

Regenerative Agriculture Extension

Review of Existing Resources and Proposed Recommendations
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Executive Summary

Regenerative agriculture is a holistic, circular approach to farming that strives to improve the health of agroecosystems and the natural ecosystems that support them. The project had the following three objectives:

1. To understand the various regenerative agriculture extension resources available to BC producers.
2. To identify the gaps, challenges and opportunities for regenerative agricultural extension resources in BC.
3. To provide recommendations for improving regenerative agriculture extension resources for BC producers.

To help achieve the project objectives, a jurisdictional scan and interviews with stakeholders were conducted. The jurisdictional scan revealed over 40 resources, within three categories:

- Knowledge development: on-farm and off-farm research;
- Knowledge transfer: delivery of in-person events, online resources, and other materials; and
- Risk assessments: technical assistance provided by consultants on regenerative agriculture topics.

The interviews helped to identify the following challenges, opportunities, and partnerships:

Challenges	Opportunities	Partnerships
Producer costs (time and money)	Knowledge sharing: in-person and online, qualified experts	Private companies, including dealers and suppliers (science-based)
Variability in climate, regions, production scale, and systems	Demonstration field days	Industry associations
Producer knowledge	BC-specific or locally-specific research studies	Out-of-province partners including academia
Limited sector-specific expertise	Education for farmers	Local agricultural organizations, including farmers institutes
Lack of extension provider capacity	Greater levels of funding with longer terms	
	Cross-regional and provincial collaboration	
	Extension provider education and resources	

Based on the project findings, six key recommendations are presented for improving extension resources, programs, and services available to BC producers related to regenerative agriculture. A key connecting theme amongst the recommendations is coordination and collaboration.

Recommendations	Rationale	Collaborations/ Partners	Resources Required
1. Fund long term research	Long-term on-farm research is needed across the province due to the variability in soil types, weather patterns, and production systems. A collaborative approach that includes many partners is required to ensure practices are realistic for the producer to implement.	<ul style="list-style-type: none"> • Producers • Academia • Provincial & federal governments • Local agricultural organizations • Industry associations • Extension consultants 	Funding and coordination
2. Facilitate access to resources.	Provide one online location and one AF contact for up to date information about available resources and funding opportunities for producers.	<ul style="list-style-type: none"> • Provincial government lead, with collaborations with all other actors 	Coordination
3. Align funding opportunities.	Create more synergies between extension organizations to reduce a duplication of efforts. Addressing this gap may include coordinating on-going meetings between extension providers and meetings when funding opportunities arise.	<ul style="list-style-type: none"> • Provincial government lead, with collaborations with extension providers 	Coordination
4. Support existing extension providers.	Provide long-term funding and increase knowledge transfer of effective practices. Provide support for scaling up of efforts that are successful but limited by organizational capacity.	<ul style="list-style-type: none"> • Provincial & federal governments • Local agricultural organizations • Industry associations • Extension consultants 	Funding and knowledge development

Recommendations	Rationale	Collaborations/ Partners	Resources Required
5. Attract and retain extension expertise.	There is a need for more experts with knowledge of best practices across production types, scales and geographic locations. Producers have difficulty finding appropriate expertise which limits implementation of practices.	<ul style="list-style-type: none"> • Provincial & federal governments • Extension consultants 	Funding and coordination
6. Share knowledge across sectors.	Develop opportunities for knowledge sharing and collaboration between all sectors and types of farm operations. This will ensure that consistent information about effective practices are conveyed. Partnerships could be developed with other Ministries and/or organizations to develop resources.	<ul style="list-style-type: none"> • Producers, provincial & federal governments • Extension consultants • Agricultural organizations, • Industry associations • Private companies 	Coordination

It is anticipated that AF can use these recommendations to inform regenerative agriculture extension priorities when considering both internal workplans and funding opportunities for external extension providers.

