13:1
Hairy vetch cover crop	11:1

Source: USDA NRCS East National Technology Support Center

Maximizing Diversity

Integrating the principle of **maximizing diversity** increases system resilience. Adding complexity to the system using a variety of plants from different functional groups is natural insurance against the impacts of drought, flood, pests, and disease while introducing a variety of nutrients to support diverse soil food webs. Diversity can be incorporated both on-field and edge-of-field. Some example practices to increase diversity on-field include full and shoulder season cover cropping and intercropping.

Intercropping involves planting two or more crops on the same field at the same time, either mixed or in alternate rows. Some considerations for selecting intercropping species include maturity timing, harvesting strategies, ease of separation (if desired), and complementary physical plant characteristics. Some examples of intercropping projects include peas/canola, peas/mustard, and flax/chickpeas. Incorporating edge-of-field diversity with projects such as pollinator hedgerows or riparian improvements offers additional benefits, including attracting beneficial insects and improving water infiltration and retention.

A note on functional groups

Plant species are grouped into functional groups based on management requirements, biology, and ecological functions. Each functional group contributes a unique ecological function and food source to the system. Functional groups to consider for on-field management such as cover cropping include brassica broadleafs, non-brassica broadleafs, warm and cool season grasses, legumes, and forbs. Functional groups can also include more traditionally edge-of-field species including trees, shrubs, and grasses. A cover crop blend can be tailored to the resource concern. For example, compacted soils might benefit from a blend that incorporates:

- A forb species with large roots to physically break up soil, like radish or sunflower
- A grass species with a fibrous root system to hold topsoil in place and prevent erosion, like rye grass (cool season grass) or sorghum sudan grass (warm season grass)
- A legume species with the ability to fix nitrogen for soil microbial life to assist in building healthy soil aggregates, like hairy vetch or peas

Maintaining a Green Plant and a Living Root

Photosynthesis, the conversion of sunlight into carbohydrates and oxygen, is the foundation of all life on earth. Moving one step beyond the principle of keeping the soil covered, **maintaining a green plant and a living root** puts photosynthesis to work feeding soil life carbon in exchange for soil nutrients (N, P, K, etc.). Living plants are required to build and maintain healthy soil aggregates – a dead plant does not excrete carbon for uptake by soil microbial life which, in turn, stops the secretion of the organic compounds required to bind soil particles together into stable aggregates.

Even in regions of Canada where the growing season is short, there are several strategies that can be deployed to keep green plants and living roots in the soil beyond a standard annual crop rotation, including full and shoulder season cover crops that incorporate plants from multiple functional groups and biennial species, when appropriate. Relay cropping or relay cover cropping with biennial species intended to be the following year's cash crop, such as winter wheat or perennial ryegrass, is another strategy for increasing the amount of time a living root is in the system.

Integrating Livestock

In regenerative agriculture, animals, plants, and soil life work together to build healthier and more resilient farm systems. **Integrating livestock** offers multiple benefits including increased soil health and fertility, improved nutrient cycling, and reduced input costs. Proper planning and management are crucial in the successful implementation of this principle – overgrazing and inadequate rest periods can damage both soil and vegetation. Livestock can be integrated by bale or swath grazing, cover crop grazing, or silvopasture. Strategies such as rotational or adaptive grazing that move animals frequently through paddocks mimic natural herd movements and prevent overgrazing – allowing recovery of the system and stimulating plant growth with co-benefits including carbon sequestration and water infiltration.

For more information on ALUS' Enhanced Grazing Projects, see **Success with ALUS Enhanced Grazing Projects**. Broadening the scope beyond traditional livestock, a whole-farm approach to regeneration encourages consideration of "belowground" livestock (soil life) as well as "edge-of-field" livestock including pollinators, beneficial insects, and wildlife. Strategies including installing pollinator strips, restoring riparian areas and grasslands, and planting trees and shrubs all contribute to enhanced habitat and increased system resilience.

Measuring Success

Regenerative agriculture is an adaptive, systems-based approach that values ecological, economic, and social outcomes. Every farm operates within a unique context – soil type, climate, landscape, management practices, and community all shape what successful regeneration looks like.

Success depends on the unique goals and needs of the individual, whether the focus is improved soil health, enhanced biodiversity, or building economic resilience.

Regenerative systems rely on adaptive management, where ongoing learning and observation inform decision-making over time. Instead of chasing fixed outcomes, regenerative producers continuously adjust their management to align with the health of their soil and resource concerns. Because there is no “one-size-fits-all” approach, success can be difficult to measure.

Careful observation, baseline soil sampling, and clearly defined resource concerns prior to project establishment will contribute significantly to assessing future success.

When asked about outcomes achieved or made progress towards, ALUS participants reported improved soil health, increased soil organic matter, and reduced inputs. These results are aligned with a 2020 survey where producers across the prairies were asked about the benefits observed from using cover crops [6].

Reported outcomes included improved soil health, increased biodiversity, increased organic matter, less erosion, and increased water infiltration. Research backs these observations with various sources linking management practices rooted in the regenerative principles to beneficial environmental outcomes including increased weed suppression [7] [8], improved soil health [9] [10], increased biodiversity [8] [10], decreased compaction [8], increased water infiltration [8] [9], and increased soil organic matter [8] [11] [12].

However, it is important to remember that context is key – soil type, landscape, and local climate all contribute to specific outcomes and long-term research into the benefits of regenerative management is sparse. Beginning with small plots and utilizing check strips allows individuals to evaluate management practices within their unique context.

Challenges, Troubleshooting, and Adjusting Strategies

As with all things regenerative agriculture related, identifying challenges and troubleshooting begins with consistent observation and record keeping – each season should be viewed as part of a long-term feedback loop rather than a final result. Regularly revisiting your resource concern will ensure management decisions continue to reflect your goals and context. Small, controlled trials incorporating check strips will allow a comparison of outcomes before committing to scaling up a practice

Regeneration thrives on collective learning – incorporating knowledge from peers and local experts, including ALUS staff and coordinators, can expedite troubleshooting when encountering challenges. ALUS encourages peer-to-peer knowledge exchange and provides access to other producers locally or regionally with experience in the implementation of regenerative practices. Reach out to your local ALUS Coordinator to learn more about programming and support available in your region.

Additional Resources and References

Producer Groups and Resources

UnderstandingAG https://understandingag.com/	**Canadian Organic Growers** https://cog.ca/
Manitoba Forage and Grassland Association https://www.mfga.net/	**Holistic Management Canada** https://holisticmanagement.ca/
Rural Routes to Climate Solutions https://rr2cs.ca/	**SaskSoil** https://www.sasksoil.ca/
Regeneration Canada https://regenerationcanada.org/en/	**Farmers for Climate Solutions** https://farmersforclimatesolutions.ca/

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This booklet is part of the **ALUS guidebook series** illustrating the types of ALUS projects available to participating farmers and ranchers. For more information on ALUS programming available in your region, contact your local ALUS Coordinator.

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