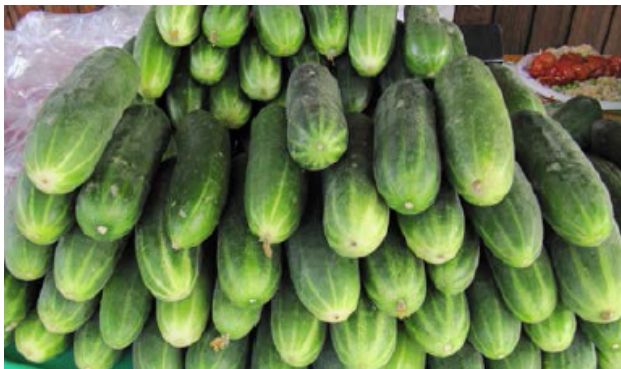


## **Cariboo Agriculture Research Alliance (CARA)**



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## **Final Report**

*for:*

### **Cariboo Cattlemen's Association & Cariboo Region**

*Submitted by:*

**Toma and Bouma Management Consultants**  
in association with David Zirnhelt

June 15, 2017

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June 15, 2017

Working Group  
c/o Cariboo Cattlemen's Association  
Williams Lake, BC

Dear Committee Members:

We are pleased to submit our final report on this new Cariboo regional agriculture research alliance (CARA) concept. Our report includes:

- Introduction and objectives;
- Models of agriculture research for consideration;
- Cariboo context and considerations for planning and operations;
- CARA organization design and plans;
- The Cariboo region applied research database and observations; and
- Cariboo region research definitions, contacts made and community consultations.

The research background underscores the need for the alliance and the community comments reflect that view. Based on these findings and the current context, the new research alliance has been designed to support both projects and extension of the findings from those projects. It is important to understand the past research outcomes for extension but it is equally important to develop a future focused organization for agriculture adaptation, innovation and growth in the region.

We see a very good opportunity to develop a strong regional organization based on the research and model developed herein. The keys to success are involving the communities, the agriculture leaders and most importantly the user groups. We look forward to discussing it further with you.

Sincerely,

A handwritten signature in black ink, appearing to read 'Darrell Toma', with a horizontal line underneath.

Darrell Toma, MSc, PAg (Dist.), CMC

## Acknowledgements

This project has involved a number of participating organizations (over 25) and individuals (50). We appreciate the assistance and advice provided to the project by the project management committee including:

- Cordy Cox, Cariboo Cattlemen's Association;
- Clint Thompson, Cariboo Cattlemen's Association;
- Rob Borsato, District H. Farmers Institute;
- Lynda Atkinson, BCAC, FARMED;
- Lori Fogarty, FARMED, Growing North Cariboo Society;
- Nicole Pressey, BC Ministry of Agriculture;
- Samantha Charlton, BC Agriculture & Food Climate Action Initiative;
- Emily MacNair, BC Agriculture & Food Climate Action Initiative;
- Erica Nitchie, BC Ministry of Agriculture;
- All the people attending the community meetings and the workshops.

It is notable that the communities in the region and industry leaders are determined to partner with education and research professionals to help address this important alliance venture to serve the need for high quality and reliable knowledge sharing. From the combined interest demonstrated in the open and rich discussions, the concept shows that it can be a "win-win" for many people in the Cariboo region.

Funding for this project has been provided in-part by the Governments of Canada and British Columbia through the Investment Agriculture Foundation of BC under *Growing Forward 2*, a federal-provincial-territorial initiative. The program is delivered by the BC Agriculture & Food Climate Action Initiative.

The Governments of Canada and British Columbia are committed to working with industry partners. Opinions expressed in this document are those of the authors and not necessarily those of the Governments of Canada or British Columbia, or the Investment Agriculture Foundation.



## Executive Summary

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### Cariboo Agriculture Research Alliance Concept Development

In 2013-2014, the *Cariboo Adaptation Strategies* planning process brought together the Cariboo region's agricultural producers and local and provincial government partners to evaluate climate change impacts on local agricultural production, and to develop strategies and actions to address the associated challenges. The need for local research, and effective communication of research results, was identified as a high priority to support Cariboo producers with adapting to climate change. A critical first step – outlined in the *Cariboo Adaptation Strategies* – is to “strengthen the capacity for a coordinated regional approach to agricultural research.”<sup>a</sup>

During the winter of 2016 and early 2017, this project gathered input from local organizations through interviews, meetings, and workshops. These mechanisms gathered feedback and brought interested groups and individuals together to determine priorities and to define the model for a local research alliance. Through the project, the foundation for a coordinated approach has evolved and is outlined in this summary document. While the alliance is still in a developmental stage, this document can serve as a “roadmap” so that the transition to initial startup operation can occur in 2017.

### Vision and Objectives for the Alliance

The Cariboo agriculture research alliance will be seen as the steward of Cariboo applied agriculture research, providing access to research outputs, helping to set regional priorities, and providing coordination for programs and projects which are important, on behalf of ranchers, farmers and other user groups. A name suggested by the working group was the Cariboo Agricultural Research Alliance (CARA).

*The underlying objectives of the Alliance are to:*

- Provide leadership on agriculture applied research problems and access to local and new knowledge;
- Provide extension and technology transfer opportunities;
- Use technology infrastructure solutions and tools (free and purchased) to allow open access;
- Manage and steward Cariboo applied research reports and data, while providing access to them; and
- Provide the Cariboo region's farmers and ranchers with benefits and opportunities to grow and sustain their operations

### Interested Organizations

CARA will be an umbrella organization, or hub, of constituent organizations. Participants from the following organizations (32) have expressed interest in being involved:

- **Province-wide industry organizations:** BC Agriculture Council, BC Agriculture and Food Climate Action Initiative, BC Association of Farmers' Markets, BC Cattlemen's Association, BC Forage Council, BC Sheep Federation, BC Honey Producers' Association, BC Invasive Species Council, BC Livestock Co-op;
- **Local organizations:** Cariboo Cattlemen's Association, Cariboo Growers Co-op, Cariboo Family Enrichment, CEEDs, Community Futures Williams Lake, District H Farmers Institute, FARMED, Growing North Cariboo Society, Quesnel Farmers' Market, Quesnel Cattlemen's Association, Quesnel Ag Centre of Excellence working group; South Cariboo Agri-Culture Enterprise Centre;
- **Government agencies:** BC Ministry of Agriculture, Cariboo Regional District, North Central Local Government Association;

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<sup>a</sup> Toma and Bouma Management Consultants, Edmonton were selected (along with David Zirnhelt) to deliver the project which took place between October of 2016 and May of 2017.

- **First Nations**, including: Tl'et'ingox First Nation, Canim Lake First Nation, Tsilhqot'in National Government Stewardship Council, Ulkatcho First Nation, Williams Lake Indian Band; and Xatsull First Nation; and
- **Academic institutions**, including: Thompson Rivers University (TRU), College of New Caledonia (CNC), University of Northern BC.

### Options for Legal Structure

A number of options exist for the legal structure of the proposed agriculture alliance including:

- No legal structure, as an informal network;
- Society with organizational members and associate members;
- Incorporated non-profit;
- Co-operative;
- Joint venture agreement among organizations; and
- Program of college with producer direction.

The recommended approach for the Cariboo research alliance is a **joint venture alliance for a 5-year term (renewable)** among the core founding organizations (such as TRU, CNC, Forage Council, Cariboo Cattlemen's Association, etc.), alliance partners (funders and in-kind) and stakeholders (regional groups and individuals who want to participate). This group can serve as a strong agriculture cluster for many developments.

This model offers quick start-up, continued individual autonomy of participating groups, potential for piloting the organization and the ability to match applied research projects with supplemental funds and resources. It is also an inclusive and open approach. When operating, the direction for the alliance will be provided through a board of directors, and subject-specific committees. **The “mechanics” of the alliance will be managed through administrative staff support and projects will be contracted via the lead administrative organization.** Coordination and collaboration will be enhanced and the agreement will need to define roles, goals and the structure, along with dispute and asset ownership issues. The new database will need to be housed within the structure.

### Near term Activities and Budget

The expected activities over the initial months and first operational year include:<sup>b</sup>

- Recruiting a founding working group (later move to Board of Directors -possibly from the Steering Committee);
- Defining a lead administrative agency;
- Securing funds/ resources/ agreements to meet the business plan goals;
- Developing partnerships and organizational capacity to help accomplish mutual strategic goals;
- Completing a number of producer- driven projects, based on their gaps and needs; and
- Defining a longer-term business plan with performance measures.

### Applied Research Database

The Cariboo applied research database includes 134 entries (including technical reports, fact sheets, and peer-reviewed literature), which are listed in a separate document. These reports have been assembled for access and use on Mendeley, which is a free open source digital library. The stewardship of the database and Mendeley use will be under management of the working group. A distribution of the reports is noted in Table E-1 below.

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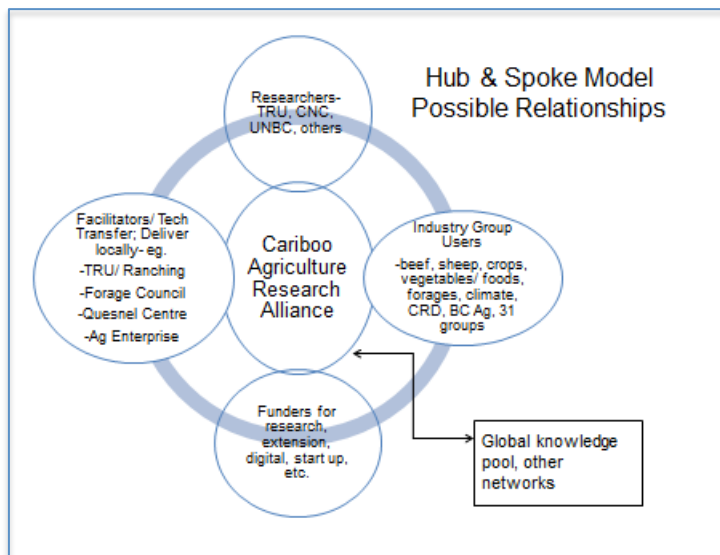
<sup>b</sup> The operational and aspirational aspects discussed herein are based on models which work, plus community and expert input and the interests of Cariboo region organizations as expressed by participants at the workshops, meetings and interviews.

**Table E-1.** Number of reports included in database by theme.

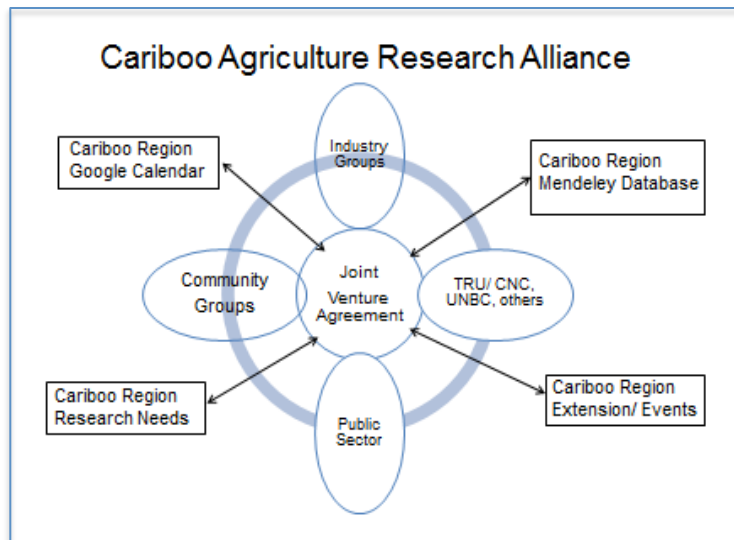
Livestock	28
Crops	28
Region/ Community	24
Environment	23
Forestry	15
Agriculture	16
Total	134

**Organizational Structure & Budget**

The proposed budget for CARA is in the order of \$202,000 annually and some activities can be started immediately with a joint working group (such as using the database). An operating budget will be needed as well as development of a joint venture agreement for start-up operations. The figure below (Figure E-1) shows the possible Alliance structure and relationships. Figure E-2 shows the core functions of the proposed research alliance.



**Figure E-1.** Possible organizational structure for the alliance with constituent organizations



**Figure E-2.** Core functions of the proposed research alliance

**Contacts**

Contacts in the Cariboo region for the continued start-up progress of CARA include: Cariboo Cattlemen's Association ([caribocattlemens@gmail.com](mailto:caribocattlemens@gmail.com)), David Zirnhelt ([davidzirnhelt@hotmail.com](mailto:davidzirnhelt@hotmail.com)), Rob Borsato, Lynda Atkinson, Lori Fogarty ([info@farmed.ca](mailto:info@farmed.ca)) and Nicole Pressey ([Nicole.Pressey@gov.bc.ca](mailto:Nicole.Pressey@gov.bc.ca)).

We appreciate all of the vigorous input, leadership, discussion and interest shown by the people attending the workshops and meetings. A gem of a new and vital idea is starting to take root.



# 1 Introduction and Objectives

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## 1.1 Project Background and Objectives

In 2013-2014, the *Cariboo Adaptation Strategies* planning process brought together the Cariboo region's agricultural producers and local and provincial government partners to evaluate climate change impacts on local agricultural production, and to develop strategies and actions to address the associated challenges. The need for local research, and effective communication of research results, was identified as a high priority to support Cariboo producers with adapting to climate change. A critical first step – outlined in the *Cariboo Adaptation Strategies* – is to “strengthen the capacity for a coordinated regional approach to agricultural research.”

Climate change projections for more variability in conditions across the seasons will increase the complexity of management for agriculture. Local research, including evaluation of technologies, practices and production systems, will support producers with managing through a range of potential conditions. Adjusting existing practices and exploring alternative practices may bolster resilience but requires piloting, evaluation and demonstration in the Cariboo context. While a number of agricultural research projects have been undertaken in the Cariboo in recent years – and this research could contribute to adaptation – future research requires stronger linkages between research and industry priorities and broad and effective communication of research results.

The importance of *effective* sharing of research results and knowledge transfer is a high priority for local adaptation research. Defining research priorities, consolidating existing research and communicating research results effectively across a large, diverse region could all be facilitated through the initiation of a regional research body. However, it is critical that this research body has longevity to provide a stable and centralized home for agricultural research in the region.

Building upon previously completed work in the region, this project explores options and outlines a model for a sustainable regional research alliance or organization the will engage the Cariboo region's entire agriculture sector and partners in agricultural research. The research alliance will provide an umbrella for prioritizing and tracking local research and, perhaps most importantly, will provide a home for research findings and will support distribution of research results to producers. The agriculture research alliance can provide applied research, opportunity identification and agri-industry training as well as being a knowledge hub of best practices to help:

- Local primary agriculture industry;
- Value-added and agriculture opportunities; and
- New agriculture technologies and practices in adaptation.

The project objectives were to:

- Collect and share, in useful and relevant formats, existing Cariboo-focused information and research
- Develop a model for a regional agricultural research alliance or organization that will:
  - Engage a broad range of agriculture producers
  - Provide a regional hub/umbrella for agricultural research to prioritize and track research and assist with securing funding
  - Lead or partner in development of regional resource materials
  - Communicate and share research or relevant work (e.g. newsletters, quarterly reports, materials specifically for producer interests).

The scope of the project included two workshops, a series of four community meetings and input from people in the region. It also relied on a catalogue of reports provided from some prior work and supplemented with other findings. The

plan is developed based on the local needs and direction provided from the over 32 participating organizations. Over 65 people were involved in the process.

## **1.2 Project Methodology**

In the autumn of 2016, a project description was developed and a project oversight committee was formed (see Acknowledgements page) to provide guidance and input to the consultant throughout the project. Toma and Bouma Management Consultants were selected (along with David Zirnhelt) to deliver the project which took place between October of 2016 and May of 2017.

The project involved six key areas of activity. The following steps were taken to complete each activity:

- 1) Conducting background research;
- 2) Developing a digital inventory/database of regional agricultural research (separate document);
- 3) Hosting an initial workshop/facilitated meeting;
- 4) Developing a draft model and long-term implementation plan for regional research organization;
- 5) Hosting a second workshop/facilitated meeting to validate the findings and recommendations;
- 6) Confirming/submitting documentation of the final model.

## **1.3 Report Structure**

The report is organized as follows:

- Background, objectives and scope (above);
- Applied research models used in agriculture (Section 2);
- Cariboo region context and considerations (Section 3);
- Cariboo applied research alliance model (Section 4); and
- Appendices including - research definitions, agriculture models, community consultations and Cariboo database.

## 2 Applied Research Organization Models

This chapter provides a brief overview of existing applied research models to provide context for the Cariboo research alliance. The sections below review four categories of applied research organizations already used in the agriculture and food sectors.

### 2.1 Defining Applied Research

Applied research is using basic research discoveries and applying that knowledge to a specific location, industry use or application for benefit to the user. This is also adaptive research done for shorter term application (1 to 5 years), often into more specific geographic and farm industry directed problems and questions. It includes taking the research into an industry or useful application which may include technology development, piloting, evaluation and analysis, market testing, and further development of the idea. A program of research is developed and can involve both people in a region and others outside the region to access the required facilities, skills and knowledge. Definitions relevant to agri-food research and models are included in Appendix A.

