

Sowing a way towards revitalizing Indigenous agriculture: creating meaning from a forum discussion in Saskatchewan, Canada

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Abstract

Agriculture is practiced on 3–4 million acres of First Nations reserve lands in the Saskatchewan Prairies—predominantly by non-Indigenous farmers. A confluence of factors including an increase in agricultural land holdings on reserve and greater autonomy in land management have renewed conversations on how First Nations can realize the full economic benefits and exert greater control over agricultural activities that affect the reserve land base. We hosted a Forum on Indigenous Agriculture to share current knowledge on the contemporary status of Indigenous agriculture and to co-formulate research, capacity building, and policy priorities. First Nations' roles in agriculture are diverse and were categorized in three broad contexts: as farmers, relying on traditional Indigenous or western practice, or a synergy of both; as landlords negotiating lease agreements; and as agribusiness entrepreneurs. Five themes emerged from the forum: centring Indigenous knowledge and traditional relationships to the land, capacity building, building respectful partnerships and relationships, financing farming and equitable economies, and translating research to policy and legislation. The forum provided foundational data to inform research and capacity building to meet community-defined goals in agriculture on reserve lands and by First Nations people.

Key words: Indigenous agriculture, First Nations, land use, food sovereignty, Canadian Prairies

Introduction

Indigenous people are often excluded from the mainstream agricultural narrative of the Canadian Prairies. Yet Indigenous people on the Prairies are connected to agriculture in multiple aspects: historically, through precolonial trade networks (Boyd and Surette 2010) and the agricultural provisions in the Numbered Treaties (Krasowski 2018), and contemporarily, through Indigenous-led farming and

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agricultural leasing of First Nations. Reserve lands to non-Indigenous farmers. Herein we use the more specific term First Nations in reference to reserve lands rather than Indigenous, as reserve lands are held by Indigenous peoples that identify as First Nations. While it is estimated that agriculture is currently practiced on as much as 3–4 million acres of First Nations reserve lands in Saskatchewan alone, old estimates suggest that only 20% is farmed by First Nations people (Pratt 2006; Champ et al. 2010). Current numbers are likely much lower as family farms across the broader agricultural sector have declined, and First Nations tended to have smaller farms (Sommerville 2019). Some First Nations have expressed a desire to reverse this trend and take greater control over agricultural activities on their lands—through modern large-scale commercial grain farming and ranching to reclaiming traditional practices on smaller scales to meet food security and sovereignty goals (Lagimodiere 2009; Pratt 2009; Marshall 2017; Sawatzky 2017; Eneas 2019).

Academic scholarship on contemporary Canadian Indigenous agriculture is scarce (Natcher and Allen 2017; Sommerville 2020) and information on agricultural land tenure and First Nations is not captured by census data (Rotz et al. 2019). Newspaper reports (e.g., Pratt 2003, 2004, 2006; Briere 2006) and grey literature (e.g., Champ et al. 2010) are the sole primary sources of information cited in the few academic publications that address contemporary Indigenous agriculture in the Prairies (Magnan 2012; Natcher and Allen 2017; Sommerville 2020). First Nations have expressed concerns that non-Indigenous leasing has degraded soil quality (Friesen 2009; Lagimodiere 2009), but no studies have examined the effects of leasing on the health of agricultural lands on First Nations—in spite of studies elsewhere in Canada indicating poorer soil quality on leased compared with owned land due to lower implementation of soil conservation practices (Fraser 2004; Rotz et al. 2019). Indigenous people involved in agricultural leasing at the band level have expressed concern that racial tensions exacerbate mistreatment of leased land (Sommerville 2019). A Statistics Canada report released in January 2019—the first of its kind to be published from Canada’s federal Census of Agriculture—provides rough information on Indigenous farmer numbers (Gauthier and White 2019). It does not, however, report detailed information on the types of agriculture being practiced (“other crop types” that include a mix of hay and specialty crops form the majority of farm types by First Nations) or any information on the status of agricultural lands on reserves, nor does it capture information on the nuanced relationships among First Nation individuals, bands, and the broader farming community.

Here, we report on the outcomes of a Forum on Indigenous Agriculture held in Saskatoon, Canada. The forum used a transdisciplinary approach (Scholz and Steiner 2015); research group members encompassed the natural and social sciences of academia, Indigenous professionals in the land and resource management non-profit sector, and local experts within First Nations. The forum sought to garner key pieces of primary data on capacities and activities with respect to agriculture so that First Nations can more effectively evaluate and balance decisions that meet community-defined goals for agriculture engagement. We also sought to identify key priorities for agriculture from Indigenous participants and explored how researchers and other institutions, both Indigenous and non-Indigenous, could support research and capacity development in agriculture collaboratively and respectfully.

Background and context of First Nations agriculture

The spirit and intent of the agricultural provisions in the Numbered Treaties were to enable Indigenous participation and to support adaptation to new ecological and economic realities on the Prairies (Carter 1990). Knowledge of the land (Savage 2011; Laforge and McLachlan 2018) and collective use of resources (Tang 2003) led to Indigenous peoples’ agricultural success in the 19th century (Carter 1990). Indeed, Indigenous people adapted to “Western agriculture” rather quickly; historical records indicate that Indigenous farmers often obtained higher crop yields than settlers, causing settler farmers concern that they were being outcompeted in the market (Krasowski 2018). In response

to these concerns and following the 1885 Métis Rebellion, the Crown began a string of restrictive policies and actions directed towards Indigenous farmers (Carter 1990; Buckley 1992). Coupled with the imposition of the Indian Act and the residential school system that severed physical and cultural ties to the land, Indigenous self-determination in agricultural activities eroded (Carter 1990; Laforge and McLachlan 2018). Instead of bolstering the initially successful trajectory that many Indigenous farmers were on, government initiatives that promoted agriculture were paternalistic instruments of assimilation and colonization—for example, the Peasant Farming Policy, Industrial Schools, Home Farms, and Farm Colonies—that ultimately undermined Indigenous farmers. For detailed historical accounts of these policies and actions see the work of Carter (1990) and Buckley (1992). Cheyanne Desnomie, a researcher and member of Peepeekisis Cree Nation in Treaty 4, provides one of the only Indigenous-centric oral history accounts of some of these past actions with her work on the File Hills Farm Colony and its lasting impact on the community (Desnomie 2016). The Crown then treated inactive use of agricultural land as justification to dispossess First Nations of their reserve land—often the highest quality land—first through amendments to the Indian Act that allowed for uncultivated lands to be leased to non-Indigenous farmers, then through surrenders by sale (Taylor 1984; Buckley 1992). Over 100 surrenders, amounting to more than 20% of First Nations reserve land occurred in the Prairie region between 1896 and 1911 (Martin-McGuire 1998). This increased as land surrenders continued after 1911 through the Soldier Settlement Act of 1917 (Taylor 1984). Some Saskatchewan First Nations whose land bases declined from surrenders have successfully pursued Specific Claims, proving in court that the surrender was enabled by either a technical breach of the Indian Act or a fiduciary breach if the sale was not in the best interests of the First Nation.