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Acronyms

AF	Ministry of Agriculture and Food
BMPs	Beneficial Management Practices
PAgs	Professional Agrologists

Project Objectives and Scope

The project had the following three objectives:

4. To understand the various extension resources, programs and services that are available to BC producers related to regenerative agricultural practices, including relevant resources from elsewhere in Canada and the USA.
5. To identify the gaps, challenges and opportunities for regenerative agricultural extension resources, program and services from interviews with BC extension service providers and other key stakeholders.
6. To provide recommendations and next steps for improving extension resources, programs and services that are available to BC producers related to regenerative agricultural practices.

The terms 'regenerative agriculture' and 'extension services' were scoped in the following manner for this project to guide discussions with key stakeholder and to gather resources for the jurisdictional scan.

Regenerative Agriculture¹

Regenerative agriculture is a holistic, circular approach to farming that strives to improve the health of agroecosystems and the natural ecosystems that support them. Healthy ecosystems are self-renewing and resilient. Indicators and outcomes associated with healthy agroecosystems include:

- Biodiversity — Where variation among organisms in an ecosystem is promoted.
- Ecological balance — Where diverse beneficial populations dampen pest outbreaks; local resource cycling is prioritized to prevent nutrient accumulation, depletion, and pollution; and greenhouse gas emissions are minimized and carbon sequestration is maximized.
- Soil health — Where the capacity of a soil to support agricultural productivity and a diverse microbial community is supported and carbon is sequestered.
- Water balance — Where freshwater use aligns with local and temporal availability; water is conserved through retention and percolation; any runoff is clean and safe; groundwater depletion is avoided; and irrigation efficiency is prioritized when and where fresh water is scarce.

Regenerative agriculture seeks continuous improvement and attends to the welfare of all species involved, including farmers, farm workers, livestock, wildlife and pollinators. BC's varied landscape and multiple sectors will result in diverse practices applied on regenerative farms.

¹ BC Ministry of Agriculture and Food. n.d. [Regenerative farming and agri-tech: Support for sustainable agriculture](#).

Regenerative Practices

Regenerative agricultural practices include, but are not limited to:

- Agroforestry (e.g., windbreak, alley cropping, hedge rows);
- Animal integration in the cropping system (e.g., silvopasture);
- Soil amendments (e.g. biochar, compost, manure, biosolids, wood ash, etc.);
- Conservation tillage practices (e.g., reduce tillage, no-till, strip tillage);
- Cover cropping (e.g., green manures, winter cover crops, mulch);
- Increasing plant diversity (e.g., crop rotation, polyculture);
- Integrative Pest Management (e.g., trapping and monitoring, prioritizing low-impact products, using cultural, physical, behavioural and biological control)
- Managed grazing (e.g. rotational grazing);
- Organic matter recycling (e.g., compost, bio-solids, manure); and
- Set-asides (e.g., fallow fields, grassland set-asides).

Extension Resources and Services

Extension resources and services include applied research, information transfer and communication, and knowledge/method/tool adoption programming.² Sector development (e.g. technical, social, environmental, economic) is the primary purpose of an extension service. For this project the focus of extension is on resources and services related to regenerative agriculture.

Often the following actors are involved in extension delivery:

- Local, Provincial and Federal government staff
- Industry Associations
- Farmers' Institutes
- Agrologists/Consultants
- Agri-retailers/Private Companies
- Academic Institutions
- Non-profit Organizations
- Certifying Bodies

For the purposes of this report, extension resources and services are separated into the categories of knowledge sharing, knowledge development and risk assessment.

Knowledge Sharing Examples

- Direct Experience (e.g. field days and farm tours)

² dela Rosa, A., W. Polasub, L. Sandler, and K. Mullinix. 2021. Organic Extension Needs Assessment: Phase 1 & 2 Report. Richmond, British Columbia: Institute for Sustainable Food Systems, Kwantlen Polytechnic University.

- Meetings (e.g. one-on-one meetings with producers (e.g. agri-retailers, consultants, ministry staff, other producers).
- Online (e.g. webinars, mobile apps, websites).
- Training and workshops
- Academic/educational programs
- Conferences/Tradeshows
- Books/Newspapers/Factsheets

Knowledge Development Examples

- On-farm research and demonstrations sites: partnerships with academia
- Academic research

Risk Assessment Examples

- Technical assistance (e.g., soil health assessments, integrated pest management, crop management, etc.)
- Environmental Farm Plans.