### 2.2 Models of Agricultural Research and Extension

Agricultural research organizations can be divided into the following four categories:

- Producer directed applied research associations (ARAs);
- University- and college-led applied research, extension and innovation centres;
- Private farm-level research;
- Public sector research.

A summary of the four operating models is shown in the table below. Each of these models is discussed more deeply in Appendix B.

**Table 1.** Summary of operating models for agricultural research and extension.

Agriculture Research & Extension Models	General Parameters	Comments
Producer-directed Associations	Regional, has members; focused on local needs	Sometimes lacks science design. Often includes crop trials in local areas to understand adaptation & performance. Often does not advance fundamental knowledge.
University and college led – and Innovation Centres	Regional, has small lab and research focus; but good impacts/ outcomes	Depends on science and business linkages to regional needs. Is common in USA and some Canadian colleges
Private Sector	Global, National, Regional	Varies from global companies to smaller ones. Is proprietary in nature
Public Sector	National, provincial, state	Large research program, multi-year and multi-site; may not include direct extension

#### Overview of Producer (directed) Applied Research Associations (ARA)

The producer-directed applied research associations in western Canada vary in financial capacity and approaches. Producer- directed associations may have revenues (each) of under \$200,000 to up to \$1 million (for all operational, staffing, equipment and other annual costs). Annual planning is not easy because often there is some reliance on public funds and quantity and timing of this funding is not always predictable. Most of these groups have \$300,000 or less in

annual funds. Funds can be sourced from provincial programs, municipal governments, commodity groups, direct levies and from contracts with private organizations or joint projects.<sup>c</sup>

Funding to support managers for ARAs is often limited leading to part-time employment situations. Most ARAs do not own their land and thus need to find land for undertaking research projects, which can be difficult. Equipment funding can also be a big challenge, given the high costs associated and this can be a barrier to some research efforts. As governments have withdrawn from some research and much of the extension support for agriculture, there has been a growing need for ARAs to fill this gap. However, there is limited support available to these organizations and developing a minimum critical base funding model is important. These models are used to support producer directed needs.

### **Overview of College and University Models**

The role of colleges and universities are similar in that both can do research (applied and basic) and both can educate and train highly qualified people. They also are involved in extension and technology transfer efforts. The links in the supply chain of research exist with industry and business interactions at several steps in the chain. This college and university support is very important to regions which are diverse, remote and rural in nature.<sup>d</sup> The University system also provides the source of fundamental knowledge (basic research). Other service providers will take that knowledge and then conduct applied research into an industry use and application.

### **Overview of Private Sector Models**

A number of companies – from the regional scale (e.g. western Canadian) through to the global scale – conduct agronomy and crop research in the agriculture sector. Much of this effort is in proprietary product development, seed traits, testing and in registrations. Traits and yield improvements are a key focus and cereals, canola, corn and soybean are top interest areas. These companies also have a strong interest in agronomy and have a number of research / demonstration farms in Canada.

These private organizations also help to provide farmers, industry and service providers with knowledge and practices to address sustained crop production within a varied Western Canada landscape and production systems. However, larger companies operate within global research agendas and are focused on global and large-scale opportunities. Importantly this is a growing trend for farmer support.

### **Overview of Public Sector Models**

The last segment of applied research service providers is the public sector, including Agriculture and Agri-food Canada (AAFC) and provincial government departments (primarily the BC Ministry of Agriculture and Ministry of Forests, Lands and Natural Resource Operations). Both the Ministry of Agriculture and AAFC are involved in applied research activities in B.C. AAFC retains research stations in two locations in the province (Agassiz and Summerland). In many cases research is undertaken in partnership with agricultural organizations. However, the role of government agencies in directly undertaking research and extension has been reducing steadily over time since the 1990s. (As noted above the University system plays a role in fundamental research and is part of the public sector.)

Through *Growing Forward 2*, the federal and provincial governments fund the Agriculture and Food Climate Action Initiative's Farm Adaptation Innovator Program, supporting 15 collaborative applied research projects (to strengthen the farm-level adaptation) across B.C. The current BC provincial effort to create a provincial adaptation research network – including a broad cross section of post-secondary, government and sector research partners – has the potential to

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<sup>c</sup> D. Toma, Fertile Ground: Agronomic Research Capacity in Western Canada, for WGRF, November 2014

<sup>d</sup> See for example D. Toma, Rural Colleges Innovative Practices Review, 2011 for NADC

strengthen the connections between agencies undertaking adaptation research, as well as transfer of applied research outcomes to producers in B.C.<sup>e</sup>

## 2.3 Summary and Discussion

The fabric of applied research and extension activities is complex and highly varied across the various agencies and stakeholders working with the agriculture sector. Many models have been developed and are developing in response to meeting current and emerging problems that farmers, ranchers and food processors need to deal with in their operations. The Canadian system has developed and adapted over the last 100 years to help the sector adapt to conditions and adopt new innovations. The four models that were discussed include: producer-directed, university- and college-led, private sector and public sector applied research.

It is notable that few (if any) of these models operate at the regional scale with direction from producer groups – creating a clear opportunity for the proposed Alliance to fill an important gap. The design of the appropriate model for the Cariboo has to reflect local needs, gaps and key problems. Then strategies and collaborations/ resources can be developed to meet the gaps or bottlenecks that have been identified. The model which appears to lend itself best to the Cariboo region, based on our current understanding and knowledge is a university or **college led and producer-directed and influenced alliance model**. The alliance model can involve many core and secondary players as service providers, facilitators and funders/ investors. These aspects are explored in other sections of the study, and will require comment and input from the stakeholders in the region.

Assessing the preferred alliance model can include criteria such as:

- Core goal, strategy and role- from basic to applied research; virtual or central group; funding level; internal capacity; and leadership and stakeholder support;
- Critical success factors- finance, people, location, market need;
- Risks, customer base, community engagement and local government interest.

It is important to consider the regional priorities and strategies first, as structure usually follows strategy. Those various considerations are noted in the latter part of this plan.

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<sup>e</sup> For background information see: [www.bcagclimateaction.ca/workshops/research-2015](http://www.bcagclimateaction.ca/workshops/research-2015)

### 3 Context and Considerations

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The context and some considerations for the Cariboo regional alliance are briefly explained below. Additional considerations may also be necessary in the future due to economic, market, technology and policy issues.

#### 3.1 Context

##### Importance of Agriculture

Agriculture is a base sector and exists throughout the region. The Cariboo region has 1,123 farms and a total farm investment of \$1.4 billion (2011). The average farm size is 354 ha (780 acres) and the average farm has \$49,248 in annual revenues (Statistics Canada, 2011 for Cariboo).<sup>f</sup> Most production in the Cariboo is cattle, sheep, horse, poultry, forage, cereal crops and vegetables among other niche crops.

##### Current Applied Research Efforts

The Cariboo region has a number of applied research projects completed and underway in areas of forage trials, vegetable production, new crops and grazing management. Applied research in the region is led by various entities including UNBC, College of New Caledonia, TRU, producer directed associations and individual private farm businesses. Producers in the Cariboo region have access to local research, as well as research results from elsewhere in BC, Canada and globally. A small sample of recent research is given below, and a comprehensive database is one of the outputs of this project (listed in appendix).

Some of the research and extension underway includes:

- On Farm Demonstration Research manual (BC Forage Council);
- Forage trials and Forage Production and Export Potential in BC's Central Interior (BC Forage Council);
- Technology transfer program (BC Cattlemen's Association);
- Cariboo Chilcotin Coast Regional Strategic Plan (Cariboo Chilcotin Coast Invasive Plant Committee);
- UAV technology to manage premium wine grape crops (College of New Caledonia);
- Greenhouse vegetable trials (College of New Caledonia);
- Quinoa trials over two years (Dog Creek First Nation);
- A cash crop feasibility study (UNBC/CNC);
- Forage production potential in a ponderosa pine stand (TRU);
- Climate change experiments in temperate grasslands (TRU).

##### Potential Production Benefits from Applied Research

Production is the annual output (yield) from farms and ranches (primary producers), including crop (vegetable, field crops), livestock and other products. The yield gap (potential versus actual) is a common problem in the sector. To achieve target yields (crop or animal products) requires inputs, technology, farming practices and knowledge and skill of the operator. Very often agriculture production will gain from innovations and applied research. While there are some vegetable and other niche crops produced in the Cariboo, the majority of productive land is devoted to livestock and forages, and research into cost reduction and extended grazing systems will be of significant importance to the region.

Applied research is using basic research discoveries and applying that knowledge to a specific location, industry use or application for benefit to the user. This is also adaptive research done for shorter term application (1 to 5 years), often into more specific geographic and farm industry directed problems and questions. It includes taking the research into an industry or useful application which may include technology development, piloting, evaluation and analysis, market

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<sup>f</sup> Margin per acre and economic cost/ returns are useful measures to consider in applied research in the region.

testing, and further development of the idea. Market research and related feasibility research on what works (grows) is also of high interest. A program of research needs to be developed and can involve both people in a region and others outside the region to access the required facilities, skills and knowledge.

### **Climate Change in the Cariboo**

The climate is already changing in the Cariboo and is projected to continue to change significantly.<sup>9</sup> Projections indicate the Cariboo can expect:

- Annual average temperature increases of 1°C by 2020s and 1.8°C by 2050s;
- About 12 more frost-free days and 147 more growing degree-days by 2020s;
- Increased annual precipitation
- Increased frequency, intensity and magnitude of extreme rainfall;
- About 2.5 x more summer warm days (by the 2050s)
- About 6 x more extremely hot days (by the 2050s)

These changes and increasing overall variability in conditions across all seasons result in increased management complexity for farmers and ranchers (and will affect yields). Local applied research will support producers with managing through a range of potential highly variable conditions. How to best support adaptation through applied research will require strong strategic planning as the region is highly diverse in soil quality, elevation, micro-climates and across a diversity of crops, livestock and water supplies. The topic can form a common “nexus” project for many interests but needs a strong economic, technical and industry research orientation.<sup>h</sup>

A comment is offered to help consider the complexity of this issue in relation to a novel Cariboo regional research program.

*“Each BEC subzone has reference ranges for temperature and precipitation (based mostly on 1980s to 1990s information), and at a site level they are broken down by soil moisture and soil nutrient regimes. There are many different soil associations in the region and likely 100s of combinations of soils, topography and temp/precip profiles. Unlike Alberta where one has relatively large Ecoregions supporting similar agriculture, BC’s diversity of topography, elevation and soils means you can have dramatic shifts in agricultural capability over very small distances.*

*In the Cariboo, this translates into quite literally producing sweet corn at one site while other sites are barely capable of supporting a light forage crop 3 km away in the same ecological subzone. The regional BEC field guide will give broad regional climatic info but of necessity, most agricultural assessment here needs site, not regional, profiling to properly assess crop options. The exception being forage production, where variable production is expected and tolerated, because it is a low-value crop with minimal inputs used.”<sup>i</sup>*

### **Adaptation and Mitigation is Needed**

There are two main responses to address climate change: mitigation and adaptation. Mitigation addresses the root causes, by using farm practices and technology to reduce greenhouse gas emissions. Adaptation involves strengthening the resilience of farms and ranches to anticipated climate changes by minimizing risks, reducing vulnerabilities, and enabling new opportunities. In production agriculture, farms and ranches have to adapt to changing conditions and

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<sup>9</sup> Climate projections data from the Pacific Climate Impacts Consortium; more information regarding projections and impacts to Cariboo agriculture available at: <http://www.bcagclimateaction.ca/regional/cariboo/>

<sup>h</sup> Nexus- a connection or series of connections linking two or more things

<sup>i</sup> Comment was requested and kindly provided by Dr. G. Powell

technology to sustain a viable enterprise. These decisions also need to be balanced with concerns for long-term economic viability within a landscape.<sup>j</sup>

## 3.2 Considerations

### Regional Extension is Needed

Extension is the practice of extending the new applied research knowledge and new practices learned from basic and applied research findings to the end user (typically a farmer or business). It is also described as technology transfer. It often involves practice change in learning a new or improved way of doing production and processing related tasks. It will involve a technology transfer agent, a target user group and various ways to deliver the information. Although extension occurs in the Cariboo in a number of ways, it was identified as a key priority by producers throughout this project, as well as through earlier workshops evaluating adaptation priorities.

### Farm and Ranch Adoption Types Vary

Farm and ranch adoption types (user groups) of a new innovation or idea can be categorized as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). This concept is used to forecast how fast uptake will occur. The technology adoption process needs to be considered for uptake in a program.<sup>k</sup>

### Technology and Farming Practices are Changing

Importantly, the use of technology (broad range of definition) will mean farmers, ranchers and businesses in the region will face many choices and will need advice from independent sources on how to use it. One approach is to bundle several technologies/ practices in farm and ranch operations for mutual goals (climate policy and economic growth). Translating the information for local use & adaptation is another approach. Additionally, farm practices do change over time and innovative practices that are beneficial can be transferred into the region.

### First Nations involvement

Within the Cariboo region there is one independent First Nation, Esketemc (Alkali Lake) and the other fourteen First Nations are members of one of the three Tribal Councils. The engagement of band level administrations and tribal/Treaty governments resulted in the expression of some interest in the proposed Alliance. An objective should be to continue to engage the First Nations organizations in the further development of the agriculture research alliance. As with non-Aboriginal agriculture operators with extensive land operations (open range), Aboriginal governance entities' interests are also evolving about use of their range lands (as their negotiations -treaty and court case directed- are advanced).

There are many First Nations' defined issues requiring attention that relate to food sovereignty (access and security). Management of adequate populations of moose, caribou, deer, elk and smaller food animals and fish are increasingly seen to be a threat (particularly salmon, moose and caribou). Cross-cutting issues for consideration in First Nations participation in the alliance include:

- Climate change will likely increase the challenges to traditional food and medicine sources;
- Aboriginal organizations may wish to pursue applied research projects with their non-Aboriginal neighbours;
- Delivery models of extension may need to be different;
- Specific topics of research may also vary; and

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<sup>j</sup> Climate factors include: moisture, heat and modifying factors. Soil factors include: moisture supply, nutrient supply, root conditions, chemical conditions and drainage. Landscape factors are: erodability and management. Land Capability determinants include: 1.climate for crop flexibility, 2.soil for productivity and 3.landscape for costs and sustainability. CLI number 1 soils have no limits for crop types. Dr. Wayne Pettapiece, PAg, AB Soils Networks, January 2013

<sup>k</sup> See the definition of extension in the appendix. The model of extension is based on Dr. Everett Rogers's theory of the diffusion of new ideas and is widely used in the agri-food system and elsewhere.



- The alliance should keep the door open for the relationship to evolve incorporating First Nations food and agriculture priorities.

### **Distance and Diversity**

The dispersed and diversified nature of the agricultural region is a key consideration. The nature of the geography of the Cariboo Chilcotin region is such that the 1,100 farms are spread over an area some 300 kms from North to South and 400 kms from East to West. Farms and ranches usually are located along the valleys which penetrate the Interior Plateau. The valley bottoms will contain the better soils in the region. Most of the soils are CLI (Canada Land Inventory) class 3, 4 and 5, with only small amounts being class 1 and 2 (1= best).

The farm organizations are located in three sub regions: Quesnel (North), Williams Lake (Central Cariboo and Chilcotin) and 100 Mile House (South Cariboo). Some people have had to travel up to 300 kms for sub-regional meetings, and are reluctant to travel even further for regional meetings. This is a barrier to interact on a face-to-face basis. Thus there is a need for a flexible organizational model and extension approach.

Not only are the physical distances great but the elevation differences within the sub-regions means that operators may have more in common with farmers at the same elevation in different sub-regions, than they do with people at differing elevations in the same sub-region. Each of the sub-regions has a low elevation of 300 to 400 m and highs of over 1100 m. This means that the communities of common interest in agricultural production occupy large geographical areas, but don't necessarily have shared interests because of proximity.

A further complication is the slow internet speed in much of the Cariboo Chilcotin area which speaks to the need to have a delivery model which is not just internet- based. The alliance will need to provide extension and research results in various formats and potentially deliver information that is tailored to the various sub-regions.<sup>1</sup>

### **Alliances Are Commonly Used in Research**

Alliances for research and extension are commonly used to help people organize and improve access to resources. An alliance can vary in the degree of collaboration and management. For example, a research alliance can be a joint-venture for a period of time among groups, it can be an agreement between two or more groups, it can be a formal or informal network and it can be a formal legal organization like an association or society.

A common model for applied research is the use of a research network with a "hub" to coordinate and direct efforts and extension outcomes. "Spokes" to the hub can be by subject matter and/ or geographic location. A common framework is to use "communities of practice" as a way of organizing research. Community of practice is a term used to describe the coordination or organization of people/groups around a particular interest or subject area for knowledge- sharing. The design of the alliance needs to consider a number of these collaboration options.