In spite of decades-long imposition of hindrances in the early 20th century, First Nations people continued to participate in the agriculture sector to varying degrees through creativity and resilience. Notably, the number of individual First Nations farmers grew and persisted in the 1970s–1990s with support from the Saskatchewan Indian Agriculture Program (SIAP). The program was established in 1974 through the Agricultural Rehabilitation and Development Administration in collaboration with the then Federation of Saskatchewan Indian Nations (FSIN; now the Federation of Sovereign Indigenous Nations) and Indian and Northern Affairs Canada. The program provided funding and training, but importantly SIAP also enabled First Nations farmers access to credit through the establishment of the Saskatchewan Indian Loan Company (Sommerville 2019). At the peak of SIAP's operations, there were approximately 600 farmers, including 150 grain farmers, and 100 ranchers. In the late 1990s, SIAP folded due to funding cuts (Sommerville 2019). In 2005 the First Nations Agricultural Council of Saskatchewan (FNACS) was established by the FSIN to fill the gap that SIAP left, but FNACS could not offer the same level of service due to insufficient funding and folded by 2009. The One Earth Farms project, a partnership between 15 First Nations in Saskatchewan and Alberta and the Sprott Resource Corporation (SRC) was initiated in 2009, but its partnership with First Nations was almost entirely finished by 2014 (Sommerville 2019). On its face, it failed for lack of economic success, borne out of slowed markets and poor climate conditions (Natcher and Allen 2017; Sommerville 2020). Underpinning the failure was a misalignment of goals between SRC, a venture capital firm with responsibility to investors, and the First Nations partners who sought greater decision-making power as well as failed delivery on promises related to employment opportunities, equity payments, and values of land leases (Natcher and Allen 2017; Sommerville 2020). Further, some First Nation individuals directly involved in the project reported racism (Sommerville 2019). The failed experiment of One Earth Farms catalyzed band-operated farming for a handful of communities that had greater access to land survey information that arose from work done to establish the partnership (Natcher and Allen 2017) and also contributed to improved farmland lease rates (Sommerville 2019).

The agricultural landscape for First Nations continues to change due to a confluence of factors. The 1992 Treaty Land Entitlement (TLE) Framework Agreement signed between First Nations and the

Federal and Saskatchewan governments in 1992 enabled 25 First Nations to purchase up to 2.4 million acres, much of it agricultural land, to rectify shortages of land promised in Treaties 4 and 6 ([Government of Canada 2015](#)). As a result, it was predicted that First Nations would hold 3–4 million acres of agricultural land by 2016 ([Pratt 2006](#); [Natcher and Allen 2017](#)) renewing interest in agriculture ([Briere 2006](#)). Further, 11 out of the 74 First Nations in Saskatchewan are operational or in the development phase of entering into the First Nations Land Management Act (FNLMA), which exempts them from 34 sections of the Indian Act pertaining to reserve land management ([Government of Canada 2012](#)). Under FNLMA, First Nations manage reserve land under a community ratified Land Code; this enables First Nations to create legislation pertaining to lands and make land decisions without the bureaucratic hoops of the Crown, potentially providing more efficient negotiations and agreements with lessee farmers. Importantly, this enables First Nations to implement land use policies that reflect community values. The FNLMA regime, however, is criticized for a number of reasons, including a disconnection with Indigenous legal systems ([Jobin and Riddle 2019](#); [Jung 2019](#)).

First Nations are now in a unique position whereby land holdings have increased as a result of TLE purchases and Specific Claims as well as more autonomy in making land management decisions. Coincident with the economic opportunities that increases in agricultural land holdings pose for First Nations is the challenge that there are fewer First Nation farmers with first-hand knowledge of farm operations. Further, there has been increased interest in food sovereignty and security initiatives at a smaller scale and that centre ecosystem health and sustainability along with traditional relationships to the land. Many First Nations are currently grappling with how to proceed in management of agricultural lands as well as how to grow food that fosters respectful relationships to the land.

Forum planning and information gathering

Research team building

Central to successful dialogue about the diversity of agricultural activities and priorities was to bring together a research and forum planning team of individuals that included those working in Indigenous agriculture and land management and that had a broad reach to other organizations and Indigenous communities. The forum on Indigenous agriculture was conceived through conversations between the principle investigator (MMA), who is an Indigenous scholar (a soil scientist and, at the time of writing, a tenure-track Assistant Professor in the College of Agriculture and Bioresources at the University of Saskatchewan), who is nêhiyaw iskewew and a member of the Muskeg Lake Cree Nation (Treaty 6) and First Nations land managers and staff (AG, ABDJ), and Indigenous agricultural and natural resource organizations (DFW, KB, SMW) with whom she had established relationships. These individuals were invited to participate as collaborators prior to proposal development. Social scientists (LB and GEHS) were invited to collaborate. They came from long-term (5+ years) relationship building and co-designed research programs with seven of the First Nations that were participating at the event and were key contacts within the university for these Nations. Their presence at the event was requested by several of these Nations as allies. The purpose of their collaboration was two-fold: first to provide stories of how to facilitate decolonizing opportunities for transformative knowledge co-creation from their experiences, and second, to rebuild relationships between Indigenous people and social scientists who were perceived historically as colonizers or objectifiers of Indigenous peoples. They ensured the forum addressed questions that mattered to the participants, not themselves, and facilitated the inclusion of all relevant sources of knowledge through co-designed and decolonized data gathering and co-analysis.

A collaborative approach was in place (as per [Goring et al. \(2014\)](#)) from the proposal development stage and was carried through the organization and implementation of the forum. Continuous

participation by the same core group of planners that included nonacademic First Nations team members brought together prior to the proposal writing stage ensured that protocols of community interaction and needs of the communities guided the forum planning. Input from all potential collaborators was essential to the planning process; we sought representation from individuals that have first-hand knowledge of agriculture, work with individuals at the reserve level, interact with the political leadership of First Nations communities, and have connections or work within the academic institutions that can address agricultural and natural resource management research or training. This bottom-up approach identified key themes to explore and key individuals, communities, and organizations who were self-driven to be involved in the planning and participation in the forum—this was verified as appropriate during the forum activities as one collaborator and Indigenous land manager, relayed:

“And at that initial meeting [first grant planning meeting], we did some brainstorming of all the issues that I thought were applicable to things that we encountered. . . . Everything that you’re listening to, all the presenters, was a key component of what we initially had discussed with this brainstorming.”

Participants

Participants encompassed Indigenous practitioners that engaged in an array of agricultural activities, from band-operated and individual commercial grain farmers and ranchers, to those that manage lease agreements with non-Indigenous farmers on a large scale, as well as those involved in traditional methods of food cultivation, seed saving, and locally based food security initiatives. Our intention was to have participant representation from First Nations that have established Land Codes (First Nations Land Management Act) and from those that are managed under the Indian Act (Reserve Land and Environment Management Program, RLEMP). Key agricultural and environmental academic and government researchers, First Nations organizations, Indigenous farmers, academic administrators, government policy-makers, and research organizations were invited to attend. Our team was comprised of Indigenous members of the Saskatchewan Aboriginal Lands Technicians (an organization that represents land managers from all 74 First Nations in Saskatchewan), the National Indigenous Agriculture Association, the Saskatchewan First Nations Natural Resource Centre of Excellence, and Indigenous scholars and knowledge keepers. Invited participants, both Indigenous and non-Indigenous, and invited speakers and panelists were identified in planning meetings by these individuals and agreed on by consensus. A widespread invitation was launched through a website and many participants also learned of the forum through word of mouth. Due to demand, the venue rental was expanded to the point that full capacity included overflow into an additional room; all requests were accepted on a first-come first-served basis, with limitations based solely on venue capacity.

The forum was attended by 86 people, including the research team, and represented:

1. Sixty-two Indigenous people from 24 First Nations communities from Treaties 4, 5, and 6 across Saskatchewan, including Elders, Chiefs, councillors, land managers, economic development officers, farmers, band farm and ranch managers, community-based educators, university faculty, and undergraduate and graduate students.
2. Federal and provincial government institutions that included scientists and policy analysts.
3. Nonprofit and for-profit organizations involved in the renewable resource, agricultural, education, and economic development sectors.
4. University faculty, staff, and students representing multiple disciplines including agriculture, Indigenous studies, education, engineering, law, and environmental studies.

Saskatchewan was the focus of this forum due to the prominence of agriculture on the physical landscape, the historical Numbered Treaties with agricultural provisions that encompass the agricultural

region, and the expansion of First Nation agricultural land enabled especially by the contemporary TLE Framework Agreement of 1992.