Project Methodology

To achieve the project objectives, a jurisdictional scan and interviews were conducted.

Jurisdictional Scan

An initial list of organizations and resources related to regenerative agriculture in BC, Canada and the US was developed. Internet searches were then conducted to identify extension services and resources across BC, Canada and the US – using the key words of “regenerative agriculture/farming” “sustainable agriculture/farming” “extension services” “extension resources”.

For each finding, several categories of information was collected:

- Name of resource
- Category (i.e., academic, government, association, organization, etc.)
- Description of extension provided
- Type of extension services (i.e., Knowledge Transfer, Knowledge Development, Risk Assessments).
- Cost to producers (i.e. free or fee for services, events, workshops, etc.)
- Regenerative agriculture category (i.e., soil health, biodiversity, water)
- Website link

The results of the jurisdictional scan are provided in an accompanying document.

Interviews

Interviews were conducted with 12 key actors with knowledge of regenerative agriculture extension services and resources. The objectives of the interviews were to:

1. Help identify the gaps, challenges and opportunities for regenerative agricultural extension resources, program and services.
2. Uncover any additional extension resources, programs and services that are available to BC producers related to regenerative agricultural practices.

The interview responses were aggregated and grouped into common themes. Occurrences of themes and specific topics were recorded, which helped to identify priorities in extension gaps.

Limitations

The following were limitations to this project's methodology:

- Websites of resources listed in the jurisdictional review were scanned for availability of relevant extension resources. Information on websites can change frequently, so updates to the excel spreadsheet will be required for the resources to remain relevant.
- There are several dozens of agricultural organizations, industry associations and farmers institutes across the province, therefore the list is not exhaustive of all potential resources available to producers provided by these organizations.
- It was not possible to assess the effectiveness or quality of the extension information provided by the resources listed in the excel spreadsheet.
- Interviews could not be completed with all extension providers in the province.

Jurisdictional Scan Results Summary

The jurisdictional scan revealed over 45 BC-based resources available to BC producers related to regenerative agricultural topics of soil health, biodiversity and water health. The resources include a variety of methods for extension including:

- Knowledge development through on-farm and off-farm research partnerships with academics, producers, industries and producer organizations;
- Knowledge transfer through academic courses and workshops, in-person events, online events, online guidebooks and beneficial management practices materials, and other workshops, meetings and materials. These were created and communicated by a wide variety of delivery agents including industry associations, farmers' institutes, agricultural organizations, and governments; and
- Risk assessments in the form of technical assistance provided by consultants on topics related to soil health, nutrient management plans, irrigation systems, integrated pest management, biodiversity plans and others.

Most of the resources that were reviewed are free for producers. There are fees associated with some webinars, events and conferences hosted by various organizations. Private consultants charge a fee for their extension services.

Other provinces within Canada have similar resources available to their producers as in BC. BC producers may find value in some of the resources reviewed, in particular if information related to certain sectors and production practices are limited in BC but may be available in other provinces (e.g., dairy in Ontario and Quebec, annual cropping in the Prairies).

Several interviewees mentioned that producers use the information provided by US colleges and universities through their agriculture extension programs. Many of these academic institutions specialize in certain crops and production systems and have extensive guides and research results published on their websites for free. Some BC producers have also directly contacted researchers in the US for crop management advice.

The list of resources in the jurisdictional scan document is not exhaustive but provides many resources for producers to access information to regenerative agricultural practices.

Interview Results Summary

The interview responses are separated into the challenges, opportunities, and potential partnerships & collaborations for regenerative agriculture extension resources. Specific regenerative agriculture topics that were mentioned as requiring more resources for the BC context and knowledge transfer to producers are also listed. These are summarized below and a complete assessment is provided as an accompanying document.