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<sup>1</sup> The alliance and others in the region need to consider enhancing digital agriculture solutions and access to better networks (wireless, etc), connectivity and provision of mobility tools and knowledge which can be useful.

## 4 Organizational Model for the Research Alliance

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The concept of the Cariboo Agriculture Research Alliance (CARA) requires a framework for operations and long-term sustainability. The section outlines the underlying vision and principles for the Alliance (based on input received), and direction regarding the main areas of focus for the Alliance (including maintaining the database and undertaking applied research and extension). Details are also provided regarding practical areas of consideration including organizational structure, legal form and funding. The final section highlights the near-term activities and areas that will require confirmation prior to initiating the Alliance.

### 4.1 Alliance Vision, Objectives and Guiding Principles

#### *Vision for the Alliance*

The Cariboo Agriculture Research Alliance will be the steward of Cariboo applied agriculture research and provide access to research outputs through extension. It will also help to provide coordination for applied research programs and projects which are priorities within the region, on behalf of ranchers, farmers and other user groups.

#### *Alliance Objectives*

*The underlying objectives of the Alliance are to:*

- Provide leadership on agriculture applied research problems and access to local and new knowledge;
- Provide extension and technology transfer opportunities;
- Use technology infrastructure solutions and tools (free and purchased) to allow open access;
- Manage and steward Cariboo applied research reports and data, while providing access to them; and
- Provide the Cariboo region's farmers and ranchers with benefits and opportunities to grow and sustain their operations.

#### *Guiding Principles*

The Alliance plan is based on a number of guiding principles including:

- Be locally led and responsive to regional and community agriculture and food research needs and gaps;
- Sustainable in focus and resources within a virtual structure;
- Leveraging alliance efforts with partner organization's for mutual benefits through collaboration;
- Avoiding duplication with others in the community and region;
- Providing leadership on agriculture applied research problems and access to local and new knowledge.

A name suggested for the Alliance was CARA (Cariboo Agriculture Research Alliance) or CCARA (Cariboo Chilcotin Agriculture Research Alliance). Other names can be explored but need to be easily understood and communicated.

### 4.2 Alliance Roles and Structure

CARA will be an organization of organizations, and will require a founding Board of Directors with a suitable cross section of interests and expertise. The roles of Alliance participants are listed and described below. Each grouping is a critical element of the research system and the network that would be formed with the Alliance. Figure 1 shows the four distinct "roles" within the alliance, but in reality, many groups and individuals may fill multiple roles.

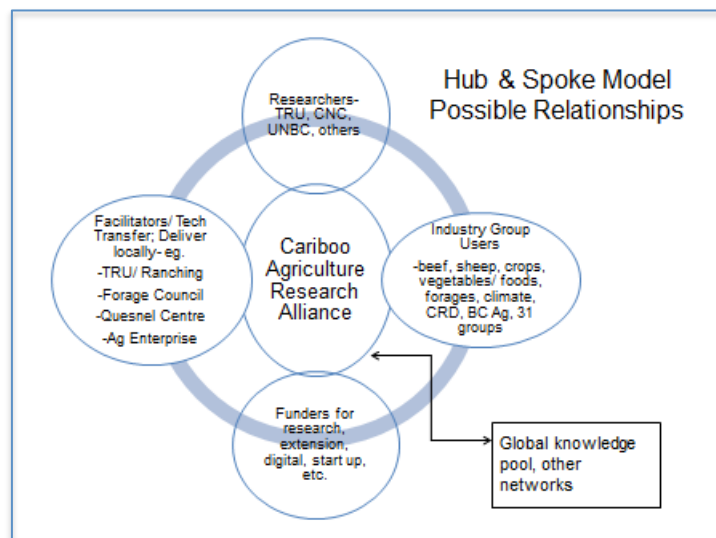
- 1. Researchers:** Includes research service providers such as TRU, CNC and UNBC, as well as industry groups and government agencies that conduct applied research. These groups help to carry out the applied research and access knowledge from their professional networks and contacts.

**2. User groups:** Includes those who will make use of applied research results and/or extension information including producers, producer and local organizations, First Nations, professional service providers and suppliers and government agencies. They may be classified by commodity, geographic location, size and/or by other categories.

**3. Facilitators/ Knowledge transfer/ Extension agents:** Includes groups or individuals helping to link producers (user groups) with whatever informational resource or service provider they require. A “spoke” or network can be formed along subject matter topics such as beef cattle, sheep, forages, vegetables and so on and provides the user group with a way to connect with the researcher.

**4. Funders:** Includes agencies or individuals that provide the funds required to help catalyse the applied research interests. Getting the correct resource mix and size is an important support needed for the research program. Having a university or college partner is important for accessing funds and also networks of knowledge.

This combination of roles within the alliance will produce a greater impact collectively than only with the sum of the parts involved.



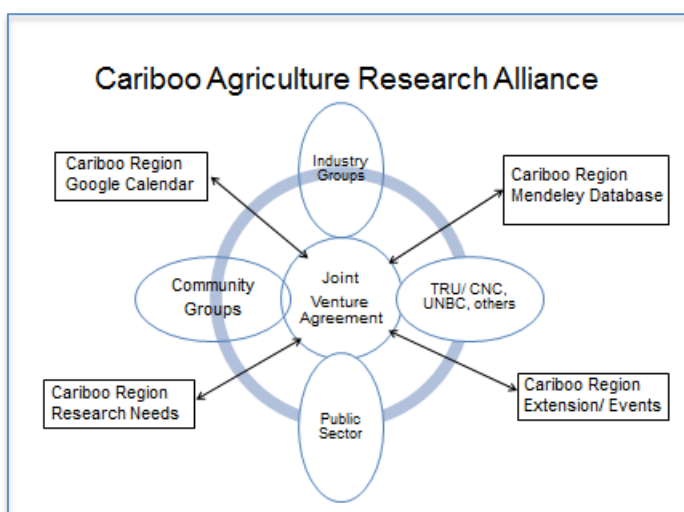
**Figure 1.** Possible organizational structure for the alliance with constituent organizations

The following organizations (32) have expressed interest in being involved:

- **Province-wide industry organizations:** BC Agriculture Council, BC Agriculture and Food Climate Action Initiative, BC Association of Farmers’ Markets, BC Cattlemen’s Association, BC Forage Council, BC Sheep Federation, BC Honey Producers’ Association, BC Invasive Species Council, BC Livestock Co-op;
- **Local organizations:** Cariboo Cattlemen’s Association, Cariboo Growers Co-op, Cariboo Family Enrichment, CEEDs, Community Futures Williams Lake, District H Farmers Institute, FARMED, Growing North Cariboo Society, Quesnel Farmers’ Market, Quesnel Cattlemen’s Association, Quesnel Ag Centre of Excellence working group; South Cariboo Agri-Culture Enterprise Centre;

- **Government agencies:** BC Ministry of Agriculture, Cariboo Regional District, North Central Local Government Association;
- **First Nations,** including: Tl'etingox First Nation, Canim Lake First Nation, Tsilhqot'in National Government Stewardship Council, Ulkatcho First Nation, Williams Lake Indian Band; and Xatsull First Nation; and
- **Academic institutions,** including: Thompson Rivers University, College of New Caledonia, University of Northern BC.

In terms of the primary activities and outputs of the Alliance, the interests of the participants are varied – both with respect to the subject matter and the specific formats that information and associated extension supports might take (i.e. research and extension needs vary). Figure 2 below shows the general groups to be involved and main functions of the Alliance.



**Figure 2.** Core functions of the proposed research alliance

Individuals involved in the current research system work in various ways through networks, joint subject matter programs and communities of practice. Communication is commonly undertaken via email with the internet as an essential “backbone” for both partnerships and information exchange. The role of technology (ICT) tools and mobility are important to consider in the organization.<sup>m</sup> A strong trend of importance relates to using technology/ mobility/ software to provide new ways to share knowledge and extend ideas/solutions to the user groups. The internet provides a backbone for distance delivery and individual knowledge selection on a specific problem or interest area. Importantly, most people have access to the internet in the region as this allows for just- in-time delivery and new models for working together.

### 4.3 Options for Legal Structure

A number of options exist for the Alliance with respect to its legal structure including:

- No legal structure, as an informal network;
- Society with organizational members and associate members

<sup>m</sup> Digital agriculture will be the next main driver to help transform the sector and will be a core tool for the organization’s user groups.

- Incorporated non-profit;
- Co-operative;
- Joint venture agreement among organizations and
- Program of college with producer direction.

There are a number of considerations in choosing an organizational structure that will succeed. The Alliance user group in the Cariboo is entrepreneurial in nature, consisting of small business and farms with many interests. It is important to anchor the organization with a mature organization, at least initially, to help it grow and become sustainable. The Alliance will need to be business-led and community-oriented to help build the local and commodity support that is required.

A strong model, and the recommended approach for the Cariboo research alliance is a **joint venture alliance for a 5-year term (renewable)** among the core founding organizations (such as TRU, CNC, Forage Council, Cariboo Cattlemen's Association, First Nations, etc.), alliance partners (funders and in-kind) and other stakeholders (regional groups and individuals who want to participate).

This model offers quick start-up, continued individual autonomy of participating groups, potential for piloting the organization and the ability to match applied research projects with supplemental funds and resources. It is also an inclusive and open approach. When operating, the direction for the alliance will be provided through a board of directors, and subject matter-specific committees. **The “mechanics” of the alliance will be managed through administrative staff support and projects will be contracted via the lead administrative organization.** Coordination and collaboration will be enhanced and the agreement will need to define roles, goals and the structure, along with dispute and asset ownership issues. The new database will need to be housed within the structure.

The joint venture is a strong option and can be viewed as a regional National Centre of Excellence model.<sup>n</sup> The strength is in the opportunity for leveraging knowledge and resources. This type of organization commonly operates in a hub and spoke organization with a science director, business director, network of communities of practice and annual conferences and/or other joint extension activities. These networks typically involve both geographic and institutional diversity which can be an asset.

A joint venture agreement would need to be developed that describes the roles, mandate, contributions, pricing, costs, responsibilities, accountabilities, IP issues, term, exit, new members, annual review and any other terms. This will be a key step for implementation.

Operationally, the Alliance will require a number of elements for an effective governance structure. These elements are likely to include:

- Board of directors (mix of alliance partners - up to 9 people);
- CARA Chair;
- Science or research director with strong research ties (e.g. from TRU);
- Science, research and extension committee;
- Coordinator or manager (staff).

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<sup>n</sup> National Centre of Excellence, these are ways of focusing research in Canada. CE currently funds 44 networks and centres through its suite of programs, which mobilize Canada's best research, development and entrepreneurial talent, and focus it on specific issues and strategic areas. see [http://www.nce-rce.gc.ca/Index\\_eng.asp](http://www.nce-rce.gc.ca/Index_eng.asp)

## **Location**

The alliance would likely be most effective operating as a virtual organization with an administrative office located (ideally) at TRU campus in Williams Lake (TBC). Other “satellite” offices could be based in Quesnel (CNC), 100 Mile House and Alexis Creek, but would need to be confirmed. Satellite offices could provide a periodic day office for the CARA manager to meet with people and work from when visiting in the local community. These spaces could be provided as an in-kind contribution and a formal linkage to organizations and physical spaces in each of these locations would assist with delivery local extension and would enable local groups to “upload” their input and local priorities/concerns into the alliance on a regular basis.

## **Assets**

The organization will “own” the Cariboo applied research catalogue and database on behalf of the member organizations and regional citizens. It will not own equipment, buildings or lab equipment but will leverage the assets of alliance partners. The alliance will access equipment, labs and professionals among its member organizations. This will help to “unlock” current applied research assets from low utilization rates and also leverage current and prospective resources. A guiding principle is to use these tools to help provide access for many people and for alliance stakeholders. The database asset will grow in value over time if it is managed well and promoted as the tool to consult with on Cariboo region research.

## **4.4 Database Management, Applied Research & Extension**

### **Cariboo Research and Database**

One of the primary objectives of the new Alliance is to steward and provide access to applied research information for Cariboo producers. A number of applied research projects have been completed or are underway in the Cariboo in the areas of forage trials, vegetable production, new crops and grazing management. Applied research in the region is led by various entities including UNBC, College of New Caledonia, TRU, producer directed associations and individual private farm businesses. The region has a number of funders for these efforts. Producers in the Cariboo region have access to local research, as well as research results from elsewhere in BC, Canada and globally.

A catalogue of relevant B.C.-based research was compiled as a part of this project and out of 860 entries (including technical reports, factsheets and peer-reviewed literature), about 134 reports have specific Cariboo region titles. More details about the database, and the information gathered and requiring additional effort to sort/refine, are provided in the Appendix to this report.

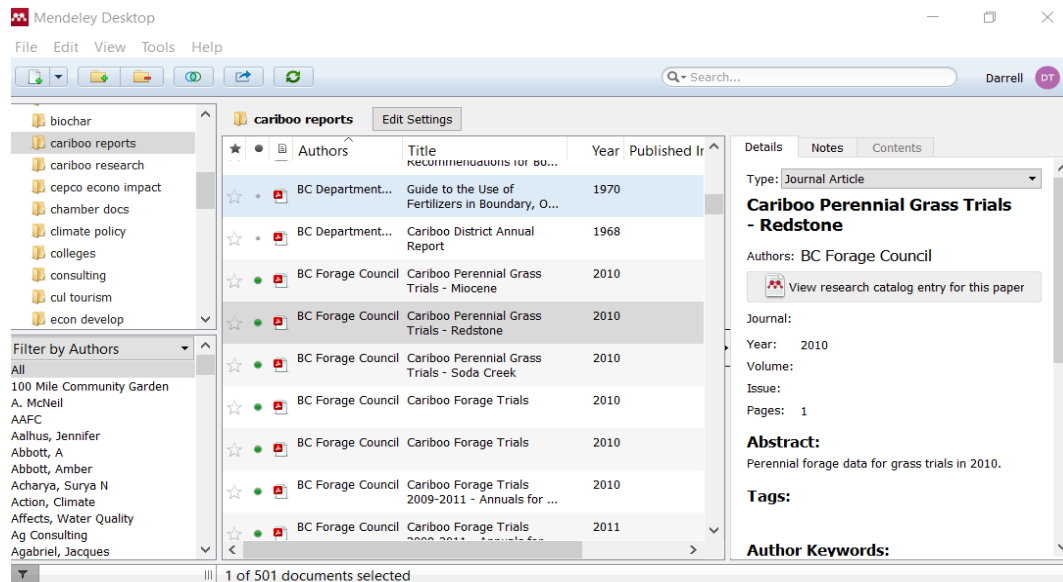
### **Improving and maintaining the research database**

There is a need for an inexpensive and accessible system for sharing the research and continuing to make it available over time. It’s likely that the best organization to support this “e-library” function – and to ensure its currency and completeness – would be either a university or college. It appears that TRU would potentially be willing and/or interested in being the service provider for this function but other options include the College of New Caledonia or UNBC.

A well-recognized research database reference management system called Mendeley has been tested with the Cariboo catalogue and seems to work well to serve the Alliance purposes. The benefit of this approach – over a website – is that it can much more easily “unlock” the database asset for a user to benefit from the research. An image of a Mendeley screen is shown on the following page (p.15).

Mendeley is a common and familiar resource for researchers and TRU already uses it. The system has the capacity for open and secured access and only requires a central manager. Mendeley can be used across platforms like laptops, desktops, iphones and Android phones and the data is housed in the “cloud”. The database can be searched for articles that can have several formats (e.g. Word, ppt, spreadsheets and PDFs) and is highly flexible and open in its architecture.

Further, this system can be set up to search the web and to add in new research documents by subject topic. The Alliance could have a master library of reports and data and producers would be able to download a duplicate copy to their smartphone for field use. Some up front training workshops or support materials (e.g. a fact sheet) would be required to support effective use of Mendeley. Other research programs could still be considered, particularly if there are other systems that are free of cost and relatively simple to maintain.



Because the Mendeley system is free of cost, it would enable continued database maintenance even if funds are short. The Alliance will need to develop policy for database access, currency of data, use/ advice, system management and ownership and operational matters.<sup>o</sup>

### Applied Research Themes

Applied research is a core area for Alliance development, along with the extension mandate. A common regional applied research program is needed to reflect the shared vision. Based on input received through the outreach with local groups and individuals and the research alliance design requirements, the following 6 specific research & extension themes are suggested:

- Sustainable agricultural production for beef cattle, sheep, horses, forage crops and vegetables;
- Cropping opportunities in forages, new crops (eg. hemp, hops, tree nuts), agronomy practices;
- Economics, new business models, value added and abattoirs, marketing for specific crop and livestock budgets, benchmark costs for various enterprises and related data;
- Climate adaptation & best practices (water, soil and land use management);
- Pest and wildlife management (predators, pests, weed control);
- Strategic research and other special projects which are important and which can address food security & access, local foods, new technology and market trend identification.