Non-Indian Status Indigenous people including Métis, who were also included and participated in the forum, have a historical and contemporary role in Prairie agriculture. The most recent 2016 Census of Agriculture indicates that Métis form the largest demographic of Indigenous farmers in Saskatchewan (Gauthier and White 2019). We focus on First Nations and agricultural lands on reserves, however, as there are unique legal and socioeconomic conditions that face this demographic and these jurisdictions—borne out of the Indian Act as well as ties to Treaty rights that do not apply to Métis, non-Status, or non-Treaty Indigenous citizens.

Information co-creation

Our approach to information co-creation was broadly guided by both the work of Vasquez-Fernandez et al. (2017) and Castleden et al. (2017) on decolonizing research with Indigenous collaborators. The methodology was co-created by members of the research team who varied by age from youth to Elder, included a diversity of gender identifiers, and included two Indigenous mentors-in-residence at the University of Saskatchewan (ABDJ and AG have held roles as Indigenous mentors with the School of Environment and Sustainability at the University of Saskatchewan). Each team member shared their desirable outcomes and successful experiences of design and delivery of past forums on other topics. Four members of the research team had previously been involved in an Indigenous water forum wherein two of the methods had been piloted and evaluated by collaborators. It was from this collection of experiences and ideas from the collaborative research group that informed the activities and structure of the forum—co-creation and co-analysis of data continued to build in breadth and included verification with participants over the course of two days. Information came directly from invited speakers and panelists as well as through other forms of information-gathering activities such as break-out groups, sharing circles, anonymous comment boxes, and interviews with researchers if participants felt compelled. Indigenous spoken-word artist, Zoey Roy, wrote an original poem entitled “We are the Buffalo” that reflected what she heard and observed; she performed the piece to all collaborators and participants at the conclusion of the forum, and filmmaker Marcel Petit produced a video of Zoey Roy performing the poem, available at research-groups.usask.ca/indigenousag/.

All participants were informed that during the forum we were undertaking data co-creation with them, from their perspectives as experts in their field, representing their professional organizations and (or) Indigenous affiliations. An Elder was on hand to provide support for any participant if requested. Participants were encouraged to verify researcher’s words and findings, as well as contribute to answers given by others if desired. The University of Saskatchewan Behavioural Ethics Committee granted ethics exemption on 20 November 2018. The application met the requirements for exemption status as per Article 2.1 of the Tri-Council Policy Statement.

Specific data co-creation methods and protocols

First, we engaged with open-ended invitations to share questions directed at any forum attendees in an anonymous format. Participants were invited to write down questions or comments on index cards that were retrieved throughout the two days of the forum from boxes located on each table in the room. A member of the research team periodically read out the questions in random order, and participants were invited to respond and give comment in an open setting with an Indigenous facilitator.

Second, we engaged participants to help us understand priorities by writing down perspectives using a modification of a visual quality labelling “traffic light activity” (Kelly et al. 2009). Participants were invited to write down their own perspectives on aspects of Indigenous agriculture that offered challenges and opportunities on coloured paper that was placed at each table. Using an analogy to traffic

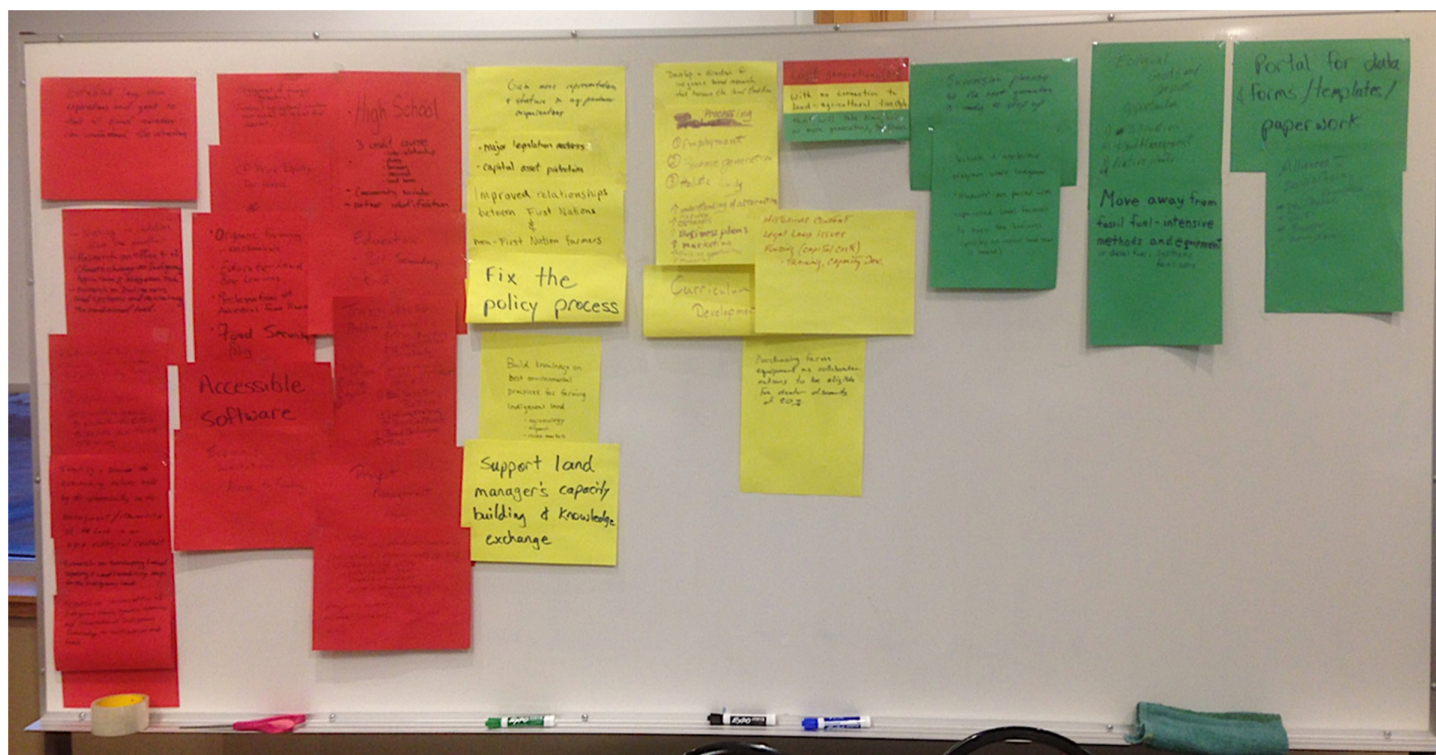


Fig. 1. Participants' responses to the traffic light activity, which suggested research priorities in Indigenous agriculture that should be addressed now (written on red paper), soon and over the medium term (yellow), and eventually (green).

lights, we explained the goal of the activity to be identifying the things they wanted researchers to complete now because it is urgent (written on red paper), soon because it is important (written on yellow paper) or eventually because it would be nice to know for planning purposes (written on green paper). These coloured papers, containing participants' ideas, were then collected throughout the day and posted on a large panel where all participants could see them (Fig. 1). During the day, the papers were thematically assessed and clustered together if they were based on similar concepts by members of the research team and any other participants who wanted to help organize the "data". After the first day, these priorities were transferred to tables in a Word document, and thematically coded (Boyatzis 1998; Denzin and Lincoln 2008) (Table S1). The subsequent morning, the papers were reorganized on the board for participants to see the analysis and presented for verification of themes in a PowerPoint slide show format. On the second day after the slide show, participants were invited to continue adding to the traffic light panel as ideas formed.