Challenges

1. Producer Costs (in time and money) (*mentioned 12 times*)
 - Resource-intensive in terms of time and money for trying new practices. May have to remove land from production to implement practices, which has economic impacts.
 - Challenging to get producers to events and to ask producers to host because they are time limited. With several organizations putting on similar events, the same producers are being asked to participate.
 - Limited number of qualified experts means their services are at a premium and producers have to shoulder those costs.
2. Variability in climate, regions, and production scales and systems (*mentioned 10 times*)

- Hard to measure the benefits of some practices due to variability in regional conditions and weather from year to year.
- Large diversity of microclimates, soil types, production systems, etc. in BC makes it hard to produce relevant high-level material/educational resources.
- Hard to find experts that understand the local/regional variability.

3. Producer knowledge (*mentioned 8 times*)

- Challenges in interpreting lab reports for soil fertility, compost analysis, plant tissue reports and nutrient management plans.
- Need basic educational materials, related to various practices, farm equipment, tools, etc.
- Producers have limited time to search for events and resources and therefore often miss out on extension knowledge or sharing opportunities

4. Limited sector-specific knowledge and extension expertise (*mentioned 8 times*)

- Can be hard to find information about practices related to BC agricultural sector context (e.g. many diversified small-scale farms).
- Lack of PAgS to sign off on management plans impacts a producers' ability to access funding.
- Lack of government-based extension support and research over the past few decades has left big gap in BC knowledge.

5. Extension provider capacity (*mentioned 7 times*)

- Lack of core funding available for extension organizations.
- Lack of human resources or time for extension organizations to do more.
- Organizations are duplicating efforts where instead they could be complimenting efforts.

Opportunities

1. Knowledge sharing (*mentioned 12 times*)

- Both in-person (producer-to-producer or group meetings) and online tools (videos or webinars) are needed that are facilitated by extension organizations. One mode of delivery will not be sufficient, a multi-pronged approach is required. For example both big and small events, online workshops, winter events and workshops in person, videos of the BMPs once they are developed, factsheets, newsletters, newspaper articles.
- Advertising should also be multi-pronged: a centralized online resource that lists all the events going on that month related to regenerative agriculture, radio and print materials.
- There is a need for a vetted list of qualified subject matter experts to ensure high quality speakers are utilized.

2. Demonstration field days (*mentioned 10 times*)

- There is an opportunity to support more producer-to-producer events; for example, by focussing on early adopters and farms with established success in regenerative agricultural practices to showcase their work through on-farm demonstration days.
- Ensure events are planned across all regions in BC to ensure regionally-specific practices are exemplified.

3. Research studies (*mentioned 10 times*)

- More BC-specific and/or locally-specific studies in conjunction with academia to develop applied research that is subsequently communicated to producers and used to develop resources. The research studies must show economic benefits over the long-term.
- Consider bringing back government-led research farms across the province.
- Provide additional funding/compensation for producers to trial research.

4. Farmer education (*mentioned 6 times*)

- Improve conveying of the general concept of regenerative agriculture to producers along with existing materials and resources (e.g. how to interpret soil tests).
- Provide proof of concept of BMPs to producers before asking for implementation on-farm.
- Develop specific prescriptions for BMPs that work for individual circumstances.

5. Funding (*mentioned 6 times*)

- Greater funding, with longer terms, is required for organizations that provide extension services.
- There are similar funding opportunities offered by multiple organization which can be confusing and challenging for producers. There is an opportunity to align funding.
- Often funding for on-farm research is not available for consultants, which is a missed opportunity as they work closely with producers and know what type of on-farm trials could be feasible.

6. Cross-regional and provincial collaboration (*mentioned 4 times*)

- AF could engage with larger commodity groups with cross-provincial reach.
- AF could coordinate lessons learned from trialling practices from across the province.
- There may be a role for a centralized organization (or hub) that can coordinate other groups working on similar regenerative agriculture extension topics.

7. Extension provider education and resources (*mentioned 3 times*)

- More opportunities for education/learning for extension providers like consultants, ministry staff, organizations, crop input/seed companies so they are in-line with the best practices as practices can change often.
- Need more experts directly engaging with producers for extension support.
- Opportunity for more availability of non-English resources (in multiple languages) to be used by extension providers.

Partnerships

The following opportunities were mentioned in addition to the current more established collaborations involving government staff, academia, research networks, etc.