<sup>o</sup> The issue of access and use is important too. The sharing of public data for free is generally seen to be accepted and some entities are moving to “smart city” approach for allowing free data to help catalyze new business opportunities. The offering of specific advice (use) on a site question by the e-library (staff) should consider using qualified professionals as the preferred service delivery agents.

For First Nations, valuable research topics could include predator control and/or shared and multiple land uses/ production needs, predation and governance related issues. Other important research areas include local food production/gardens, beef production and education/ extension on farming practices. Some common over-arching research project needs were discussed at the January workshop and the main ideas (from 36 participants) were:

- Soil/ water/ land use, crop trials, forage- beef, transportation, beneficial management practices, climate change and predators;
- Economic viability/ feasibility- what works here?<sup>p</sup>
- How to grow?- various crops/ new crops;
- Information and knowledge-sharing projects.

All topics will need to be confirmed by the Board or a science advisory committee of the Alliance. Some interests/ sources may be easier to start with including: beef and forage cost of production/ best practices and in related economic and marketing topics. Other common interests include climate change related topics such as carbon sequestration in grasses and forages (TRU) and in forage trials (BC Forage Council). Connecting groups with allied research interests will be a good way to support locally relevant research. A common regional applied research program is needed to reflect the shared vision.

A robust research program proposal could garner new out of region funds through college and university research funds, new federal infrastructure sources and innovation related funds. This has been accomplished in other areas (e.g. Alberta Association of Colleges and Technical Institutes (AACTI) with a new \$6 million three year applied research program). These projects should involve collaboration within the region and outside the region to focus on meeting a strategic research need which is science-based and credible. An important issue for the Cariboo region will be in addressing industry needs adequately with leading research concepts for validation and extension.

We recognize a trend of absentee ownership (e.g. Blue Goose, Douglas Lake, others) and also that some productive land remains idle. It would be valuable to present the CARA concept to these owners to incorporate their needs and interests as they may be willing to support research themes with a focus on relevant issues such as land use/ stewardship, mapping, climate indicators and productivity issues.

### **Improving research extension**

Extension and technology transfer of the research results follows as a second core mandate. Research results could be presented in several formats including: pasture walks and demonstration (farm sites), workshops and written fact sheets. Extension materials will be managed in the research database and made widely and freely available. Where possible, regional video and audio clips will be produced pending budget and board support. Placing these events within an annual shared calendar would be very useful for maximum participation. The plan below indicates a number of extension approaches and events which could help with knowledge sharing and problem solving. The extension process needs to be linked to allied organizations conducting research (such as BC Forage Council) and into the communities and with any satellite offices (noted above).

### *Summary fact sheets*

A simple “quick win” for CARA to strengthen regional extension resources, would be a project to take the current research reports and “bundle” some of the findings into fact sheets and other user-friendly summary documents. From the producer

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<sup>p</sup> Fundamentally the region must have viable farms and ranches and competitiveness is a core issue for Canada. In 1991 Dr. Michael Porter (Harvard) conducted a first study for the federal government and concluded that the beef industry in Canada was a fundamental growth sector. Equally beef is critical for the Cariboo region, along with other opportunities.



interests expressed in the meetings and workshop, the topics could include forage production, beef economics/ marketing, vegetable production and sheep production/ marketing. These extension documents could be done locally with input from a science advisory committee and a qualified writer/ analyst (PAG or experienced person with suitable training).

### *Communicating and sharing extension opportunities*

A problem mentioned by many meeting and workshop participants was the lack of coordination and effective communication around extension opportunities. The population centres of Williams Lake, Quesnel, Alexis Creek and 100 Mile House have active groups and individuals that are already engaged with coordinating local events. Industry groups like the Cariboo Cattlemen's Association and the BC Forage Council bring in experts and speakers for technical training. The Ministry of Agriculture, TRU and CNC also host industry events and training workshops. There are also private suppliers, marketing businesses and social enterprise groups putting on sessions that may interest producers. *Coordinating and communicating* this knowledge and technology transfer effort – to increase uptake and visibility – is a relatively simple step and a common area of interest (in connecting and networking across these groups and extension opportunities).

As with the database or research library, cost-free and open on-line tools can address the regional coordination issue. The use of Google calendar (or an equivalent) should be deployed for the region. This would need to be managed by one coordinator but can be open to qualified people around the region to add events. If this was done on a regular basis, there would be a master calendar available to all who are interested. It would be accessible on all platforms and at all times of the day. Some initial training would be required and then an on-going commitment to using the calendar to maintain the linkages across the region.

### *Use of digital knowledge sharing tools (e.g. Whatsapp)*

Whatsapp is a direct communication “app” which uses cell phone numbers to connect users through an instant messenger service. Up to 256 users can be linked within one group, enabling special interest groups to communicate and to share pictures and attachments. This type of tool could have practical application for knowledge exchange between producers – for example, a group could form on noxious weeds through which a user might share photos of a weed to receive group input on identification and also on management and control. The speed and reach of this type of tool could be valuable and could help to create communities of educated users. It is also suggested as a tool that can help address the coordination and communication gaps. This type of tool can be highly interactive and easy to use once people have basic training.

### *Website*

In addition, a website is needed to help as an external “face” or signpost to the world, given the other tools are really ones to serve those who are involved in the Alliance. Option could include taking an existing website – the Marketplace BC site – which was developed and is now an orphan site (see: <http://www.marketplacebc.ca/>), or developing a new site.<sup>9</sup> The advantage of a current site is that it is built and recognized by Google for searches but needs to be re-organized and re-purposed. The existing site does have a database of producers which is integrated with Google maps, but this is not working well and is not currently managed. If the website will just serve as an informational/directional site to benefit the Alliance, it would be possible to migrate the useful content to Wordpress and then add new content and PDF downloads. If the existing site is used, it will need to be re-launched/ re-branded.

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<sup>9</sup> Website was developed by the AWBET project (Agriculture Web-Based Enterprise Tool). An issue with the existing site is that it uses the word marketplace when the CARA is not about marketing.

## 4.5 Funding Sources and Costs

### Financial Plan and Funders

Establishing and maintaining the Alliance will require operating funds and in-kind contributions from Alliance partners and related public agencies. A funding plan to secure and encourage additional funds for research will be needed. For accessing any public funds a legal organization – such as a Society or an incorporated non-profit – is required in order to enter contracts.<sup>r</sup> Another approach is to have a lead organization contract on behalf of the Alliance organization partners.

The Alliance will need to define an applied research program (3 to 5 years) and collaborators in a network and then apply for funds from the relevant agency. There are a number of potential funders that could be approached for start-up and project funds. Potential funders have not been contacted and programs will need to be reviewed to determine specific funding availability and funder interests.

Possible sponsors and funders (all TBC) include:

- TRU/ CNC-grant writing, start up support, other in-kind;
- CFI- Canadian Foundation for Innovation (<https://www.innovation.ca/>);
- Cariboo Regional District;
- Northern Development Initiative Trust;
- Community Futures Corporation/ Western Diversification-workshops and projects;
- Member/ workshop fees and farm association supports;
- BC Agriculture & Food Climate Action Initiative;
- Cariboo- Climate Beetle Action Committee;
- IRAP-industry research projects and SME capacity support program;<sup>s</sup>
- BC Ministry of Agriculture and Jobs Tourism and Skills Training and other BC government agencies;<sup>t</sup>
- Investment Agriculture Foundation of BC;
- Federal innovation funds for college applied research projects;
- British Columbia Rural Dividend Fund; and
- Corporate and community sponsors.

A relevant example of a regional funding model exists in Alberta with the REDAs (Regional Economic Development Alliances) which are jointly governed municipal economic development agencies that receive funds on a per capita basis (est. from \$.40 to \$1/ capita). Alberta has about 13 of these regional agencies and each sets its own per capita level. For example, CAEP in Red Deer (Central Alberta Economic Partnership) has 35 municipal members, has a \$0.40 per capita levy which provides an annual budget of \$118,000 in these fees. With other provincial operating grants of about \$121,000 in 2016, the total annual budget for this REDA is about \$300,000. The rationale for this levy model is to encourage collaboration, local buy-in and a sustainable model.<sup>u</sup>

### Start-up Costs and Operating Costs

The Alliance will require funding for staff and administration. Operating costs can be reduced if office space is provided as an in-kind contribution – possibly by TRU at their Williams Lake campus and/or through use of shared facilities via

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<sup>r</sup> Some public funders such as IRAP and others require an incorporated body to contract with in providing their services to the end user group- of incorporated businesses (SMEs) for some programs.

<sup>s</sup> IRAP-Industrial Research Assistance Program of the Canadian government

<sup>t</sup> JTST-Jobs, Tourism, and Skills Training

<sup>u</sup> In Western Canada a number of producer- directed applied research associations operate with budgets in the order of \$250,000 each per year, based on fees and grants. See D. Toma, Fertile Ground: Agronomic Research Capacity in Western Canada, for WGRF, 2014

regional partners. Start-up costs for the proposed model are estimated below at \$21,500 (including computer, desk, identity, website and other supports). Operating costs (including one staff person with rent and travel) are estimated at \$77,000 per year to manage and lead Alliance activities including developing community linkages, developing fact sheets and seeking funds (with Board of Directors help). Cost for an annual research update conference and field day is estimated at \$2,500 (with some cost-recovery) and annual review and reporting to funders is estimated at \$5,000 per year.

Over the first three years, the average annual budget for a new joint venture is estimated at \$202,067 with the CARA scope of operations and as envisioned in the previous discussions. Ultimately, the operating budget will depend on the vision of the board of directors, the final business plan scope of work and internal capacity.

**Table 2.** Budget outlining start-up and operating costs for the first three years of the Research Alliance.

CARA Estimates (2017\$)	Year----->						
Projected Costs	1	2	3	Total			
<b>1. Start-up</b>					Comment		
Desk. Computer, phone	6500	0	0	6500	Furniture, cell, laptop, printer		
Identity/ Website	5000	0	0	5000	Website, bus. ID		
Professional support	10000	0	0	10000	JV agreement, other advisory		
Start up Total	21500	0	0	21500	In-kind may offset some cost		
<b>2. Operations</b>					Core Functions		
Staff+operations, rent	77000	77000	77000	231000	Manager from \$55k to \$65k/yr		
Website/ comm	2400	5400	5400	13200	Calend events, web, cell, domain		
Research Update/ field day	2500	2500	2500	7500	Cost recovery conference		
Annual review/ reporting	5000	5000	5000	15000	Accounting, legal, consulting		
Operation Total	86900	89900	89900	266700			
<b>3. Projects- potential</b>							
Workshops-3/yr	3000	3000	3000	9000	3/year- spring, summer, fall		
Extension-fact sheets, digital	28000	28000	28000	84000	5 fact sheet/yr. digital docs		
Applied Research Project	25000	25000	25000	75000	3 yr program, technician		
Strategic Projects	40000	40000	40000	120000	Researchers/ consultants		
Consulting assistance	10000	10000	10000	30000	For projects		
Projects total	106000	106000	106000	318000			
Grand Total	214400	195900	195900	606200			
			per year	202067			

#### 4.6 Implementing the Concept

A transition to startup operation of the Alliance could occur in 2017. The expected activities over the initial months and first operational year include:

- Recruiting a founding working group (then to Board of Directors -likely from the current Steering Committee);
- Drafting a joint venture agreement;
- Securing funds/ resources/ agreements to meet the business plan goals;
- Developing partnerships and organizational capacity to help accomplish mutual strategic goals;

- Completing a number of producer- driven projects, based on their gaps and needs; and
- Defining a longer-term business plan with performance measures.

The high level concept will need to be confirmed (with the founding Board):

- Vision, mandate and scope;
- Governance and staffing;
- The alliance name will need to be agreed to;
- Programs- research database management and access, applied research themes;
- Financial plan- capital and operating costs and funding potentials (cash, in kind); and
- Schedule and timing for a possible start-up.

The areas below discuss some allied issues for success and expectations of the new Alliance. The aspects include critical success factors, expectations, and timing.

### **Critical Success Factors and Outcomes**

For the alliance to succeed, there are a number of critical factors that will need to present:

- Leadership which can be independent while also building the Alliance;
- Focus and plans responding to the Alliance partner and stakeholder needs;
- Commitment to regional collaboration and a shared regional vision;
- Supportive funders (cash, in-kind) and annual accountability reports to funders;
- Farm/ ranch and community buy-in;
- Local government support and encouragement; and
- Managed growth to the vision.

### **Expected Outcomes**

It is important to consider the overall outcomes being sought by the Alliance organization and these include:

- Management of applied research and research database for the Cariboo region;
- Focused research projects which are collaborative;
- Capacity building among local organizations (which are too small to manage projects or broader issues);
- Increased agriculture production in the region including forages, vegetables, livestock, new crops;
- Increased crop productivity from use of best practices and local and new knowledge;
- New farm growth opportunities and possibly more new farmers;
- Recognition of the region as a modern productive agriculture and food centre;
- Introduction of new technologies/practices into the region for use and application;
- Greater economic development opportunities and visibility for the region; and
- A sustainable and exciting alliance that is proactive, responsive and seen to be useful to the region's economic prosperity and growth.

### **Timing**

The Alliance can be formed within 6 months assuming there is agreement to proceed. Some planning and development work post-project and initial funding for start-up and advisory services are needed. Drafting a joint venture agreement and confirming an understanding of common interests will help crystalize CARA partners and organizations. Thereafter some joint research and extension planning can commence to help demonstrate real action/results within the region.

The concept of a Cariboo regional agricultural research alliance makes sense in a region that has this core industry, is facing low forestry employment and income opportunities and lacks a clear technology transfer/ extension agent. CARA

can be a catalyst for applied research, new innovations and new ideas to be developed and brought into the region for the various user groups.

This plan should provide a good basis for the CARA business case and also how to proceed and what investment is needed. Benefits will flow for current and future generations if CARA is carefully and correctly developed. The brand can build as outcomes are delivered. Ultimately “people make things happen” and hopefully the plan and supporting evidence presented herein helps to move the important concept forward.

## **Appendix A. Definitions in Agri-Food Research and Models**

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**AAFC:** Agriculture and Agri-Food Canada, the national lead in agri-food research

**Activity:** is an economic activity that produces an emission as one output.

**Adaptation:** is a process of an organism evolving to survive and adapt to changing conditions. Adaptive traits may be structural, behavioral or physiological. In this context farms, ranches and people need to understand how to adapt to changing climate, technology, economic and market conditions.

**Agricultural production:** outputs from farms (primary producers) with crop, livestock and other products.

**Agronomy:** the study and practice of crop production and the management of land and water resources. It aims to meet the demands of producing food, feed, fuel and bio-products while maintaining a sustainable environment.

**Alliance:** involves people and organizations which work together for a common purpose. They have a process through which they evolve and grow or perish. Can be a formal or informal arrangement. A supply chain is a vertical strategic alliance, involving three or more independent supply links (segments) which agree to work together to better serve consumers. These value (or supply) chains are needed to compete and address industry wide problems such as food safety and product differentiation. They can increase information flows and help better respond to consumer's needs. Some authors indicate: "In future, companies won't compete, supply chains will compete". A flexible network alliance is a "hub and spoke" strategy, having a central administrative office to manage operations and communications, with distributed and independent businesses and resource groups. The hub coordinates many activities of multiple players, facilitates new events and drives the central objective of the alliance. The network alliance strategy is very useful in a large geographic area to be well connected in a virtual manner, allowing collaboration and sharing of resources. This approach has proven very successful and is a tool for many small dispersed organizations to "cooperate to compete".

**Applied Research Associations (ARAs):** producer directed applied research associations in Alberta, BC and Saskatchewan. Manitoba uses a model of shared direction by the province and local producers. These organizations have members and specific research interests.

**Applied Research:** adaptive research done for shorter term application (1 to 5 year), often into more specific geographic and farm industry directed needs. It includes taking the research into an industry or useful application which may include technology development, piloting, evaluation and analysis, market testing, and further development of the idea.

**Basic Research:** is highly varied in purpose but will involve peer reviewed projects, typically done at universities, public labs and provincial research departments for curiosity, understanding of structure, function, mechanisms of action, longer term effects and replicable experiments which provide broader additive foundational knowledge. This knowledge will add to the global knowledge pool and understanding. It includes the discovery of a new idea, finding or conclusion which addresses a question of curiosity or specific problem using a hypothesis.

**Capacity-** Is taken to mean current internal capability (science and technical expertise, related skills, land, equipment, focus area) of an organization within the research interest.

**Capacity-building:** the activity completed to raise the current capacity (egg training, outside advisory services)

**Co-location:** is a practice of having people located in a common working space for the purpose of improving communication, relationships and the ability to transfer ideas to each other. Benefits include potentially sharing other resources, stronger communication and new opportunities.