Third, we engaged participants in modified focus groups or small sharing circles (Tachine et al. 2016) based on the index card questions, panel questions from audience members, traffic light priorities, and other emergent discussion that occurred during the forum. Five focus groups were conducted in the afternoon of the second day of the forum with 40 volunteer participants who decided, in each group setting, whether they wished their discussion recorded and included as co-created data. Focus groups were organized around ensuring an appropriate size of group for deeper conversation (number of participants are indicated in brackets), ensuring Elder participation where possible, and providing a variety of themes to be explored in depth. Individuals self-selected from five focus groups (FG) that discussed one of the following questions:

FG1. Are there trade-offs between leasing and collecting rent from non-Indigenous farmers versus doing the farming yourselves [i.e., band or individual First Nations farms]? What are the advantages/disadvantages of each approach? (6 participants)

FG2. Will the future of Indigenous agriculture be distinct from current conventional agriculture? How? (7 participants)

FG3. What can academic and other institutions do to support revitalization of Indigenous agriculture? (11 participants)

FG4. What opportunities exist for creation of Indigenous-led agri-business? (4 participants)

FG5. How can communities balance traditional relationships to the land and agricultural endeavors? (12 participants)

Volunteer participants or forum organizers moderated and audio recorded the conversations, which were transcribed following the forum. Results from the focus groups come directly from these transcripts. Common themes and priorities were triangulated (Flick 2004) from the participants during the traffic light exercise, index cards, feedback form, and the focus groups.

Emergent themes

Theme 1. Centring Indigenous knowledge and traditional relationships to the land in agricultural land use decisions and stewardship

“[If] the land is healthy, the people will be healthy.” (FG5-Participant (P) 4)

Reclaiming and revitalizing traditional relationships to the land was suggested as a way to move forward in Indigenous agriculture initiatives and to address long-standing sustainability issues with industrial agriculture. There were expressions of concern about the negative effects of high-input farming on land and water quality and human health; traditional practices were viewed as a solution (Table 1). Indeed, being led by Indigenous-held values of land management was deemed central and participants reported striving not to compromise those values for the sake of convenience or expediency (Table 1; a). Results from the traffic light exercise underscore the importance of looking to the past to revitalize traditional relationships to the land, while also expressing concerns for the future and how communities might adapt to climate change (Table 1).

There were also open conversations that emphasized both the tensions and synergies between contrasting Indigenous and Western worldviews on food cultivation. Some participants expressed pragmatism as well as internal conflict about conventional high-input agriculture practiced on First Nations reserve lands, whether by Indigenous or non-Indigenous farmers (Table 1; b). Although concerns have been raised that non-Indigenous farmers leasing land are not considerate of its long-term sustainability (Friesen 2009; Lagimodiere 2009), one long-term land manager indicated that the lessee farmers he works with have a sense of accountability to the band to sustainably manage farm land for long-term cultivation; the farmers “treat it as their own” (Table 1; c). It is unclear whether the majority of farmers that lease First Nations land share this view, or if this is a unique situation; though the limited studies on the effects of leasing on soil quality even in non-Indigenous lands suggest that leased lands are not managed with the same degree of care for long-term sustainability (Fraser 2004; Rotz et al. 2019).

Some of the conversations had a hopeful tone, as participants discussed how Indigenous knowledge could transform conventional practices and create innovations to current conditions (Table 1; d). There was a focus on resurgence and connection to culture and land-based relationships through food

Table 1. Emergent Theme 1: Centring Indigenous knowledge and traditional relationships to the land in agricultural land use decisions and stewardship.

Participant comments from focus groups (FG)	Reported traffic light priorities
<p>a. “I’ll give you an example that we’re grappling with right now. That is to maintain our traditional relationships to the land, it means that we can’t be using chemicals like Roundup. We can’t just be killing indiscriminately just to establish some kind of vegetation cover. That becomes a real issue ‘cause if you ask any restoration practitioner or agrologist . . . , they think it’s impossible . . . without that chemical, to do the things we wanna do out there. So . . . , we need to be able to balance this and thought it might be easy for us to dismiss our Indigenous relationships with the land. For us here, doing this project, it really is important for us to really highlight that . . . we’re not just making it look good on paper. We actually have to do the hard work as well too.” (FG5-Participant (P) 4)</p>	<p>Red—Now</p> <p>Learn values held by communities on managing land and stewardship on agro-ecological context</p> <p>Natural land practices that sustain the natural land resources</p> <p>Organic farming</p> <p>Better care of land</p> <p>Reconcile with lost generations</p> <p>Reclamation of ancestral food traditions</p> <p>Research on Indigenous food systems and traditional foods</p> <p>Research on conservation of Indigenous plants, genetic resources and preservation of Indigenous knowledge</p> <p>Effects of climate change on Indigenous agriculture</p>
<p>b. “I’d like to see that too, where you’d have smaller farm plot, like the old days where you have your 120 acres or whatever and grow the native crops of Canada and stuff like that. But . . . I don’t want to be negative about it, but I don’t know how you could possibly do that in this day and age when there’s the big industrial farms and the big money companies and the farmers are trying to . . . the organic farmers are trying to fight against the sprays and everything that’s going right beside their crops.” (FG2-P2)</p>	<p>Yellow—Soon</p> <p>Build knowledge on best environmental practices for Indigenous land</p> <p>Rebuild connections to agricultural lifestyle</p> <p>Develop a direction for indigenous based research that honours land traditions</p>
<p>c. “[Non-Indigenous farmers] might not have the same approach because it’s not [their land]. But, in talking with some of the guys, or pretty much all the guys that lease . . . , they like to treat it as their own. Just because they want to continue to farm it. They don’t want to break any sort of a covenant, or break a lease, or do something wrong that’s going to get them kicked off of there.” (FG1-P2)</p>	<p>Green—Eventually</p> <p>Move away from fossil fuel intensive methods and equipment</p> <p>Ecological goods and services: pollination, flood management, native plants</p>
<p>d. “If I can just add to your earlier comment about feeling like you have some practices that conventional agriculture embraces and you feel they don’t really fit, you’re not alone in that. There are lots of individuals that you might view as part of conventional agriculture that share those same thoughts and there’s a growing desire and a growing understanding of which I think a lot of the First Nations’ knowledge and values can help further advancement of those techniques. . . . There’s huge opportunity.” (FG5-P5)</p>	
<p>e. “It’s also looking at the value of invasive species or plants that have been introduced that are going to be here forever. The way that we took advantage of dandelions, one of the best medicines that we have for diabetes today. That [is] an introduced species. So knowing what we need to protect, what we need to adapt and how do we utilize all of these in a community discussion or forum to make these decisions together.” (FG5-P3)</p>	

cultivation and the importance of adaptation (Table 1; e), which struck a chord with the participants and reflects feedback on presentations that emphasized food sovereignty as a path towards decolonization. In an invited talk, an Indigenous community-based educator emphasized the need to build sustainable economies for First Nations as just one part of this process.

Theme 2. Capacity building through comprehensive education and training

“We need people with expertise . . . if we’re going to go back that way into farming our own land, we need the human resources. We need the capacity. We have to develop those first and foremost before we move forward.” (FG1-P1)

Table 2. Emergent Theme 2: Capacity building through comprehensive education and training.

Participant comments from focus groups (FG)	Reported traffic light priorities
<p>a. “I don’t have enough expertise in the area of farming. . . . A farmer would know to take care of their land. I know I can rent it, but I don’t know when we should change over [crops within a rotation]. That’s my biggest concern as a land manager.” (FG5-Participant (P) 2)</p>	<p>Red—Now</p> <p>Education of Chief and Councillors</p> <p>Education Post-Secondary</p>
<p>b. “I gotta not only be an agriculturist, I gotta be a soil scientist . . . I gotta know everything about cattle. I gotta know everything about grain and seed food. Various varieties, whether they’re drug resistant, insect resistant, I gotta know everything about invasive species, species at risk. I gotta know everything about the economics of it. And that’s just the agriculture side. . . . And it goes on, and on, and on.” (FG3-P1)</p>	<p>Education—high school credit course on interrelationships, planning, business, stewardship</p> <p>Agriculture Boot-camp</p>
<p>c. “Even with retiring farmers. While these guys don’t really want to get out of the game, but they don’t want to have 10 thousand acres. They might be interested in just being a manager, First Nation, having that 70 years of experience . . .” (FG4-P1)</p>	<p>K-12 Education</p> <p>Education: land-based learning</p>
<p>d. “I think there’s an opportunity for crop consultants, like if a guy’s got a PAG [Professional Agrologist credential] or ag. degree that helps First Nations, because we hire that out, but we maybe could do that in house.” (FG4-P2)</p>	<p>Engagement of younger generation</p> <p>Training vehicles</p>
<p>e. “We don’t have a choice how we farm, how we interact with the land. I almost think we need education options that move that policy and that political agenda where choice and subsidies for more sustainable growing practices and more accessible ways to access food for local communities . . . decolonization I think, in general, is about choice.” (FG5-P3)</p>	<p>Project management Training</p> <p>Yellow—Soon</p> <p>Curriculum development</p> <p>Increase training and capacity development</p>
<p>f. “We’re aware that the university wants to Indigenize the campus, . . . we need more [student] enlistments, while I’m standing here in the wind . . . , I need the help to get up here. You know, where is this mentorship for us?” (FG3-P1)</p>	<p>Green—Eventually</p> <p>Initiate mentorship program where Indigenous students are paired with local farmers</p> <p>Succession planning so next generation is ready to step up</p>