1. Private companies (e.g. input and seed) (*mentioned 4 times*)
 - Seed dealers and suppliers should be involved and engaged in the extension conversation; making sound recommendations based on current science.
 - Suppliers can come with lots of knowledge but need awareness of biases for (e.g. ultimately they are selling products).
2. Industry associations (*mentioned 3 times*)
 - These agencies should be involved in all extension efforts.
 - Could foster more inter-association collaborations across the province.
3. Out of province partners (*mentioned 2 times*)
 - Learn from organizations and producers in Alberta where similar production practices are being used to the BC context and collaborate with partners there.
 - Look to academic-based extension models from University of Western Washington and Oregon State University.
4. Local agricultural organizations (*mentioned 2 times*)
 - Efforts should be made to identify and involve these groups in all extension efforts.

Regenerative Agriculture Topics Mentioned

1. Soil Health (*mentioned 12 times*)
 - More information is needed regarding: cover cropping, soil conditioners, compost quality, crop rotations, intercropping, reducing/managing inputs, pasture rejuvenation, best forage practices, minimal/no-tilling practices, testing and interpreting soil results.
 - Expertise/knowledge on regionally specific cover cropping practices is missing.
2. Nutrient Management (*mentioned 7 times*)

- Need more planning expertise and help interpreting results.
- Expertise/knowledge on regionally specific nutrient management practices is missing. E.g. vine sap analysis for wine/tree fruit industry emerging technology to help with nutrient management.
- Gap in support for small to medium producers, particularly for annual and perennial crops.

3. Extreme Weather (*mentioned 2 times*)

- Agricultural redesign opportunity to create a regenerative agriculture system after recovery from extreme weather events.

4. Other areas

- Silvopasture is an area that needs more research
- Weather data; it feeds into irrigation scheduling, pest management, soil health practices.
- Livestock and annual crop integration has high potential in the Peace region. Need more research, demonstration and communication of benefits.
- Need products tailored to specific-pests and diseases, as BC is vulnerable to new pressures coming from other parts of North America.
- Need reduced bureaucracy/permits/licences to help producers with better water/drainage management that benefits land and producers.

Other Comments

Regenerative Agriculture Metrics and Certification:

- Metrics/indicators should be developed for regenerative agricultural practices. Some producers already use regenerative practices and should be recognized and assisted in understanding the impacts of these practices (e.g. measuring soil health indicators over time).
- Metrics to evaluate the success of new regenerative agriculture policies and programs (including extension support) should be developed so that AF can better understand if initiatives are being successful.
- Producers won't adopt regenerative agricultural practices without financial incentives (i.e. becoming certified as regenerative puts a premium price on their products). Certification needs to be regulated or else greenwashing can happen which frustrates the farmers who are actually certified.

'Regenerative agriculture' terminology

- The term ‘regenerative agriculture’ seems to translate well to the public audience and is helping the general public understand the idea of stewardship by producers and on farmland.
- Consumers are asking farmers at the markets and on social media if they are ‘regenerative’ and wanting some criteria/knowledge about regenerative farming practices.

Several interviewees mentioned they are appreciative of the efforts and work from the Ministry in the last year or so related to extension and want that to continue and expand.

Summary of Extension Gaps in BC

Expertise

- There is a general lack of expertise across the province when it comes to providing locally relevant and effective information on regenerative agricultural practices.
- A comprehensive review of all relevant experts was out of scope for this project, however all key players interviewed noted that for some sectors and specific practices there was no one in the province with expertise or that there are limited number of experts so capacity to provide extension is limited.

Locally-relevant information

- Due to the varied climactic and environmental landscapes throughout BC, regenerative practices that work in one region may not be relevant everywhere. This leaves a gap in information about effective practices for a specific location and for specific sectors, for producers to trial and implement on-farm.
- The following were the specific practices or topics within regenerative agriculture that were noted as requiring more locally relevant information for producers: soil health and nutrient management, extreme weather events, weather data., silvopasture, pest and disease management.

Long term funding

- As uncovered in the jurisdictional review, there are many organizations involved in and providing extension resources and programs to BC producers. However, these organizations often lack long-term funding and are therefore spending time applying for funding rather than engaging in outreach activities with producers.