**Collaboration:** a jointly delivered research project involving mutual interest and resources.

**Cluster:** a term describing a research funding program designed by AAFC and co-funded by AAFC and industry under the overall structure of Growing Forward 1 and 2 (funding programs). The original cluster concept is from research completed by Dr. Michael Porter (Harvard) who outlined the economic cluster in a diamond with supporting conditions. He reviewed the Canadian economy for the Canadian government (1991) and indicated one of the key growth potentials was the beef sector.

**Disciplines:** the requisite education, skills and experience needed for projects such as agronomy, animal science, crops and cropping systems, economics, finance, forestry, range management, sciences, soils, entomology, physiology, pathology, weed sciences.

**Extension:** the practice of extending the new knowledge and new practices learned from basic and applied research findings to the end user (typically a farmer or business). It often involves practice change in learning a new or improved way of doing production and processing related tasks. It is also described as technology transfer. The model of extension is based on Dr. Everett Rogers's theory of the diffusion of new ideas and is widely used in the agri-food system and elsewhere. Rogers proposed that adopters of any new innovation or idea can be categorized as innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%- based on the mathematically based Bell curve). These categories, based on standard deviations from the mean of the normal curve, provide a common language for innovation researchers.<sup>v</sup>

**Innovation centres:** new models of delivering applied research for business and industry using a discovery idea for an applied research project. Innovation is a process of taking an idea into a commercial or market application and can involve use of researchers, students, labs, facilities, incubators, colleges, public agencies and non-profit programs. Incubators can be varied to help an entrepreneurial start up business by way of coaching, business planning, financing, shared equipment, office space and other needed services.

**Facilitators:** people who assist people and organizations with services, information, guidance and advice.

**Funders:** are public, private and NGO investors in research programs and projects.

**Gap or bottleneck:** is the resource which is missing to improve or increase current capacity to the required or desired capacity as defined by the organization.

**GHGs:** greenhouse gases are also called emissions. GHGs are typically carbon dioxide (CO<sub>2</sub>), methane, nitrous oxide (N<sub>2</sub>O) and water vapor. Methane has a higher global warming potential (GWP) of 21 times higher than carbon dioxide and nitrous oxide has a GWP that is 310 times higher than carbon dioxide. These factors are taken into account in order to compare across the common unit of carbon dioxide equivalent (CO<sub>2</sub>e).

**Leaching and runoff:** is the loss of water-soluble plant nutrients from the soil.

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<sup>v</sup> Wikipedia, accessed November 24, 2016

**Network:** is a term which is used to indicate business, industry and professional relationships within a common interest area. In research a national centre of excellence (NCE) model uses clusters and networks to advance discovery. These concepts offer potential to industry in new business models and peer to peer learning.

**Mitigation:** lessening the intensity of something unpleasant, to moderate in force or intensity

**Mobility:** a recent trend describing the use of smartphones, portable computers and communication devices which greatly increases the scope and speed of a query/ response and overall productivity for a user group. Many emerging and current allied technologies (eg. GPS, drones) have augmented the power of mobility.

**Model farms:** are created as an “example” by organizing farm input focus groups and collecting industry data. Demonstration farms are operating farms used as examples to demonstrate a leading technology or new farm practice or crop/ livestock breed.

**Multi-site:** this is the practice of involving several geographic sites in a common experiment across regions to test for robustness/ effectiveness of the research concept. It can accelerate the research testing process.

**Practice change:** management at the farm level is a key to any change (as is technology). Practice change can mean a different way of managing/ completing a task in the annual farm operation and may result in minor new costs (or lower costs). A second way to introduce a practice change is with new technology, such as use of LED lights, but also means a new capital cost in implementation.

**Protocols:** are accepted scientific procedures which are prescribed in a document to manage a research experiment with consistency, standards of good practice and to reduce the source of error. Companies will also use protocols to hire others to do contract research.

**Project funds:** Typically will be provided by any level of government, granting councils, commodity associations, non-profit funders, and others for the purpose of finding results for a time-limited research project, not usually involving core (hard) funds. These are also known as soft funds.

**Region:** a geographic area which is contiguous and naturally provides interactions among organizations and people.

**Research performers/ service providers:** scientists and researchers, although others are typically involved including technicians, data analysts and related service providers. In smaller organizations, these may not be scientists but are otherwise typically qualified in the applied research they conduct.

**Research and development system:** all components (labs, people, programs and services) involved in moving an idea or concept from basic research (lab scale) through proof of concept, piloting, scale-up, developmental, adaptive and finally commercial applications. Roles and scope vary along the R&D continuum.

**Technology:** a term which can describe inputs, machines, devices, software, and genetics that can be deployed and used by farmers and ranchers in their farm practices and production processes. Complexity in management and expected outcomes can increase with use of new technology (and thus an allied term is technology transfer). Bundling of technology (two or more types) is one way to provide interesting new applications for an industry use.



## Appendix B. Research Models (Supplemental to section 2)

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### *Producer (directed) Applied Research Associations*

Western Canada has about 20 producer-directed applied research associations across BC, Alberta, Saskatchewan and Manitoba. These associations offer several different models for farmer and agri-business involvement and provision of farm community supports under a non-profit structure with a board of directors and local staff. Producer-driven associations often work in a network and address research priorities and gaps like testing of new equipment, technologies or crops. These organizations can take on contracts for companies and for local farmers on specific crop trials and for product testing. These are good models to consider for local governance and regional models. Several examples are noted below

These producer-directed groups have become an important vehicle for regional approaches and some are proving to be growth oriented in responding to the need for their services in applied agronomy projects.<sup>w</sup>

#### **BC Grain Producers Association**

BC Grain Producers Association is located in Dawson Creek. This producer-driven association's activities focus on grains, oilseeds and cereals and include applied research through agronomy trials with two major field sites in Dawson Creek and Fort St John. The Association has capacity of 4 FTEs (2014) and carries out annual crop trials with access to 92 acres on a crop rotation basis. The operating budget is modest. The Association's members provide funds via a levy for their research and related equipment. They have been very active in the region since 2000 and have responded to the regionally specific needs of their producer members.

The Grain Producers Association also works collaboratively to support sustainable agriculture in northern BC with other producer groups. Collaborations occur with individual producers and with AAFC (Lacombe) on data analysis. The Association has collaborated with about 18 scientists (plant breeding) on agronomy work. Collaborations are undertaken by approaching other groups and then seeking funding to accomplish shared objectives. Results are shared with producers in printed formats at their AGM and also through their website. See <http://www.bcgrain.com/research.html>

#### **BC Cattlemen's Association**

The BC Cattlemen's Association has completed work in the area of beef cattle extension and technology transfer and has a working model which may be useful to explore as a partner to the new alliance concept. See <http://www.cattlemen.bc.ca/techtransfer.htm> for some examples of the activities which were tested and used through a pilot project (funding through Growing Forward 2).

The Cattlemen's Technology Transfer pilot had 8 research extension themes including: forage development, environment, people & business development, land access, commodity vs. branded beef programs, traceability & data management, wildlife and animal care. To support their Technology Transfer pilot, the Association utilized information drawn from a range of sources/expertise within BC and beyond to provide information on broad range of production and management topics. The Technology Transfer pilot project had four objectives:

- Provide B.C.'s cattle producers with research to improve production management in their ranch operations;
- Encourage producers to adopt outcomes of relevant beef cattle research to improve their ranch operations;
- Provide producers with tools, including innovative technology to access relevant industry information; and
- Evaluate the effectiveness of new delivery systems and their economic feasibility.

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<sup>w</sup> D. Toma, Western Canadian Agronomic Research Capacity, WGRF, 2014

### **BC Forage Council**

The Forage Council is a producer association that operates in the Cariboo region and conducts forage and crop trials. The Council is a member of the Canadian Forage Association. The Council has reports available for forage trials from 2009 to 2012 and on forage production and marketing. A 2013 study by the BC Forage Council (BCFC), "Forage Production and Export Potential in BC's Central Interior", confirmed opportunities to expand the export forage market and identified existing limitations. One such limitation is that in the Central Interior, the ability to produce a suitable volume of export grade forage is limited by variable weather conditions during the harvest windows

A recent project related to climate change adaptation (funded through the Climate Action Initiative's Farm Adaptation Innovator Program) has resulted in the development of an On Farm Demonstration Research Manual. The adaptation project also allowed for the purchase of both weather stations and various kinds of equipment that can now be rented out by members (e.g. a bale scale, a hand forage tester, a drill driven forage tester and a soil sampler).



The Council is interested in the climate change issue and operates within a small budget. See <http://www.farmwest.com/bc-forage-council>

### **Farming Smarter**

Farming Smarter is located in Lethbridge, is operated privately and is working with over 150 producers and a number of industry clients. It is derived from a regional organization (SARA) and is striving to "support profitable, environmentally sound Southern Alberta agriculture by creating innovative opportunities, adapting to merging issues and disseminating unbiased information. SARA conducts applied agronomy research and has about 12.25 FTEs, including a contract PhD (.25), two Masters and technical staff (2014). SARA has access to 200 acres but can access more land to support its considerable research activity in the areas of cereals and oilseeds. The equipment employed by SARA is current and they intend to reinvest in equipment. They look for new ideas, innovation in crop production, novel crops, cropping systems (s), field scale research and precision agriculture

Farming Smarter works with over 150 organizations including AAFC, AITF, the provincial Government, industry, producers and other associations. Results are communicated by website, crop walks, field schools, conferences, workshops, trips, videos/ youtube, Facebook, twitter, e-newsletters and a magazine (2x per year).

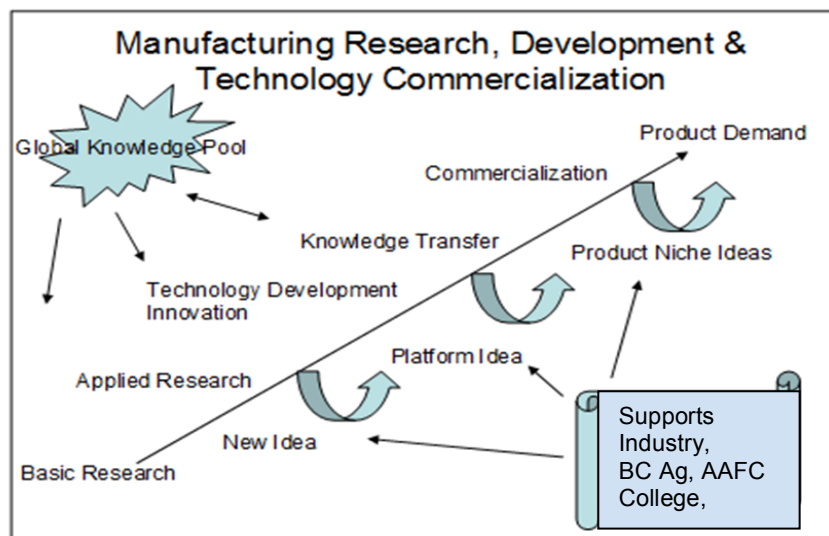
For more information see: <http://www.farmingsmarter.com>

### College/University Led Applied Research and Innovation Centres

The role of a college and university is similar in that both can do research (applied and basic, respectively) and both can educate and train highly qualified people. The links in the supply chain of research are shown in the following diagram. Industry and business interactions can occur at several steps in the chain. A key point is the design of products and services.

Product (and service) design is an extremely critical step in creating a successful product to achieve final customer acceptance. Products build revenues for companies by being bought. Product design considers manufacturing equipment and specification needs, customization aspects, environmental “friendliness” as well as customer requirements of functionality, utility, cost and quality. Products often have “life cycles” and can be improved upon with technical improvements or built directly from a novel idea (or new discovery). The “life cycle” means how long sales can continue until a competitive product emerges. Products can be created in many ways. The R&D and technology commercial path will involve much research and applied research within the chain of innovation. The same idea can be applied to farm and ranch innovations which then are tried, proven, and then transferred to industry to use.

Figure 3- Applied Research Path (Toma)



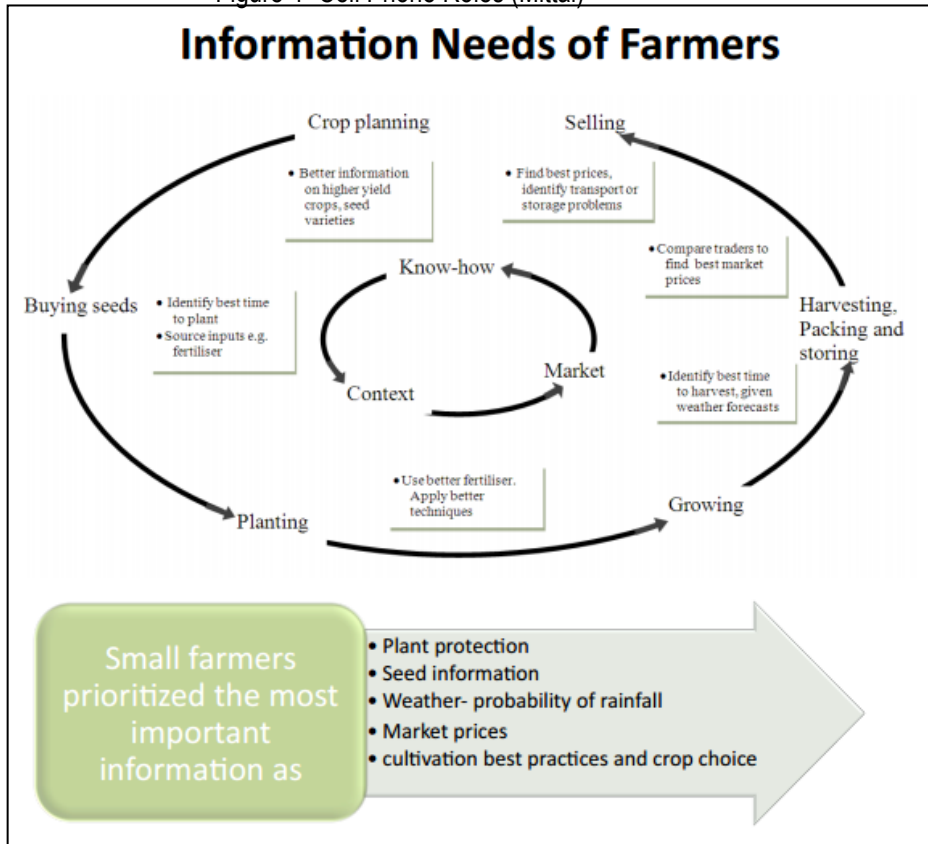
A common challenge to farmers and businesses (same as with manufacturers) in new ideas is moving from idea concept to commercial use and new sales (as noted above). Risk of failure can be high and colleges and public labs can help in overcoming the “death valley gap” (moving from idea to real income and commercial sales). This is a common problem for new product and service starts.

### Using Mobile Technology in Extension for Engagement & Success

A recent trend is the use of mobile smartphone devices and software. These information and decision-support products can be highly useful in a rural remote area like the Cariboo region. Mobility and distance learning can be provided with wireless and the internet (websites) using valid knowledge and related decision tools (accessed by the user when needed). Smartphones can be used for accessing and using decision tools (apps) and in knowledge sharing by farmers.

The role of cell phones is greatly increasing to allow collaboration, information sharing, knowledge building and technology transfer. As an example, Mittal notes the information needs of Indian farmers (and elsewhere) in understanding markets, crops, production and many allied aspects. Some lessons can be learned from the example as knowledge transfer and information is needed in the region to help Cariboo regional farmers and ranchers (of course, also understanding there are cell dead spots). Given today's dynamic markets, these are very important considerations.

Figure 4- Cell Phone Roles (Mittal)



He indicates the need for helping build a stronger second green revolution with cell phones. “A push towards higher agricultural productivity will require an information- based decision making agricultural system”.<sup>x</sup>

A feature of the future in extension and applied research is that mobility will increase, collaborations will increase and the role of the private sector in validating and using these applications will also increase. Given these trends, many service providers (public and private) have built their databases and knowledge-sharing platforms to leverage the use of the internet, websites and many app-tools because distance is dead and people near and far can benefit equally.

This segment of applied research is well developed in Canada and the USA and is a proven model for science and industry collaborations. The role of a college and university is similar in that both can do research (applied and basic, respectively) and both can educate and train highly qualified people.

<sup>x</sup> Mittal Surabhi, The Role of Mobile Phones in Agriculture Growth, Mobile Plus Conference, September 2011

### **Olds College Centre of Innovation** (now the School of Innovation, Olds, Alberta)

Olds College has had an innovation centre and program in applied agriculture research since 2000. The feasibility analysis and a business plan were undertaken in 1999 and to date the School has attracted \$20m and now is operating with staff (scientists and technical staff and special processing equipment). The School has a focus on bioprocessing, bio-diesel and conducts research for farmers in agronomy, horticulture, wetlands and other areas. It has responded to farm and small-scale agribusiness applied research needs and provides students to support/resource some industry projects.