Across the variety of data gathering methods, participants consistently expressed the vital need to create educational opportunities and capacity building and training programs to develop their own skills and knowledge, share knowledge with others, and prepare next generations for undertaking Indigenous agriculture—at all scales. A challenge that many Indigenous participants identified was limited knowledge of land resource management broadly and farming and farm history specifically. In spite of this challenge, many participants stressed the need to contribute to capacity building beginning with youth and extending to professional development of land managers, farmers, and band leadership (Table 2). Of the topics that participants viewed as most urgent to address in the traffic light exercise (red paper), the majority were related to training and education (Table S1). Discussion around capacity building encompassed formal training of youth in the school system and adults in post-secondary institutions as well as land-based Indigenous knowledge taught within communities. Participants described agribusiness as a venture that required community, commitment, and ongoing innovation for success over the long-term—there was an acknowledgement that farming is also a lifestyle that requires problem-solving skills not taught in conventional learning programs.

Participants stressed the need for land-based Indigenous education and capacity in land management and agriculture: “it’s going back, reverting to traditional foods, and having the science and the

Table 3. Emergent Theme 3: Building respectful partnerships and relationships.

Participant comments from focus groups (FG)	Reported traffic light priorities
<p>a. “I’ve always been able to get into a combine and ride around with the guy and just shoot the breeze. But now that they have all this technology at their fingertips, it’s available to my eyes as well. So, I can use that and say, ‘Oh. Geez, this is a hell of a good crop. Hmmm. Well, I guess you might be able to afford to pay a little bit more next year.’” (FG1-Participant (P) 2)</p> <p>b. “They’re getting the land for fairly cheap then . . . And that happens on most reserves. Soon as you cross that line, [the reserve is] on this side, the white’s on this side. this guy’s getting more rent all the time compared to what’s on the reserve.” (FG1-P1)</p> <p>c. “One of the things we kind of struggled with, is ‘here’s the research, but here’s a whole other component on community engagement and training.’ And then they’re not as easy to fund.” (FG3-P3)</p> <p>d. “We are not very good at playing with each other at the university. That’s something that we need to get better at.” (FG3-P3)</p> <p>e. “The universities are sometimes . . . stuck by the funding that is involved . . . [the relationship] has to be supported by a funding model that recognizes the need for that kind of collaboration.” (FG3-P4)</p> <p>f. “A lot of these funding programs are . . . competitions. So let’s eliminate that competition and that redundancy there . . . And that’s re-identifying yourself as a university, as an organization, is it for personal accolades or . . . advancement in your personal careers, that kind of focus . . . Your competition is focused on that. Or is your priority where it’s . . . at the grass-roots level, community-based, like where it’s gonna have a really profound effect.” (FG3-P1)</p> <p>g. “A lot of [research is] individual focus, ‘What can I research and what can I discover?’ But when you’re working on reserve, that’s your fundamental reason that you’re at work. And then . . . you’re responsible to everybody, here, and passed on.” (FG3-P2)</p> <p>h. “The status quo [leasing land] needs a little tweaking, and if we go the other route [farming ourselves], I think partnerships are the way to go . . . Where you share the cost, you share the risk, and you share the profit . . . We have to start small, monitor it, evaluate, and then when it becomes successful, that’s when we grow.” (FG1-P1)</p> <p>i. “The individual . . . came out to renew his bid . . . , he was paying \$5 an acre. And I called the counsellor, I said, ‘I really don’t give a damn what you’re charging this guy. I’m a band member, I want the land. And I’m willing to pay a portion of the rent.’ Well, they chased us out about three times, and every time I went up, the guy went \$10 bigger, \$15 an acre. I went back into counsel, I said, ‘I don’t know what you people are doing, but, you’re not listening to me. I’m going to take that land as a band member whether you like it or not. For a price, or for nothing. But I’m going to farm it.’ So, they had to make a decision. And that’s when it really changed to the band members getting a chance to rent the land.” (FG1-P4)</p> <p>j. “When I was [farming], I always had to compete with outside farmers. If they were bidding, I had to learn to bid a little more than that to farm on the land. Now that changes all the time, but that all depends on the [band] politicians. At one time, we had a group of politicians who wanted to throw us farmers in the reserve off, they wanted to go with white people. They had a big argument.” (FG1-P3)</p>	<p>Red—Now</p> <p>Community navigator</p> <p>Partner identification</p> <p>Stop working in isolation from each other</p> <p>Yellow—Soon</p> <p>Improved relationships between First Nations and non-First Nation farmers</p> <p>Green—Eventually</p> <p>Alliances with supply chains (Star produce, Sysco/processors)</p>

research to document and improve that” (FG3-P1). Many First Nations participants spoke of using modern technology and Western science-based tools, while maintaining and revitalizing cultural and community-based values. This contemporary perspective reflects the historical information that

Dr. Winona Wheeler, Indigenous scholar and invited speaker, presented on late 19th century Indigenous Prairie farmers. We learned how Indigenous farmers' success in Western-style agriculture was grounded in Indigenous knowledge of the land, communal social structures, and their ability to adapt modern farm technologies to their existing knowledge base—this was also well documented in Sarah Carter's seminal historical work (Carter 1990).

Indigenous land managers add value to communities through increasing record keeping within reserves and with non-Indigenous farmers, and they have a thorough grasp of what practices are occurring on their land. Their value as knowledge holders is important to communities, researchers, and policy-makers since they note trends, measure successes, identify opportunities, and act as eyes on the ground. Some land managers, however, are still concerned with their lack of knowledge of why certain decisions are being made at the farm-field level (Table 2; a).

In a panel discussion of land managers, all three panelists remarked on the many roles they play and the different types of knowledge they apply to decision-making on a day-to-day basis (Table 2; b). For full-time land managers, training needs to be tailored to accommodate their job demands and accompany strong relationships to land users, scientists, and other land manager colleagues with whom they can consult for data and information.

We learned that some First Nations farmers also advise land managers, which leverages within-community relationships and distributes the knowledge burden. Relying on First Nations farmers extended to building capacity in individual and band-level farm operations (Table 2; c). With increased agronomic capacity within communities, there is also potential to internalize and capitalize on the agriculture knowledge economy (Table 2; d). Ultimately, capacity building and education enable choice, which links to decolonization and food sovereignty (Table 2; e)—having the agency to choose what and how information is applied to decision-making is critical to achieving community-defined goals. Many First Nations expressed the desire to find ways to adapt to contemporary agricultural economic and ecological conditions, but like their ancestors, they seek to engage on their own terms, with Indigenous knowledge systems intact, and with consideration for revitalizing and maintaining cultural traditions on the land.