Sharing and coordination of information

- There could be more coordination around creating synergies with extension providers and organizations working on similar regenerative agricultural topics and

knowledge transfer events. Creating an environment for more cooperation and building off of existing work is an opportunity to develop more detailed resources for regenerative agricultural practices.

- Producers are often confused about where to find information about extension resources/events, and which funding opportunities are applicable for them. There is no one place online or organization that compiles all the relevant information for easy access by producers and by extension providers and organizations.

Recommendations

The following recommendations are presented for improving extension resources, programs and services that are available to BC producers related to regenerative agricultural practices. The recommendations are informed from the results of the jurisdictional scan and interviews and are presented in no particular order. A key connecting theme is coordination and collaboration.



These are further detailed in the table on the following page

Recommendations	Rationale	Collaborations/ Partners	Resources Required
1. Fund long term research	Long-term on-farm research is needed across the province due to the variability in soil types, weather patterns, and production systems, to provide locally relevant information to producers. A collaborative approach that includes producers, extension consultants, industry associations, local agricultural organizations and governments is required to ensure practices are realistic for the producer to implement while meeting regenerative agricultural objectives (e.g. increase in soil health).	<ul style="list-style-type: none"> • Producers • Academia • Provincial & federal governments • Local agricultural organizations • Industry associations • Extension consultants 	Funding and coordination
2. Facilitate access to resources.	There is a need for one online location and one AF contact that provides as much up to date information as possible, about available resources and funding opportunities for producers.	<ul style="list-style-type: none"> • Provincial government lead, with collaborations with all other actors 	Coordination
3. Align funding opportunities.	There is the need for creating more synergies between extension organizations providing similar information and hosting extension events. There is often a duplication of efforts with extension providers applying for similar extension funding opportunities. Addressing this gap may include coordinating on-going meetings between extension providers and meetings when funding opportunities arise.	<ul style="list-style-type: none"> • Provincial government lead, with collaborations with extension providers 	Coordination

Recommendations	Rationale	Collaborations/ Partners	Resources Required
4. Support existing extension providers.	Extension resource providers, such as local and provincial organizations and extension consultants working in the field of regenerative agriculture require increased support in terms of long-term funding. More knowledge of regenerative agricultural practices that are effective (e.g. cover cropping practices across production systems) is also required. In turn, this support leads to increased knowledge transfer to producers. This could take shape in the form of support for scaling up efforts that are currently successful but that are limited by organizational capacity.	<ul style="list-style-type: none"> • Provincial & federal governments • Local agricultural organizations • Industry associations • Extension consultants 	Funding and knowledge development
5. Attract and retain extension expertise.	There is a need for more experts (through the provincial/federal government and consultants) with knowledge of best practices for regenerative agriculture across production types, scales and geographic locations. Producers have difficulty finding appropriate expertise which limits implementation of regenerative agricultural practices.	<ul style="list-style-type: none"> • Provincial & federal governments • Extension consultants 	Funding and coordination
6. Share knowledge across sectors.	Develop opportunities for knowledge sharing and collaboration between all sectors and types of farm operations will ensure that the same information about effective practices are conveyed. Partnerships could be developed with other Ministries and/or organizations to develop apps, create an online resource hub, or connect to advisors who can provide extension resources in languages other than English.	<ul style="list-style-type: none"> • Producers, provincial & federal governments • Extension consultants • Agricultural organizations, • Industry associations • Private companies 	Coordination

Appendix: Interview Questions

- What are some of the most useful regenerative agriculture extension services that currently exist and are accessible to you?
- What services do you provide (or receive)?
- What challenges do you face in delivering/receiving extension services/programs for regenerative agriculture?
- What are the gaps in extension services for regenerative agriculture in BC (e.g. either a certain topics or a certain method of delivery)?
- What are the biggest opportunities for expanding extension services for regenerative agriculture in your area/BC?
- Are there certain partnerships/collaborations that would be good opportunities to develop/deliver regenerative agricultural extension services?
- Are there extension services in other jurisdictions that you are aware of that are appealing from within a BC context?