For more information see: <http://www.oldscollege.ca/schools/ocsi/index.htm>

### **Peace Region- CRI (Centre for Research and Innovation)**

The Innovation Network (TIN) Model (2000) was designed to assist the communities in the Peace River region. This network model operates from Peace River, Fairview and Grande Prairie/ Dawson Creek and was intended to help entrepreneurs/ agri-business/ small-scale food businesses and farmers to get applied research support. The model is now operating as the CRI (Centre for Research and Innovation) and is co-located in Grande Prairie Regional College. It is staffed by 1 to 2 people and accesses students and staff for projects. The model shows that a network of communities can be served.

The Centre for Research and Innovation is located at Grande Prairie College and started in August 2008. The funding for this centre came from Alberta's Rural Development Fund, amounting to \$3.5 million over a three year term. The centre is located at the college as a standalone area, and reports to the VP of Administration. The College rents space for which Alberta Advanced Education & Technology has provided three years of funds (and for operations). See <http://www.gprc.ab.ca/community/cri>. The CRI has a focus on rural ventures in the Peace region and is in a similar agriculture, forestry and oil and gas remote community region of Alberta.<sup>y</sup>

### **South Cariboo Agri-Culture Enterprise Centre Society (100 Mile House) - TRU**

The 100 Mile House Ag Centre is a smaller scale model with a focus on education, networking activities and extension among its members. The Centre has no base funding, is a Society that is led by a volunteer board and has about 125 members in the region. The Ag Centre was previously located in the historic Lodge building but no longer has a physical office. In 2009, a feasibility study was completed, planning for Centre budget of about \$243,000 annually, with \$5,000 from member fees and the balance from the public sector.<sup>z</sup> This funding was not secured but would have been applied to an agriculture support officer, marketing specialist, offices and related operating expenses.

The Centre has (more recently) developed a relationship with Thompson Rivers University (TRU) for delivery of education in an Applied Sustainable Ranching program. That program is well received and seen to be successful. Some key lessons from the Centre include the importance of strong community buy-in, as well as a focus on local needs and local government support.

### **UFV Agriculture Centre of Excellence (ACE-2013)**

In 2013, the University of Fraser Valley (Abbotsford and Chilliwack) initiated a centre for excellence to assess the agriculture industry regional research priorities and interests. With support of \$1 million from the BC Government, the ACE Centre has a focus on agri-business, production topics, horticulture and livestock. It serves the supply management industries (poultry, dairy) and other sectors like the berry, fruit and smaller-scale agri-businesses. The Centre is meant to respond to the trends that are driving agri-food industry changes and to help farmers and agri-

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<sup>y</sup> D. Toma, The Innovation Network, Peace Region- Operational Business Plan, 2001- 2006, for Peace Region Economic Development Alliance

<sup>z</sup> Stonefield Consulting, Agriculture Enterprise Development Centre Feasibility Study South Cariboo and Surrounding Region, March 31, 2009

businesses in that region to innovate and understand competitive issues.<sup>aa</sup>

For more information see: <http://ufv.ca/ace/>

### **Quesnel Agriculture Centre (2016)**

A study was recently in Quesnel to assess the need and design for a new innovation model in the region to help agriculture, agri-business and small-scale entrepreneurs.<sup>bb</sup> This project was led by the City of Quesnel and a number of other agri- organizations in the North Cariboo region. The project involved community meetings, interviews, literature reviews and analysis of the appropriate model for the region. Recommendations included having the College of New Caledonia involved in applied research and to focus on the local needs of marketing, new crop trials, knowledge assembly and dissemination, demonstration sites (greenhouse, farms), education and local events. It was to be sited at the college if possible. It is in process of continued planning and seeking funds for start-up.

### **Private Sector Applied Research**

#### **Agritrend**

Agritrend is a private company which provides crop consulting, extension and some research projects for farmers. It operates across Western Canada and has a number of agronomy services. Agritrend has about 99 FTEs, including 19 FTEs with PhDs (8) and MScs (11- in 2014). With USA professionals included, the firm has access to about 29 PhD and MScs, about 3.3 million acres and 100 agri-coaches. The firm has no dedicated land or equipment for plots and research but can access land from producers they serve.

Agritrend has an interest in doing more in the applied research market for crops. It has links into the USA and is developing field-based tools for crop analysis and databases. Agritrend offer services in precision farming, crop planning, agrology consulting, grain marketing, carbon credits and also in database management of land data. The firm has recognized a need in the sector for more short-term, producer based research projects and is actively pursuing this area. The firm sees a need for more collaboration within the research and development community for greater impact and is seeing more farm level research projects emerging. The staff conduct work in cereals, oilseeds, forages, specialty crops.

For more information see <http://www.agritrend.com>

#### **Ag-Quest Inc.**

Ag-Quest, Inc. began operations in 1983 with the aim of providing top quality, cost effective research to the agricultural industry. Ag-Quest has gained the confidence and respect of national and international clients by focusing on three key areas:

- Application of sound scientific principles to field trials,
- Application of knowledge and experience in commercial farming to protocol development, and
- Maintaining a competent, professional staff.

The company has two locations in Manitoba (Minto and Elm Creek), one in Saskatoon, Saskatchewan and one in Taber, Alberta. Ag-Quest has 480 acres owned or rented and access to a further 5,500 in Manitoba and 80 acres in Taber. The

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<sup>aa</sup> D. Toma, PAg, CMC, Toma & Bouma MC, Agri-food Directions to 2020: Trend and Technology Drivers, for Chilliwack Ag Commission, CFSF, IRAP, UFW, May 2013

<sup>bb</sup> D. Toma, Quesnel Agriculture Centre Feasibility Study, 2016



permanent workforce (2014) included 22 FTEs including 3 PhDs, 3 MSc and 16 with degrees/diplomas. Up to 45 staff is hired seasonally. As a contract research organization, the company focuses on residue, efficacy and varietal testing. Ag-Quest would be interested in expanding into agronomic research. As the work it conducts is proprietary, Ag-Quest disseminates information only to its clients. Work is published by clients as they need - work contracted by public bodies may be published and made available by those bodies.

### Global Company Applied Research Interests

A number of the global companies also complete allied agronomy and crop research in the agriculture sector. Much of this effort is in proprietary product development, seed traits, testing and in registrations. Traits and yield improvements are a key focus and cereals, canola, corn and soybean are top interest areas. They also have a strong interest in agronomy and have a number of research / demonstration farms in Canada. This larger company effort may have some collaboration on specific projects but not in general farm information. All are involved in a variety of research activities in trait and product developments. The table below indicates some of the resources in the companies (2014).

Table 3- Global Company Agronomy Interests-Canada (2014)

Monsanto, Dow, Syngenta, CPS, Agrium, Pioneer	PhDs	MSc	Staff	Total	Research Farms- across W Canada	Acres
Totals	15	17	138	170	7 farms;3 centres;6 sites Breeding centre/ farms; 4 sites	1,420

Source: TBMC, ibid.

These private organizations also help to provide farmers, industry and service providers with knowledge and practices to address sustained crop production within a varied Western Canada landscape and production systems. However, they operate on a global research agenda and are focused on global and large-scale opportunities.

### Public Sector Applied Research

The last segment of applied research service providers is the public sector including Agriculture and Agri-food Canada and provincial government departments (primarily the BC Ministry of Agriculture and Ministry of Forests, Lands and Natural Resources..

In BC, AAFC has research stations, one in Summerland and one in Agassiz (320 acres and labs). AAFC has the unique strength of a network of sites, common equipment, standards, internal protocols and a culture in science. This network seems to be changing and the assets (farms) and senior people (retirees) need to be understood within the system. AAFC is a core player in applied research and other agriculture and food topics.

The main areas of focus for AAFC include agronomy (crops, soils, beef grazing, and range management), agrometeorology, weeds, pathology, entomology, cropping system microbiology and of course, the economics of the research conducted under AAFC. In addition the Summerland Research and Development Centre in British Columbia is one of Agriculture and Agri-Food Canada's national network of 20 research centres. In Lethbridge there is a centre for beef production research.

For more information see <http://www.agr.gc.ca/eng/science-and-innovation/research-centres/?id=1181591790641>

The provincial Ministry has most resources in the Abbotsford Agriculture Centre and the Cariboo region has two Agrologists and a First Nation (FN) Agrologist available. The FN Agrologist covers the whole province and thus is

stretched very thin. See <http://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/ministries/agriculture>

The department has several goals:

- sector growth and development;
- environmentally sustainable sector;
- Community and social well-being.



## Appendix C. Community Consultations

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### Appendix C1- Study Contacts (51)

Dr. George Powell, consultant	Clint Thompson, Cariboo Cattlemsn's Association
Laurey-Anne Roodenburg, North Central Local Government Association	
Wylie Bystedt, BC Association of Farmers' Markets	Candace Suderman
Christina Johnson, South Cariboo Farmers' Market	Rob Borsato, Mackin Creek Farm
Karen Eden, Cariboo Chilcotin Community Futures	John Massier, Cariboo Regional District
Luke Doxtater, TNG Stewardship	Lori Fogarty, FARMED, Growing North Cariboo Society
Sally Sellars, TNG Stewardship	Grant Huffman, BC Cattlemen's Association
Diane Dunaway, BC Honey Producers' Assn	Dr. John Church, Thompson Rivers University
Douglas Jamieson, College of New Caledonia	Jordan Hammond, Cariboo Regional District
Teresa Donck, 100 Mile House	Rhonda Leech, Williams Lake First Nation
Gillian Watt, TRU Applied Ranching Program	Lynda Atkinson, BCAC, Growing North Cariboo Society
Sheri Shweb, BC Forage Council	Martin Rossmann, Quesnel Cattlemen's Association
Emily Colombo, JTS BC	Janel Alphonse, Tietingox First Nation
Rita Giesbrecht, Rod Hennecker, CEEDs, South Cariboo Agri-Culture Enterprise Centre	
Lisa Depaoli, Cariboo Family Centre	Lynda Archibald, Cariboo Growers Co-op
Roy Christopher, Canim Lake First Nation	Pete Bonter, South Cariboo Cattlemen
Mike Doherty, BC Sheep Federation	David Clark, BC Forage Council
Lucy Jones, PAg, BC Range Agrologist	Bev Madley, rancher
Betty Anderson, Cariboo Regional District	Cathy Mumford, rancher
Helen Bayliff, rancher	Darrell Sulin, Ulkatcho First Nation
Susan Fournier, EDO, Williams Lake	Gord Keener, Cariboo Growers and Xatsull FN (Soda Creek)
Brianna Van De Wijngaard, Cariboo Growers Co-op	Ron Kaufman, BC Livestock Co-operative
Rainer Krumsiek, rancher	Samantha Charlton, BC Agclimateaction
David Zirnhelt, rancher, Cariboo Cattlemen	Nicole Pressey, PAg, BC Agriculture
Erica Nitchie, PAg, BC Agriculture	Cordy Cox-Ellis, Cariboo Cattlemen
Sam Zirnhelt, Williams Lake	Serena Black, UNBC

## APPENDIX C2- Data from E-Survey

Question	Cariboo e-Survey n=31										Total							
1.What source provides you with production agriculture information now?																		
Association	15	internet	20	industry magazine	17	workshops	18	researchers	12	friends	15	other	3	100				
Percent	15%		20%		17%		18%		12%		15%		3%					
2.How would you prefer to get production agriculture information now?																		
Association	11	internet	18	industry magazine	12	workshops	20	researchers	11	friends	6	other	2	80				
Percent	14%		23%		15%		25%		14%		8%		3%					
3.What are your top 3 problems?																		
Production	9	Marketing	11	Technology	4	Inputs	6	Land Use	4	Climate Ad	5	Equip	7	Labor	8	Other	5	59
Percent	15%		19%		7%		10%		7%		8%		12%		14%		8%	
4.How could an ag research alliance help you?																		
Manage databa	15	Secure fund:	16	Extension	20	Fact Sheet	9	Priority Set	9	Manage re:	12	other	1	82				
Percent	18%		20%		24%		11%		11%		15%		1%					
5.Do you have adequate access to the internet?																		
Yes	21	no	6	27														
Percent	78%		22%															
6.Is the alliance of interest to you?																		
Yes	24	no	0	24														
Percent	100%		0															
7.I am a:																		
Farmer/rancher	16	research/ed	4	public age	3	supplier	0	other	5	28								
Percent	57%		14%		11%		0		18%									
Source: e-survey																		
Total surveys= 31, not all questions were completed.																		

## APPENDIX C3 – Regional Consultations

### Summary of Cariboo Community Meetings and Findings – December, 2016

A series of four meetings were held in early December (5, 6) to receive input from local organizations and individuals. In addition, a workshop was held on January 20 at the TRU Williams Lake campus to discuss the concept with farmers and ranchers and organizational representatives. A validation workshop was also held on April 7 at the TRU Williams Lake Campus. Some other direct interviews were also conducted with leaders in the region.

#### 1. Community Meetings

In total, 25 people attended meetings in December, with 19 organizations represented.

Location	People	Organizations Represented
Alexis Creek	6	3
Quesnel	2	2
100 Mile House	6	5
Williams Lake	11	9
<b>Total</b>	<b>25</b>	<b>19</b> (beef, veg, sheep, crop, soil, social enterprise)

The key findings of the community meetings are documented below in bullet form. Where possible, verbatim comments have been provided.

#### A. Issues and priorities

“-There is a lack of local materials and resources

- Communication is a challenge through the region

- People need all sources of information- typically they will use the internet, friends, peers, associations

- A common problem is- can it grow locally? Water is an issue, invasive weeds and need control or management methods, marketing and farm economics

- There are a lot of new outside investors (e.g. buying up large ranches) - who are not engaged but affect the land base
- Land use/ sustainable cropping and profitable enterprises are key areas
- First Nations- how can we engage the youth? Wild horses are a problem, predators- wolf, cougars
- Labor to work on farm/ ranch is a gap”.
- All people have internet access of some sort, and they need locally adapted research information to guide production
- The climate issue is a common concern and in relation to land use, water, possible new crops, possible fish farming, agronomy and production advice
- People need [information about] other methods; need extension of applied research and how to grow -economics information is missing often (fencing, crops),
- It's hard to get good genetics (chickens, hogs) for small farms
- Few suppliers actively support the agriculture industry here, need info on funding sources as there are not many and some are highly (Govt BC) oversubscribed now
- The carbon tax will cost \$8/hd on a gross return now of \$18/hd- so big impact expected soon, infrastructure is a big issue too- fences, water, greenhouses are an opportunity
- See Resettling the Range book on trends and changes, “Growing Between the Frosts”
- People need knowledge transfer, a “how to” manual would be good, fact sheets, toolkit of ideas, webinars are used, good ones are pasture walks with an expert to guide and challenge/ suggest
- UNBC has done some trials but no communication out, TRU does a good job on the applied ranching program,
- Agriculture is out of mind; beetle kill is a big issue
- The last website was a big investment but is now of no use- no current manager,
- We need a catalogue of the research in the region, we live on the land and make a living on the land, need more business models,
- Farming and ranching is a broken model now, we need to tie production and economics together more- is missing now, need to sort and store research, inputs are a high costs,
- Sheep farmers need an auction locally, there is no slaughter facility now, and we need a critical mass of people involved
- Is some local research information and methods of dealing with production, but no central coordination of events, research results, new ideas, may be competitive and insular, need a database and more sharing of the information, where has the local information gone?”

#### B. Observations about the Current Situation in the Region

- The region has diverse size in enterprises and distances are real factors to prevent collaboration
  - Needs and interests vary but are common concerns exist too
  - Commercial farms/ ranches may be in succession phases
  - Key issues- markets and low prices, marketing, slaughter facility,
  - People include many part time farmers and have allied income sources
  - A common view is there is not much extension help but people do want and need help
  - Several agricultural organizations are willing to partner but there is no one clear “leader” yet and this means coordination and collaboration is needed”
- **Alexis Creek** participants noted that there is no central hub organization. There was a big fire which affected people in different ways; water retention has changed, vetch is becoming a problem, producers need sustainable forages and land management, and are seeing a pattern of greater drought conditions. The area is not sure of the CRD interest- and they do weed control work.

- **100 Mile House** participants observed that the Ag Enterprise Centre can be hub and lots of entrepreneurial/ social enterprises exist in the area. Events that have been locally coordinated have strong attendance (e.g. 300 people showed up for carrot/ potato event) – also conduct board training workshops and had 50 attendees and the farmers' market has 50-60 vendors.
- **Quesnel** participants highlighted that the area seems to be more organized and has a number of agricultural groups. There is also the benefit of the City's support for the innovation centre.
- **Williams Lake** participants noted that the City is interested in agriculture developments. Thompson Rivers University also has a presence in Williams Lake
- Across all areas participants expressed strong interest in a regional alliance for applied research.