Formal education in all aspects of land management, governance, and agriculture was emphasized. Participants reinforced that Indigenous people face barriers in universities and other educational institutions (Table 2; f). Indigenous students are underrepresented in the science, technology, engineering, and math (STEM) fields, partially due to a feeling of disconnect between science and its applicability in their daily lives (Bonny 2018). This sense of disconnect may be more pronounced in the agricultural sciences and be exacerbated by the prevalence of open anti-Indigenous racism, poor relationships between First Nations and non-First Nation rural communities (Table 2), and the historical marginalization of First Nations participation in agriculture in the rural Prairies (Sommerville 2019, 2020). As such, support may be particularly important for Indigenous students in agricultural sciences and agronomy (currently self-declared Indigenous students comprise 8% of the undergraduate student body at the College of Agriculture and Bioresources, while comprising 15% of the total population at the University of Saskatchewan), and it is not likely that faculty have the cultural competency to support Indigenous students (Paul et al. 2014).

Theme 3. Building equitable and effective relationships and partnerships

A common characteristic of participating experienced First Nations land managers was a willingness and ability to build relationships. Examples included partnering with academic and government institutions for data collection and building relationships with non-Indigenous ranchers and farmers that

lease land. A land manager remarked on the importance of how good relationships with lessee farmers could strengthen his bargaining position (Table 3; a). This land manager was also a former farmer; as a result, he readily found common ground with the non-Indigenous farmers that leased the land and had a good understanding of cutting-edge farm technologies—an invaluable combination that is not likely common in most First Nations. Undervalued leases of reserve lands for agriculture relative to equivalent land off-reserve has been a common complaint, noted by participants at the forum (Table 3; b), and in interviews of First Nations land managers by Sommerville (2019). Based on discussions at the forum that support interview responses with First Nations land managers conducted by Sommerville (2019), it appears that whether unfair pricing of leased land is occurring likely depends on the capacity of the First Nation's land department and may also depend on the land management regime (e.g., FNLMA vs. RLEMP) and tenure arrangements (e.g., predominance of buckshee leases). Strong relationships among lessee farmers, First Nations land management staff, and government that mediate these arrangements through Indian Act instruments in the case of RLEMP bands are critical to the fairness and ease with which leasing is implemented.

Role of academic and government institutions

“We’re still trying to fit into the university system as opposed to the university thinking ‘How can we work with you and change the way we do things to suit your needs?’ ” (FG3-P2)

Indigenous participants emphasized the need to partner and build relationships with universities and government institutions to support Indigenous agriculture and agricultural land management. While many interactions have been positive, participants reported that institutional structures can often stifle relationship building and progress towards meeting Indigenous-defined goals. The removal of institutional barriers is required to make these partnerships more efficient and equitable.

Universities across Canada are grappling with how to “Indigenize” the academy (Gaudry and Lorenz 2018) and many non-Indigenous researchers and faculty are genuinely interested in how they may respectfully engage in this effort. Non-Indigenous university faculty participants in the forum expressed uncertainty in the best way to engage as well as frustration with the institutional challenges (Table 3; c). Improved access to funds that involve Indigenous organizations and communities will better enable development of new areas of research in natural resource management that requires multidisciplinary approaches that extend beyond disciplinary boundaries and require community-based researchers.

A critical topic that was discussed involved encouraging interdisciplinary collaboration within universities and funding agencies. In response to a First Nations land manager who pointed out that land management requires interdisciplinary knowledge, a university faculty member acknowledged that collaboration across disciplines is uncommon (Table 3; d). Another non-Indigenous researcher emphasized funding agencies need to improve support for relationship building (Table 3; e). However, a First Nations land manager described the frustration of the academic model that is built on the successes of individual researchers (Table 3; f). The current funding model and academic tenure and promotion standards promote individualism and self-promotion which is antithetical to Indigenous values of humility and community-based research and models of knowledge creation and transfer in Indigenous communities. There was also broader sense of responsibility to community—one that is multigenerational—that Indigenous people can carry as employees in community and Indigenous-based organizations (Table 3; g).

Private for-profit and nonprofit agricultural sector

First Nations individuals involved in commercial farming and economic development discussed partnerships with private industry to advance agribusiness. They recognize the high risk associated with

large-scale grain operations (the most common type of farming on the Prairies) and provided ideas to mitigate risks through partnership. It was suggested that individuals could receive on-the-job training in agricultural supply businesses, which could potentially lead to ownership. A few participants suggested that private industry should be more involved in forums such as these, to develop relationships and view Indigenous farmers as potential clients. Because of the high capital costs of farming, First Nations may also consider entering into partnerships for farming to maximize profits from the agricultural land (Table 3; h).

In discussions of First Nations managing farm operations, there was an emphasis on scaling up slowly to mitigate risk; in contrast to what three participants discussed occurred with the fast implementation and failure of One Earth Farms (FG1-P1, P3, and P4). Further, the view that One Earth Farms was “not a creature from First Nations” (quoted from a staff member from the Little Black Bear First Nation in Sommerville (2019)) and thus destined to fail was shared by some forum participants.

Within-community relationship building

Researchers need to be cognisant of the divergent opinions and values that can exist within an Indigenous community and across First Nations in any particular region. Oppressive federal policy and the Indian Act complicated land tenure within First Nations reserves and continues to cause tensions due to inequitable access to lands (and profits from those lands) through both formal tenure (certificate of possession) and informal claims (“buckshee”) by individual band members to what is communal land (Rudolph and McLachlan 2013). For example, First Nations that have a history of buckshee leasing indicate that most buckshee land holders lease it to non-Indigenous farmers, at low rates, and sometimes hold a large share of the total land on the reserve (Sommerville 2019)—land that otherwise would be managed at the band level with lease revenues benefiting the band rather than an individual. The Chief from one First Nation discussed his Council’s contentious decision to reclaim band control over buckshee leases that benefited individual band members and not the whole community.

Experienced First Nations farmers reported dynamic relationships with their own band. Depending on the sitting Chief and Council, difficulties sometimes arose with competition with non-Indigenous farmers to rent band-managed land (Table 3; i and j). In informal discussion, community leaders and other participants remarked on the need to reconcile within their own communities. Part of this reconciliation involves dismantling structures that were imposed on communities through the Indian Act that created inequity, jealousy, dependency, distrust, and discord within communities with respect to land use decisions—among other aspects of life.

Theme 4. Financing farming and equitable economies

Agriculture to stimulate and support First Nations economies was a central point of discussion throughout the forum—it was cited as a prime motivator for engaging in agriculture. Large-scale corporate grain farming, agricultural supply companies, bison ranching, processing value-added products, organic market gardens, and agri-tourism were just some examples of the diverse means to engage in agriculture—some of these are underway, while others were posited as ideas to potentially pursue. One First Nations Chief highlighted his community’s plan to pursue band-level grain farming and have developed a business plan that includes incremental growth in the number of acres farmed and future diversification into supply and value-added businesses. Strategies to enter into agribusiness ventures through partnerships to ease risks (Table 4; a) and to capitalize on the agricultural products (seed, fertilizer, chemicals, etc.) that are used on vast tracts of First Nations agricultural land were discussed (Table 4; b).

Table 4. Emergent Theme 4: Financing farms and equitable economies.

Participant comments from focus groups (FG)	Reported traffic light priorities
<p>a. “It’s a big opportunity for First Nations to look at success at acquisition rather in starting new business There’s so many small–medium manufacturing and other supply businesses . . . , and I’ve talked to a lot of them, and they’re very interested in partnering with First Nations people to train in the job, in the facility, for transition ownership at some point, whether it’s [an] individual entrepreneur or community, but I think that’s a good opportunity for a community, so it should be looking at like a co-op model of [within the] farming sector. We’ve talked to people who can’t afford all of 20 pieces of equipment and the bins . . . , but collectively could probably manage to do something like that.” (FG4-Participant (P) 1)</p> <p>b. “When I think of agriculture, I think, okay, a lot of money is being put into that land. A lot of money is being taken out of that land.” (FG4-P3)</p> <p>c. “The First Nation is also looking to generate revenue, because they only get a certain amount of money for certain programs. And the unfunded programs, a lot of times, that’s where land revenue kind of kicks it and props up some of these other things that don’t get funded by regular funding.” (FG1-P2)</p> <p>d. “I think that the biggest thing is risk management and mitigation. If you lease your land, you’re pretty much guaranteed that revenue because you’ve got a signed document, a legal document that Pete the Cheat or Sam the Record Man will pay X amount of dollars on this date for this amount of land. That’s guaranteed for the most part. And we haven’t had any trouble dealing with anybody reneging on any of their leases for all of these years that we’ve been leasing land. So I think risk mitigation is the biggest trade-off. . . . We know what we are getting for our land before anything happens with our land. If we are to assume more involvement in terms of actually going into the actual aspects of farming, it’s high cost. Nothing is guaranteed. Nothing is guaranteed.” (FG1-P1)</p> <p>e. “At the end of the day it’s all agricultural land, it’s going to get used, it’s going to get farmed.” (FG1-P3)</p> <p>f. “You really have to balance nationhood with the work that we’re doing within our communities and we need to start thinking about how do we feed our nations because there are some local solutions, but when we’re looking at economies, if 80% of our monies in our communities are leaving the community and only 20% is going to a band store, what good is that to us? We’re never gonna get ahead if that’s the system, and that’s the system that is put in place in our communities.” (FG5-P3)</p>	<p>Red—Now</p> <p>Economic Limitations</p> <p>Access to Funding</p> <p>CP [certificate of possession] price equity for leases</p> <p>Financing, where to get funding for farms on reserve</p> <p>Yellow—Soon</p> <p>Capital asset protection</p> <p>Niche markets</p> <p>Processing: employment, revenue generation, and holistic farming</p> <p>Business planning</p> <p>Increased marketing</p> <p>Funding (capital costs)</p> <p>Purchasing farm equipment as collaborative nations to be eligible for dealer discounts</p>

Most First Nations are currently engaged in agriculture through large-scale leasing of land to non-Indigenous farmers. One band councillor, who is also a retired farmer, highlighted strategies for gaining a better share of the revenues from land leasing in his First Nation. In discussions with participants, there was an acknowledgement of the financial benefits of entering into leasing to fund community needs that otherwise would be insufficiently supported (Table 4; c). This can put communities in the difficult situation where decisions to lease land, possibly under unideal terms, are driven to support chronically underfunded critical services like education and health. Participants also emphasized that the terms of the lease agreements are guaranteed, while managing a farm directly carries more risk (Table 4; d). A view was expressed that high-quality productive land would be inevitably farmed (Table 4; e), with the implication that idle land would be a lost economic opportunity. There was a clear relationship between capacity building, increasing employment opportunities, and the desire to support local economies. Indeed, participants linked improvements to economic conditions of First Nation individuals and communities to the need for capacity building in agriculture,

across all scales and types of agriculture and levels of engagement and as foundational to nation building (Table 4; f).

Participant excitement about the vast potential to build agribusiness and develop agricultural initiatives to support economic development was balanced with the frustration of financial barriers that still hinder Indigenous agriculture (Table 4). Access to credit remains one of the greatest barriers to entering the commercial agricultural sector as a result of the collective tenure of reserve lands held in legal title by the Crown—since the lands may not be sold, they may not be leveraged, neither by the band nor by individual band members. Participants stressed that programs and policies that enable First Nations' access to agricultural loans are critical to the establishment and maintenance of capital-intensive farm operations. Two potential options that were discussed were the Saskatchewan Indian Equity Foundation which provides lending services to First Nations businesses, and Farm Credit Canada, which now has a Director of Indigenous Relations. These are steps towards improving access to financial resources that could benefit agriculture on First Nations, but the general feedback from participants is that further improvements are still required (Table 4).

Participants discussed their frustration with the lack of mechanisms for valuing nonextractive uses of the land on reserve. This focus presents a barrier to stewarding the functions and processes of the land (i.e., ecosystem services) that support sustainable farming (e.g., pollinator habitat creation, soil organic matter formation) and alternate activities such as medicine harvesting. The idea that economic growth, colonization of the land for production uses, and the need to fit productivity of land into the Western economy to justify its use mean that some Indigenous values for the land are left out of the economy—thereby limiting land sovereignty. There was the perception of having no option to leave the land to restore itself, for instance as native grasslands that could support bison and traditional medicinal and edible plants. The institutionalization of land as it is defined by revenue generation and creating financial capacity contributed to a relationship of land servitude—which contradicted with Indigenous values of interconnectedness and dismissed opportunities for land restoration outside of its valuation in the current economic system.

Theme 5. Translating research to policy and legislation

Participants expressed frustration with inaction, inaccessibility to funding and training opportunities, and slow change on policy that could improve conditions for First Nations farmers and land managers (Table 5; a). In the traffic light exercise, participants called out the inefficient and inequitable policies that have created barriers to engagement (Table 5). First Nations participants recognized the need for data and statistics to drive policy change and many indicate that they have spent substantial time lobbying the federal government and other agencies to do so, with data in hand (Table 5; b). However, there was still a sense of urgency for more “evaluations and assessment of [First Nations] agriculture—feasibility studies, strategic plans, market analysis, data and monitoring” (Table 5).

Participants indicated that there has been recent movement towards supporting agricultural initiatives from Indigenous and non-Indigenous organizations. There are a number of Indigenous organizations, including forum partner organizations, the National Indigenous Agriculture Association and the Saskatchewan First Nations Natural Resource Centre of Excellence, that deliver and are developing programs to support First Nations in agriculture and natural resource management. These organizations have pursued partnerships with for profit and not for profit organizations to collect data and improve service delivery. Nevertheless, there remains a recognition to continue to strengthen positions in the broader agricultural sector. For example, partnerships with Agriculture and Agri-Food Canada (AAFC) and Saskatchewan Ministry of Agriculture are being pursued. Agricultural producer groups have substantial lobbying power at the provincial and federal government level; thus, greater First Nations representation within these groups was reported as a way to elevate First Nations

Table 5. Emergent Theme 5: Translating research to policy and legislation.

Participant comments from focus groups (FG)	Reported traffic light priorities
a. “That frustration builds up, and a lot of times it’s where we’re being tasked with getting funding but having to do specific work towards funding that may not be useful day-to-day, but . . . we gotta do it because it’s attached to funding at the moment.” (FG3-Participant (P) 2)	Red—Now Evaluations and assessment of agriculture—feasibility studies, strategic plans, market analysis, data and monitoring
b. “We’ve done everything that everybody said for us to do. To document in the lab, to do risk assessments, and everything. And where do we go from there? We’re stuck. We’re locked at the next stages, at the policy and regulations, the federal and provincial governments I need that data. And the whole idea . . . with having this forum was to fish with the researchers and the schools to get this data.” (FG3-P1)	Yellow—Soon Major legislation redress Fix the policy process Research legal land issues Gain more representation and stature in ag-producer organizations

interests in the agricultural sector (Table 5). The Assembly of First Nations committed to develop a First Nations Agricultural Strategy in collaboration with AAFC at their 2016 General Assembly (AFN 2019). Since then, an Indigenous Agriculture and Food Systems Initiative has been established by AAFC to support Indigenous-led projects with current commitments until March 2023 (AAFC 2019). While there were representatives from AAFC and the Saskatchewan Ministry of Agriculture at the forum, participants expressed the need for greater communication about programs available from these as well as other institutions.

Discussion: Sowing seeds for Indigenous agricultural research and policy development

Contemporary information on Indigenous agriculture and agriculture on First Nations lands on the Prairies is nearly void from the academic literature, yet it is in demand (Natcher and Allen 2017; Sommerville 2020). One of the difficulties in responding to this need is discovering Indigenous priorities and community-driven needs for agricultural research and policy change. Through presentations, panel discussions, and data gathering methods we learned that Indigenous people are currently engaging or planning activities in agriculture in multiple contexts: as farmers, relying on traditional Indigenous or western practice, or a synergy of both at multiple scales, as landlords negotiating lease agreements with non-Indigenous farmers, and as agribusiness entrepreneurs. The extent to which any individual or First Nation is engaging in any of these contexts is varied and far more nuanced than what is captured in census data or any other published information source in the grey or peer-reviewed literature. Research in Indigenous agriculture could have real impact if co-developed with Indigenous communities, especially because agriculture is the dominant land use on First Nation lands in the agricultural region of the Prairies.