#### C. Comments provided about Principles for Cariboo- Applied Research Alliance:

*“ We need a low cost and sustainable solution*

- *Needs to be farm/ ranch business driven*
- *Needs to leverage others' efforts and their information*
- *Needs to have a strong link to college/ TRU/ others*
- *Need to meet the local defined priorities - local delivery and adapted research. The applied research needs to be high quality and science-based*
- *Anecdotal information is also of interest- elders' view/ experiences*
- *Use computer based tools and digital solutions*
- *Deliver locally where possible; link to local groups*
- *Be accountable and responsive*
- *Have annual reporting/ planning*
- *Needs some funding in or to avoid volunteer burnout and gaps in delivery/efforts*
- *Open, collaborative, flexible, outreach- focused”*

#### D. Model Parameters Which Should be Considered

*“Distributed delivery; distributed inputs for the shared knowledge base*

- *Regional governance with members from local organizations*
- *Reliance on open tools; open data*
- *Credible and forthright*
- *Need standards- currency of data; screen before for accepting data and reports*
- *Centralized management but distributed inputs*
- *Shared event calendars; shared resources when possible*
- *Formats- PDF (for sharing); also – word docs; excel; ppt; videos- if available/ affordable*
- *Possible direct benefits exist- by: using a hub/ spoke of communities plus communities of practice (beef, sheep, forages, vegetables, other)*
- *Delivery- internet backbone and hands-on where possible- and events could be fee based?*
- *Direct coaching/ peer based where possible”*

## 2. Workshop Comments

Following the December meetings, the next major input session was a workshop in Williams Lake at the TRU campus on January 20. The agenda and invitation were provided to 63 agriculture industry business people and professionals with 36 people (57%) attending the four hour workshop. The workshop allowed for discussion and networking breaks. It is thought that over 25 regional and provincial agricultural organizations were represented in the discussions. Participants felt that this level of attendance was good – and evidence of interest in the work – for the target group.

The process involved a general discussion and introductions, breakout groups (4), lunch and then a closing general session. The structure was intended to enable an open and participatory process. Four topics were reviewed in each of the breakout groups:

- Topic 1- Cariboo applied research- what regional agriculture research gaps exist?;
- Topic 2- Cariboo agriculture research & extension;
- Topic 3 - Selecting common projects;
- Topic 4 - What is needed from an agriculture research alliance organization?

The main themes suggested were:

- Topic 1-There is a need for a database of research findings which is accessible and has a “home”. The research topics of interest range from climate change, livestock, crops, forages, soils, water, predators to economics and viability (what works here?). There are gaps in local research but there is also uncertainty where to find research results, what has been done and who can help.
- Topic 2- Producers currently access agricultural information from online sources and through industry associations and government advisors. People generally prefer peer-to-peer learning, workshops and crop trials.
- Topic 3- Common research project ideas vary and include issues related to soil and water management, slaughter facility feasibility, crop trials, forage-related research, best management practices, and climate change impacts/adaptation;
- Topic 4- There is a need for an organization which is producer-driven and linked to research institutions/ other ag organizations. This organization could house research, requires, a sustainable plan, should have core funds for regional coordination and seek other project funds, may have members, could coordinate fee for service/ workshops, and should inclusively serve the region and commodities.

In summary – although both common and specific research needs were identified – there was a very high degree of participant and organization interest in a cross-cutting alliance organization.

### 3. Regional Survey

The last approach used to gather regional input was an e-survey (one page form) for people who were not able to provide input through meetings or workshops, and also to allow for individual responses without group influence. A summary of the responses (31) is provided in the Appendix.

The key points from the e-survey are:

- Most people currently access production information through the internet, industry magazines, associations, workshops and friends;
- Producers prefer to receive information from workshops, the internet, industry magazines, and researchers;
- The top four problems they face are: marketing, production, inputs and equipment;
- An alliance could help with: extension, securing funds, managing a research database, and with research management;
- Most people have adequate access to the internet (78%);
- An alliance is of interest to all who responded (24);
- Respondents are: farmer/ ranchers (57%), other (11%), researchers (14%) and staff with public agencies (11%).

#### 4. Summary

From these three main input sources, and some additional interviews, the need for a regional agriculture research alliance was validated and is clearly both needed and wanted throughout the region.

The specific needs of each commodity type user group (beef, poultry, sheep, forages, vegetables, etc.) will vary and the way information and advice is delivered should also vary accordingly. However it is clear the solution needs to incorporate some elements that were of common interest including both aspects including on-line materials and, distance delivery and generating practical and science-based research. Currently a number of needs could be addressed by employing a new alliance of organizations which represents the diversity and assets present in the region.

#### **Cariboo Agriculture Research Alliance Workshop - January 20, 2017, TRU**

- A. **Overview-** A workshop to review the Cariboo agriculture research alliance was held in Williams Lake January 20<sup>th</sup> at the TRU campus (10am to 2pm). An agenda and invitation was provided to 63 agriculture industry business people and professionals with 36 people (57%) attending the four hour workshop. It allowed for discussion and networking breaks. Over 25 regional and provincial agriculture organizations (representatives) and other people participated in some way in the discussions.

The format included a general discussion on the alliance/ organization role. Breakout groups were facilitated by four steering committee members. An agenda and a background document were discussed in each of the groups. The topics were:

- Topic 1- Cariboo applied research- What regional agriculture research gaps exist?;
- Topic 2- Cariboo agriculture research extension- what delivery formats are preferred?;
- Topic 3- Selecting common projects for the region;
- Topic 4- What Is needed for an agriculture research alliance organization?

The process involved a general discussion and introductions, breakout groups (4), lunch and then a closing general session. Each of the four topics discussion and comments are noted below.

#### **B. Summary Comments**

Based on an evaluation of the workshop at conclusion, the workshop was judged to be highly successful and interactive for the 36 participants.

The main themes suggested for the topics are:

- Topic 1- **What regional agriculture research gaps exist?** Need a database of research findings which is accessible and housed. The research topics of interest vary from climate change, livestock, crops, forages, soils, water, predators to economic/ viable (what works here?). Gaps do exist. The gap of current Cariboo ag research was expressed (where and what has been done?) and also not knowing who can help;
- Topic 2- **For research extension- what delivery formats are preferred?** People access agriculture information from online sources, prefer peer to peer learning, workshops, crop trials, and source knowledge from industry associations and government advisors;
- Topic 3- **Selecting common research projects for the region-** Ideas vary, such as: soil/ water, slaughter facility, crop trials, forages, developing applied research/ a research source, transportation, Beneficial Management Practices, and climate change;

- **Topic 4- What Is needed for an agriculture research alliance organization?** An organization which is producer-driven and linked to research institutions/ other agriculture organizations, has research housed somewhere, employs a sustainable plan, has core funds for regional coordination, seeks other project funds, may have members, have fee for service/ workshops, and serves the region and commodities/ includes all.

The following sections provide the group comments without any attribution (no order of groups and comments are verbatim). We observe a high degree of participant and organization interest and a requirement to provide a crosscutting alliance organization solution for the varied needs and interests. Common research interests and also different research needs were expressed.

- C. **Topic 1- Cariboo Applied Research-** what regional topics are important? What specific topics are important to you? Gaps?

**Database:**

- Marketplace BC. Previously funded initiative. Holds a lot of agricultural resources. 40-50 documents. Cariboo focused. You can search by sector/business type. Also a forum for trade (linking producers to markets, buyers and sellers).
- Worksheets on cost of production are on this site
- A database needs to be sorted by how current resource is.
- Could our database effort be connected to marketplace BC since we infrastructure already in place?
- Some good database models already exist
- Data management. Most attempts at a database fall flat on their face (Infobasket, AgriBC). Information without context adds noise not clarity)
- \* Need a connector between research and extension. A research filter role. Bring to bear research from other regions that is relevant.

**Gaps/Research Topics:**

- Need to know what has been done before knowing what the gaps are
- BC Cattlemen's Association: are they already working on the predator question? Are they already working on the slaughter question? Need to know the gaps.
- Topics of interest:
  - Increasing dollars to producers. Technical processes for adding to profit margins?
  - Dead pine effects on watershed, combined with removal of dead pine and lack of replanting
  - Predators
  - Climate change and weed control
  - Wild horses
  - Extreme heat and animal choice/breeding (i.e. Angus may not be climate resilient)
  - Pollination/bees
  - Value added. Beef. Slaughter capacity. (However, there is mixed messaging from government in terms of benefits of value add and support for this, and pressure to rely on export market/ emphasis on export)
  - Direct marketing
  - Production systems that work for future climates. Changes in precipitation and production systems. (Not just production but economics). Is new equipment needed for new precipitation dynamics?
  - How to diversify into other areas of agriculture since the middle class of ranching is disappearing.

## Regional Needs

- Opportunity for communication
  - Gap between producer and city perspective/ Cariboo Regional District role
  - Viability, economic fundamentals, structural inefficiencies
  - Food production and value-added, development
  - Education, communicate value and quality
  - Niche markets and opportunities- research based
  - Need skilled labor- that pays
  - Attract agriculture investors, marketing, business plans
  - Extreme variability- extended moisture conditions, good for grass, bad for apples, foot problems, bad for haying, drought in spring, water levels for stock water, snowfall unpredictability
  - Soil health
  - Grass fed beef, forage for livestock
  - Landscape uses- feral and wild horses
  - Business capacity building, finance and economics capacity, innovation, crowd funding, successful strategy, farms in the family
  - Viability of frozen vegetables, processing
  - Winter feeding and climate change
  - Finishing on forages vrs grass
  - Capacity for producers, grow more, food security
  - Invasive species, ag range species
  - Watershed management
  - Innovative predator control/ mitigation
  - Specific topics- nutritional value of standing forage affected by climate change
  - Scale up regenerative agriculture, ck soil health application sot others
  - Getting product to market, transportation
  - Reconciliation & moving forward together
  - Economic diversification of products, micro opportunities , startup operations
  - Gaps- small animal sheep auction in the Cariboo
  - Kill plant in Cariboo other than cattle- tied to production capacity & market access & distribution
  - Grazing tenure length & how could or not work with FN land use plans
  - How to take Cariboo resource & manage it to result in healthy food?
  - What can grow up/ down the elevation?
  - Crop diversity options, by location and elevation
  - Micro economic development opportunity
  - Agri-tourism rules, liability sessions as way to move forward with information
  - Current land negotiations & how may play a role in ag business opportunity. Who to work with? Expectations? Status? Authorizations?
- D. **Topic 2- Cariboo agriculture research extension-** how should the research be provided to you? Access, formats- print, web, video clips, delivery- workshops, peer to peer, regional conference?

## Extension formats and Information Provision

- All formats should be available. Print and web and face to face
- Workshop- with a low fee



- Producers need to vet what we need for each topic before investment is made
  - Extension format has to meet the urgency of the topic
  - Limit the “hoop jumping” required to get the information.
  - Webinars
  - network with structures in place- CRD, City, Ag office, Ag assns.
  - BC Agriculture, online is sometimes too specific. Relying on regional specialists to have all the answers is too much to ask
  - Forage Council – is generating and collecting regional research
  - Plant-based operations need to be more geographically centered (as compared with livestock)
  - Producer driven organizations
  - What happens with the data?
  - Coordinate do not duplicate
  - Arms of alliance – storage, extension-events calendar, applied research (or contracting out)
  - Alliance must be sustainable (long term)
  - Finding commonality, respecting mandates of individual industry groups
  - Allow input from all producer groups, even emerging ones
  - Web as integral access tool, must contain links to provide specific information, should include basic information on how to search
  - How to do research (ie. Forage Council)
  - Opportunities for new crops (hops, rice, tea, citrus, wild harvesting)
  - Definition of agriculture is expanding
  - Important for producers to get together (pasture walk) not only for knowledge sharing but for community building
  - Free or low cost
  - Farm tours- learning right for experience, see, feel, data- empirical
  - Succinct, research, extension
  - Email, website
  - Online source able- google question and get info
  - Discussion groups (COP)- producers, TRU, experts; regular meetings with speakers to present research and discuss application to the region
  - Field days, building relationships and capacity
  - Webinars
  - Presentations via road show- so everyone can hear it
  - PDFs
  - Existing publications can be distributed- BCCA, Countrylife, blogs, newsletters, subscribe
  - Websites, resources, links
  - Alliance site could house links to other online resources
  - Alliance could link members with tourism.
- E. **Topic 3- Selecting common projects** -are there obvious immediate common projects (several) the agriculture research alliance can start with/ facilitate?

#### **Common research topic to start with**

- Need to create a matrix that acknowledges the diversity of regional/sub-regional priorities, production systems and interests

- Matrix would look at what has already been done and at the short-term and longer-term needs across the region
- I.E if Quesnel has done work on water, then we need to do equal work on water in the south to bring it up to speed
- Matrix will keep a regional view in context, rather than a piecemeal disorganized approach to research across the region.
- Whether to pursue a research topic or not will be evaluated, in part based on how many people in the region it will be useful to
- Potential topics with widespread utility across region:
  - Soil
  - Water
  - Crop selection in context of climate change. Climate change opportunities for high value specialty crops.
  - Mechanisms for cattlemen to be more adaptable (i.e, maybe not just cow-calf)
  - Ways to reduce transportation costs of product (apply to many commodities)
  - Connecting the producer to the market
  - Land access and alternative models
- Economic-development folks are seeing:
  - More people concerned with bottom line
  - Young people concerned with climate change and the unknowns of production
- Best management practices for any topic will differ greatly across the region. Create opportunities for producers from across region to share best practices with each other and to share innovations with each other. What is working in different areas? What can be transferred across region? Trade best practices from different parts of the region. Use this forum as a way for people to create linkages and collaborate across region and across commodities (I.e. A cattle rancher needs their weeds eaten, a sheep herder needs a place for early forage = sheep graze before the cattle on the cattle ranchers land).
- Co-op student could build this matrix and simultaneously collect success stories on practices that have worked
- Applied – shared vision, practical steps= momentum
- Eg. A regulatory efficiencies study- better streamlined
- Alternatives to consolidation- push back; challenge the size of operations
- Eg. Extend grazing & finishing season- staggered/ slaughter
- Eg. On-farm slaughter
- Eg. Foreign workers- share and exchange throughout the season, local & seasonal
- Eg. Products – viable- to come with climate change? (wine, energy drinks, greenhouses)
- Diversity is healthy
- Eg. Culture of working together, co-ops
- Gene pools, new and old, stewardship- what can we do together?
- Eg. Food hub to process, cold storage, communal infrastructure year around greenhouses
- Sustainable agriculture
- All about production
- How do you do this?
- Presentation method
- Content- research – data collection- build a framework ; library – calendar of events
- Soil
- Marketing (less commonality here) - design a sustainable alliance
- Water

- Workers
- Cariboo ag Wikipedia
- Develop a mission statement
- How can the alliance support production?
- \$\$ both for alliance and for associations
- How to access getting political?
- Soils- what is depleted? How to improve economically? Who is doing what and what works or does not?
- Review what is done in the past and share
- Better handle on soils in the region
- What new / old varieties can grow?- that I do not know about
- Challenges for ag in the region, research the bigger challenge
- Transportation to market
- Forage trials- other than grass, climate change varieties
- What grows in our soils best? After testing it
- Align research with BC initiatives for \$\$ ie. Cumulative effects, innovation, climate, technology
- Ethical humane handling abattoir that could be training research
- Labelling, packaging, QA, meat
- BC meat grading program & tracking to abattoirs
- Non-bank finances
- Met grading needs to be implemented at the abattoir
- Related to tractability, QA for BC meats

F. **Topic 4- What is needed?**- Agriculture Research Alliance Organization- how is it best organized/ managed for sustainability? What are the sticky points?

#### **Agriculture Research alliance structure/funding**

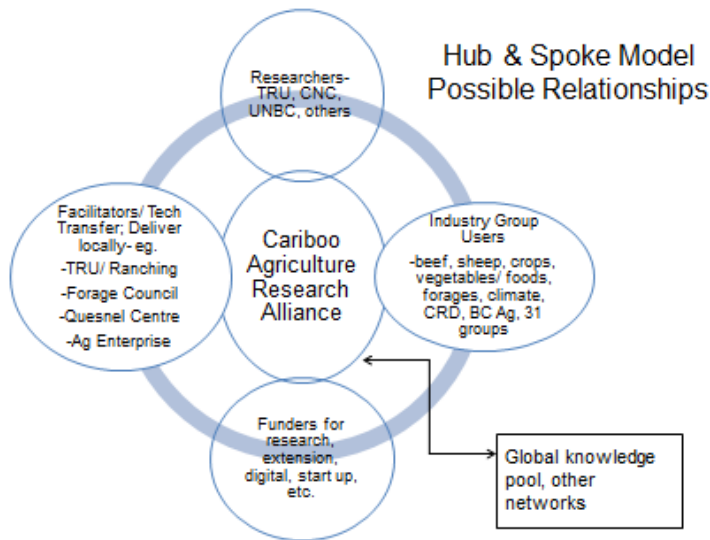
- Delta Farmland and Wildlife Trust. Works because
  1. Funding. Stable trust interest. We can't rely on "soft" funding
  2. Full time coordinator/connector
  3. Board/committee that is strong
- Trust funding that can be leveraged
- Trust model is a steeper set up, but more sustainable in the long-run
- Governance- by a board that is equal part producers and non-producers. This is for governance and not delivery. Aligning network functions and research with matrix tool would be their role.
- Need first nations at the governance table
- Need to properly resource board/governance volunteers so that they can participate (travel expense etc.)
- Paid support for a coordinator and a connector is key
- Paid coordinator needs to be someone who can work across commodities.
- Every commodity that benefits should contribute to the position financially.
- Geographic location, if position is based at TRU, they need a good travel budget and a mandate to hold events/engage across the rest of the region
- Alliance could be housed at TRU. It would be welcome there and infrastructure already exists.
- Have a renewable electoral process on the board. Written into the TOR to keep the board fresh.
- NDIT will match dollars fundraised by foundations.
- There may be philanthropist groups that are looking for places to give funds.

- Other funding idea: Banquet. I.E. COABC banquet. Conference is in very high demand, good money maker. Acknowledged that this is rare, and most events of this type require a lot of resources to deliver and might only break even.

- Need to know why Quesnel project isn't moving forward yet and learn from that.
- Need local governments on board
- Local government needs to expand their role beyond sewers/lights. Were supporting 100 mile agriculture centre, then pulled away their physical office space.
- Better communication needed with local government and need cooperation with them
- Possible gap: research that looks at future conditions (water/fire etc.)
- Emergence of the mega ranch in this region.
- People can't afford big land masses anymore, smaller scale agriculture. (Not sure if this is a research question)
- People focused on production, not on economics. Need the economic information
- Key climate change impacts seen so far: changes in precipitation dynamics, precipitation and soil moisture
- Diversity of agriculture has disappeared, need to rebuild
- ¼ to 1/3 of census farms are actually sitting idle.
- Computer capacity needed for farmers/ranchers, Extension from Ministry of Agriculture or others to train the farmer in tech. Computer literacy is a pre-step in order to facilitate extension and use of research. However, this is more the role of Rural infrastructure or other ministries/bodies.
- Strong aversion to the term "client" when discussion government services and citizens
- CARA, university internet access
- Engagement- membership, benefits, incentives, how unique?
- Research- Rural Advisory Council champion
- An alliance of stable existing organizations
- Region- Cariboo -Chilcotin
- Filter- curated data that's regionally specific/ applicable (sector groups?)
- Network linkages to authorities on subjects
- Local, regional, national network- BMPs- beneficial management practices
- Partner with institutions to trial work + "so what factor" to ensure relevance- collaborate
- Sustainability of alliance
- Look at positive examples, but also failures & roadblocks
- How does the Cariboo Regional District fit?
- Cariboo Strong economic development initiative
- Find an organization that is already anchored here
- Funding- producer driven but this is limited when it comes to \$\$
- Post- secondary as lead; overlapping territories, all have grant writers and resources
- Possibility of combining producer driven and post-secondary universities as "keepers of knowledge"
- Paid coordinator, contract to provincial body, see Samantha
- Grants as we go
- Partner with CNC, TRU, UNBC, others
- Clear on knowledge sharing, need to share knowledge
- Hosed at TRU as an option, could have office at TRU
- Board directs the coordinator , research alliance board, TOR, remain own entity
- Could it be under exiting institution? Succession & sustainability long term plan
- Contract as coordinator for discussion groups

- Spike or satellite offices
- Feeds, membership or pay to play?
- Fees based for field days, discussion groups
- Research alliance board could sit with Agriculture Advisory Committee
- Influence funding
- Geography – distance is a sticky point; diversity
- Practical applied research
- Member driven research
- Buy in from other groups, how is this relevant to non- traditional ag partners?
- User fees vr member fees- see CCCTA model
- Strategic plan/ succession plan with respect to \$
- Balanced research across commodity and regions
- Sustainability \$ for operations
- Partner with bigger industries for opps
- Partner with industry associations for opps
- Tiered memberships
- Strategic plan is key
- Year 1- spend time seeking \$ (private)
- Year 2- research
- Partner with Community Development Foundation (100 mile House)

An organization model example was presented and shows the regional relationships which may be occurring given local needs and communities of interests. This is not yet finalized (January).



**Research Alliance Workshop Attendees- January 20**

Dr. George Powell	Clint Thompson
Laurey-Anne Roodenburg	Wylie Bystedt
Candace Suderman	Christina Johnson
Karen Eden	John Massier
Luke Doxtater	Lori Fogarty
Sally Sellars	Grant Huffman
Diane Dunaway	Dr. John Church
Douglas Jamieson	Jordan Hammond
Teresa Donck	Rhonda Leech
Gillian Watt	Hellen Bayliff
Lynda Archibald	Sheri Shweb
Emily Colombo	Janel Alphonse
Rita Giesbrecht	Mike Doherty
Rod Hennecker	Lucy Jones
Susan Fournier	Rainer Krumsiek
Samantha Charlton	David Zirnhelt
Nicole Pressey	Rob Borsato
Sam Zirnhelt	

Cariboo Research Reports- are listed in a separate report.

## Appendix D. Cariboo Database and Applied Research

An important element of the Research Alliance is to support effective distribution of research results. For this reason, an underlying objective of this project was to collect, analyze and make available existing Cariboo-focused research. Ensuring that there is a centralized “home” where producers can access existing research results – and through which future research results can be distributed – will be an important function of the new alliance.

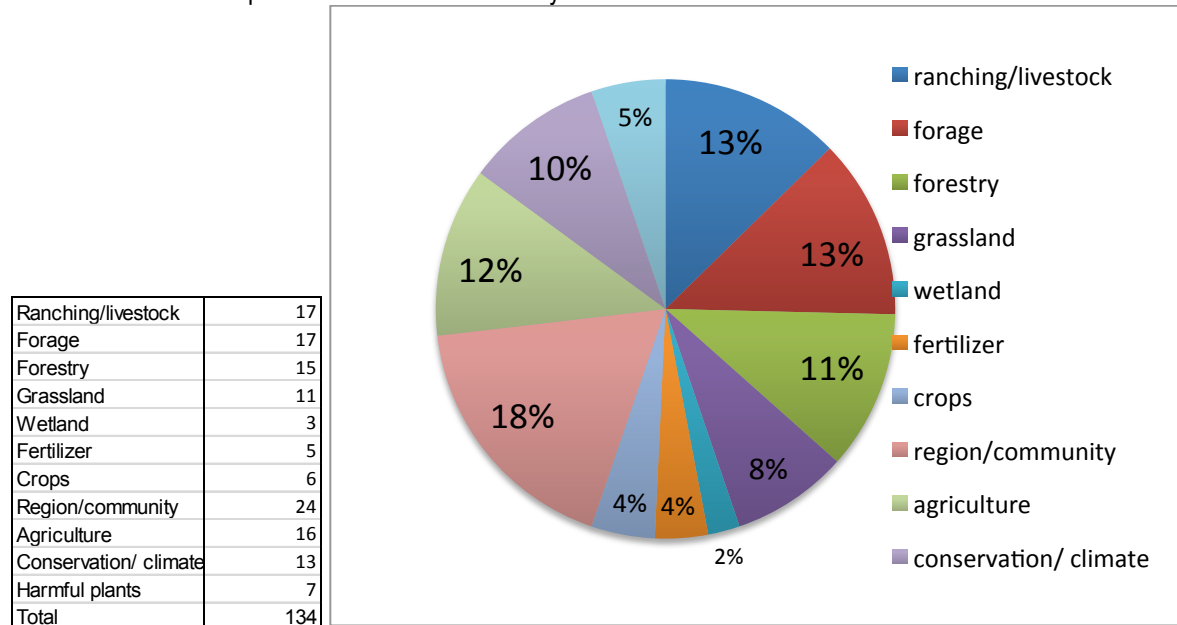
As a preliminary step in this direction, the existing research has been compiled and is currently available through a research database management program called Mendeley which allows users to quickly sort and view PDFs, Word documents, spreadsheets and PPT formats. Having a database is only useful to the user group if it can be accessed. Additional steps to maintain and improve accessibility of the database are discussed.

### Existing Database Review Findings

A previous project in the region had catalogued a good deal of the relevant research, but it was not accessible or up to date.<sup>cc</sup> A more recent review of all regional research was done to support a clearer understanding (is listed in a spreadsheet catalogue format) and is provided through a separate document to this report. The total number of references is 871 and is comprised of Cariboo specific resources, as well as potentially relevant resources from BC and other Canadian and US jurisdictions. Of the 871 titles, 529 are listed on Mendeley (in various formats).

Each Cariboo specific report has been coded on the main topic under study. The topics were then totaled for reporting purposes. Table 4 below, along with Figure 5, shows the number and proportion of entries, respectively, by theme:

**Table 4.** Number of reports included in database by theme.



**Figure 5.** Distribution of Cariboo research database entries by theme

<sup>cc</sup> The cataloguing was completed by Demian Pettman under a separate contract to complete some work that she had done for the region.

The documents of particular interest are those with a specific focus on the Cariboo region (134 documents). Of the 134 reports, 65 reports (49%) are 2007 or more recent, 62 reports (46%) are 2006 and older and 7 reports have no dates. A number of these reports are (only available in) hard copy and some are not really research outputs. Some other findings regarding the available Cariboo research:

- Some reports deal with climate or environmental matters (13 or 10%);
- Some reports exist on beef (17) and forages (17) but together this material is only 25% of the Cariboo totals;
- Region and community reports total 24 reports (or 18%);
- Few reports seem address local foods, vegetables and new crops;
- Few reports appear on farm/ ranch economics, marketing or related management best practices (from what we see).

We have grouped the above topics into fewer higher-level suggested themes of research as main findings. The main areas research areas total 6 themes, with the most reports in livestock, crops, regional / community followed by environment, forestry and agriculture topics. From the report review only a few reports are on the topic of climate related work. A common annual research area for the Cariboo is in forage trials and grasslands work. No comment is made on the quality of the work as it does vary from anecdotal to small-scale to peer review and larger analysis.

**Table 5.** Number of reports included in database by theme.

Livestock	28
Crops	28
Region/ Community	24
Environment	23
Forestry	15
Agriculture	16
Total	134

The retrospective look at the research materials indicates that some of these reports could be developed into fact sheets and possibly even be bundled (with professional judgement) to create a strong basis for regional workshop delivery.

It will be highly useful for the science committee to understand the current Cariboo literature (and missing) in view of current and prospective needs. Some important trends which may need research include: climate policy (emerging), new crop opportunities, economic and marketing topics, land use, First Nation topics and new emerging technologies.

We make some observations on the Cariboo database:

- Some documents will likely be removed due to lack of relevance or quality. The Alliance will need to determine its policy and parameters for the digital library to support this sorting process. The scope of the library may be limited based on geography, type/quality of research and/or age of research.
- The majority of relevant research documents have been located but some may be still be missing (e.g. non-digitized material stored in government offices in Quesnel and Williams Lake or held as private information by sector associations).
- The total catalogue of 871 documents includes some hard copy documents that have not been digitized. An early project should be to sort and convert the desired files into PDF format for sharing across the region.
- Within the overall past research reports, it is clear no strategic research focus or program has been set for the region. The breadth of applied research topics varies widely and some are quite old. It will be very useful for the Alliance to set out the top priorities (through a science committee) which can then help to guide the future focus with respect to key gaps in knowledge, farm adaptation practices and other important areas for adding to the database and ultimately extension/ technology transfer and producer use.



- The Alliance will need to answer the critical questions of who will manage the database, how will it be stored and who has access.

To help understand and test using the reports we loaded them into a research management program called Mendeley which allows one to quickly sort and view PDFs, word, spreadsheets and ppt formats. This tool is discussed more below. Having a database is only useful to the user group if it can be accessed. The benefit of the platform is that it is free, open, well recognized, stable, can work across operating systems, devices and TRU has used it. Other means of knowledge transfer are also needed including workshops, peer to peer learning and print materials (fact sheets).

### **Current Cariboo Research Efforts**

Documentation of the current research underway in the Cariboo region was obtained by contacting the primary organizations involved with current projects. The main institutions with research capacity are: Thompson Rivers University, College of New Caledonia and University of Northern BC. The BC Forage Council and other industry associations are also actively involved with applied research projects.

Some of the research and extension underway includes:

- On Farm Demonstration Research manual (BC Forage Council);
- Forage trials and Forage Production and Export Potential in BC's Central Interior (BC Forage Council);
- Technology transfer program (BC Cattlemen's Association);
- Cariboo Chilcotin Coast Regional Strategic Plan (Cariboo Chilcotin Coast Invasive Plant Committee);
- UAV technology to manage premium wine grape crops (College of New Caledonia);
- Greenhouse vegetable trials (College of New Caledonia);
- Quinoa trials over two years (Dog Creek First Nation);
- Cash crop feasibility study (UNBC/CNC);
- Forage production potential in a ponderosa pine stand (TRU);
- Climate change experiments in temperate grasslands (TRU).

### **College of New Caledonia**

The Applied Research Department at the College of New Caledonia (CNC) has been more project oriented particularly in the field of forestry. CNC is starting to branch out and is taking on more Ag/Tech/ Food Security related projects. In recent years there has been applied research in the Okanagan (Doug Jameison, UAV technology and sensor technology with the wine grape sector) and studies to evaluate technologies pertaining to greenhouse production (including construction of greenhouses at the Quesnel campus and a new greenhouse to be built at the Prince George campus).

The Ag-tech projects that have been completed in the past couple of years:

- CNC has collaborated with a certified organic market gardener in Prince George to test a bio-energy greenhouse heating unit with thermo-electric power generation capabilities. (2016)
- CNC is installing a heated-bed technology in the greenhouse at the Quesnel campus in January to test efficacy (2017)
- CNC will be constructing a larger greenhouse than the one on the Quesnel campus, at its Prince George campus (2017/2018)
- CNC is working with a GrowBox technology company that will test the efficacy of its system in demonstration unit at the Prince George and/or Quesnel campuses (2017/2018)

For more information see: <http://www.cnc.bc.ca/quesnel-campus.htm>

### **TRU (Thompson Rivers University)**

TRU has a campus in Williams Lake and is actively pursuing agriculture research in the region in forages, soils and related topics. Some of the staff with agricultural research areas includes:

- Dr. John Church is the B.C. Regional Innovation Chair in Cattle Industry Sustainability at Thompson Rivers University. The Chair leads a multidisciplinary research team dedicated to the exploration and invention of innovative practices and technologies leading to the sustainability and enhancement of the cattle industry, rangelands, and meat production and related products. He is active in beef production and related topics.
- Dr. Lauchlan Fraser is Professor and Canada Research Chair in Community and Ecosystem Ecology. He is part of a new University of Alberta grazing and carbon project. Dr. Fraser has active research interests in carbon and climate science with grasslands including a project that involves a number of Cariboo producers, evaluating grazing management regimes:

<https://grazingmgtandclimatechange.wordpress.com/research/management-intensive-grazing>

### **UNBC (University of Northern British Columbia)**

Most of the areas of focus for UNBC faculty appear to be eco-agriculture, soil and forestry related; no production agriculture professionals were identified through the UNBC website. Faculty with areas of focus related agricultural themes (identified through web research) include:

- Dr. David Connell, Environmental planning, local food systems, agricultural planning, regional food hubs, farmer's markets
- Dr. Scott Green, Ecosystem Science and Management, community-based sustainability, local food production
- Dr. Hugues Massicotte, Ecosystem Science and Management, wood ash reclamation in agricultural soils
- Dr. Bill McGill, Ecosystem Science and Management, soil specific cropping systems, value-added biomass ash utilization, soil biogeochemistry, fate and transport of organic compounds in soils
- Dr. Chris Opio, Ecosystem Science and Management, agro-forestry
- Dr. Jane Young, Ecosystem Science and Management, organic fertilizers.

For more information see: <http://www.unbc.ca/research/research-clusters#Agriculture>

### **BC Forage Council**

The Forage Council is active in forage research and forage topics for the Cariboo region. The Council and makes its research available to producers online. A recent major project was the creation of a manual to help farmers and ranchers carry out their own on-farm research and trials. This is a capacity building project, offering a tool which is likely to be useful to many producers.

For more information see: <http://www.farmwest.com/bc-forage-council>

### **Other Research**

Other applied research – outside of the structure of the above groups – has been completed or is underway in the Cariboo region. Three examples of this type of research include:

- BC Ministry of Agriculture, Sector Development Branch, has two Silvopasture demonstration sites in the Cariboo region (one at Zirnhelt Ranch, Thompson Ranch); and,
- BC Ministry of Agriculture, Resource Management Branch, has been conducting applied research into nutrient management and stewardship of livestock seasonal feeding areas. There are no set trial locations, but many

farms and ranches have participated ad hoc to allow sampling of soils, manure and feed from their operations. This project is currently on hold due to lack of funds.

- There are multiple Farm Adaptation Innovator Program projects – in the areas of cattle, forage and vegetable production – with relevance to and/or farm cooperators in, the Cariboo region. More details about these projects can be found at: <http://www.bcagclimateaction.ca/farm-level/adaptation-innovator-program/>

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