It was evident across the various knowledge co-creation methods during the forum that multiple institutional barriers affect the ability of First Nations to be sovereign land managers. In the governance and economic realms, the multiplicity of government approval processes especially for those bands whose land management decisions are governed under the Indian Act negate land sovereignty. Lack of access to credit, limited economic valuation, post-secondary institutions that are slow to adapt to Indigenous student needs, and low representation of Indigenous people in the Prairie farming sector hinders capacity building and decision-making that is inclusive of Indigenous values. These barriers

can be present even for those First Nations with autonomy over land management decisions under the FNLMA regime—yet FNLMA applies only to reserve lands. While discussion of land during the forum tended to focus on First Nations reserve lands (whether under FNLMA and RLEMP regimes), it was acknowledged that barriers to Indigenous agriculture and land sovereignty extend beyond reserve boundaries and brought up questions of land restitution and exertion of Treaty rights on traditional territories off-reserve. In the social and cultural realm, anti-Indigenous racism, limited opportunity for decolonized educational opportunities for farming, lack of cultural competency in educators, and limited inclusion of Indigenous knowledge and value systems into farming practices create additional hurdles. Efforts such as traditional knowledge camps, entrepreneurship, and involvement in public events such as in the Canadian Western Agribition need more support and awareness to promote social and cultural change.

The findings and emergent themes from the forum can direct future research about Indigenous agriculture and relationship building between Indigenous and non-Indigenous farmers. For example, further work may include: an update of current or nonexistent data on the agricultural and ecosystem service capabilities of First Nations lands, potential niche markets, or restoration of native grasslands to support bison herds; co-developed research programs and capacity building activities focused on Indigenous land-based knowledge and food cultivation; and a push to develop policy that leads to program and service development to address the gaps and needs of First Nations farmers and land managers on reserve. Increased inclusion of Indigenous traditional agricultural knowledge and practices into education systems (from primary and high school through to post-secondary and professional training opportunities) should be supported across local, regional, provincial (as governments having primary roles to play in public education), and federal scales.

We identified recommendations among the various represented groups that could support Indigenous agriculture broadly, as well as recommendations specifically for engaging in research and development of evidence-based policy in Indigenous agriculture. The following recommendations were developed for government and academic institutions:

1. Advance research and policy that develops programs and services for Indigenous farmers and land managers across generations. At the forefront is capacity building with academia, support for community- and land-based education and the involvement of private industry which sees Indigenous producers as clients, and producer access to capital.
2. More efficient partnership pathways for First Nations communities and organizations to engage with academic and government institutions in research activities in leadership positions and in an equitable manner. While this means that institutions like the *Indian Act*, and economic systems for agriculture must be reevaluated, the push for reconciliation is opening this policy window. Taking on the challenge of overcoming institutional barriers ensures community goals are not only heard, but prioritized and reflect more than those of academic or non-Indigenous government institutions.
3. Promotion of collaboration rather than competition in research granting processes to remove redundancies is needed; many First Nations nonacademic partners who are active leaders in land management can become thinly spread among multiple projects led by different researchers with overlapping objectives.
4. The creation of research objectives and activities that tie more closely with capacity-building activities and training. Collaborations with Indigenous education programs need time and support to happen.

Recommendations for Indigenous land managers, communities, and individuals engaged in agriculture emerging from the forum include:

1. Initiating and accessing knowledge sharing and creation opportunities with other Indigenous agriculturalists, agri-business entrepreneurs, land managers, academics, and industry partners.
2. Making time to share knowledge with youth and other interested Indigenous community members so that traditional knowledge is maintained and practices can continue.
3. Documenting individual concerns, questions, and practices to share with community's decision makers as well as at future forums or other events.

Recommendations for researchers include:

1. Listening to community-driven needs of Indigenous agriculture community members and land managers to be responsive and prioritize objectives in an equitable way.
2. Focusing research mobilization directly to the Indigenous research partners as well as into channels that will benefit audiences beyond academia.
3. Adhering to data governance protocols and respecting data sovereignty of Indigenous communities, organizations, and individuals.
4. Advocating at grant funding agency tables for more Indigenous partnered opportunities and interdisciplinary research overall in the agricultural sciences.

Anonymous written feedback indicates that participants were supportive of the forum's goals and objectives. Participants were forthcoming with knowledge sharing and were grateful for the opportunities made available during the forum; however, they made clear that there is additional need for ongoing commitment by funding agencies, individual researchers, universities, and policy-makers to overcome institutional barriers. Critical to application of any potential research outcomes is an effective knowledge mobilization strategy, which will involve continued collaboration with Indigenous practitioners and the necessary resources to support the research and knowledge mobilization activities beyond the walls of academia—to avoid research fatigue in Indigenous nonacademic collaborators.

We recognize that the triangulated results in this work are built from a particular point in time, framed by current events and participants themselves, and the directives of the funding agreement for this work. Research bias was controlled to some degree by having an interdisciplinary team co-analyze results in isolation from each other, before building meaning together, having participants review and comment on results from the forum's official report, and by reviewing findings with others. The research team continues to maintain the forum website, providing links to approved forum reports, art-creation products that emerged from the workshop, and updating the website as opportunities for ongoing work become available. The team approaches communities individually to ascertain their interests in ongoing collaboration and data analyses respecting that each First Nation has the right to manage the data shared by them at the forum in a way that is consistent with their customs and reflective of their current views. The team also respects the right of refusal of each Nation and other collaborators in pursuing other knowledge sharing or research grant opportunities. Further research and capacity-building work have since emerged from the forum activities and relationship building. The research team plans to continue with engagement on relevant topics with participants through follow-up workshops at a smaller regional scale and dissemination of the forum results at subsequent knowledge transfer events (e.g., an invited presentation was made to the Saskatoon Tribal Council Land Forum) so that emerging trends can be established, and appropriate knowledge mobilization channels are developed.

Conclusions

Indigenous individuals, communities, and organizations are interested in creating sovereign agricultural economies that support community-defined economic and cultural goals, include a

revitalization of traditional food cultivation practices, and (or) that draw on traditional relationships to the land. First Nations reserve lands will likely continue to support large-scale commercial agriculture as a source of revenue while the Canadian and global economic systems operate the way they do; however, policy change and capacity building can ensure greater control over the economic, social, cultural, and environmental outcomes of agricultural activities. Further, pathways for First Nations to learn about farming, operate their own farms, or to support individual band members in farming or agribusiness ventures need to be clarified and improved. Balancing commercial industrial-style agriculture is a shift towards community-led food security and sovereignty activities that extend perspectives on agriculture to include ecological and tradition-based relationships to land. This forum was an initial step and lays the foundation for further research and data collection to support First Nations agricultural initiatives at all of these scales and philosophical approaches.

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Author contributions

MMA, LB, DFW, GEHS, KB, ABDJ, SMW, AG, and DS conceived and designed the study. MMA, LB, and GEHS performed the experiments/collected the data. MMA and LB analyzed and interpreted the data. MMA and DS contributed resources. MMA, LB, DFW, GEHS, KB, ABDJ, SMW, AG, and DS drafted or revised the manuscript.

Competing interests

The authors have declared that no competing interests exist.

Data availability statement

All relevant data are within the paper and Supplementary Material.

Supplementary material

The following Supplementary Material is available with the article through the journal website at doi:[10.1139/facets-2020-0004](https://doi.org/10.1139/facets-2020-0004).

Supplementary Material 1

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