



**TOWN OF CRESTON
REGULAR COUNCIL MEETING AGENDA**

Tuesday, October 27, 2020, 4:00 PM

Held Electronically via Webex In Accordance with Ministerial Order No. M192

WEBEX LOGIN: <https://creston.webex.com/creston/j.php?MTID=m756418652aaf438dc98cf371a3065397>

Access Code: 133 855 3695 Password: TownCouncil

1. CALL TO ORDER

2. ADOPTION OF AGENDA

3. ADOPTION OF MINUTES

- a. Regular Council Meeting Minutes - October 13, 2020
- b. Public Hearing Minutes - October 13, 2020
- c. Regular Committee of the Whole Meeting Minutes - October 20, 2020

4. DELEGATIONS

- a. Dr. Joanne Taylor, University of British Columbia, regarding Food Security and Food Sovereignty in the Creston Valley of British Columbia

5. ITEMS OF BUSINESS

- a. Dr. Joanne Taylor, University of British Columbia, regarding Food Security and Food Sovereignty in the Creston Valley of British Columbia
- b. Recommendations from the Regular Committee of the Whole Meeting held October 20, 2020

RECOMMENDATION NO. 1:

THAT the Council Direction Request from the Manager of Engineering regarding the results of the traffic assessment on Hillside Street and 20th Avenue North, adjacent to the Creston and District Community Complex, BE RECEIVED; AND FURTHER, THAT Council DIRECTS staff to bring forward information on the cost of traffic calming measures for Hillside Street and 20th Avenue for Council consideration within the Five Year Financial Plan.

RECOMMENDATION NO. 2:

THAT the Council Direction Request from the Director of Finance and Corporate Services, BE RECEIVED; AND FURTHER, THAT Council DIRECTS Staff to prepare the 2021 Operational Budget, excluding one-time projects, to include a 3.54% increase to municipal taxation to cover known and obligated inflationary, infrastructure replacement reserve funding, police tax increase and the Creston Emergency Services Building debt servicing.

RECOMMENDATION NO. 3:

THAT the Council Discussion regarding Service Level Review, BE RECEIVED.

RECOMMENDATION NO. 4:

THAT the Council Direction Request from the Director of Community Services regarding the proposed development of Market Park, BE RECEIVED; AND FURTHER, THAT the consideration of committing additional reserve funding, contingent upon the successful award of the Community Economic Recovery Infrastructure Program Grant, to support the development of Phase 1 of the Market Park Project, BE REFERRED to the 2021 Budget Process.

RECOMMENDATION NO. 5:

THAT the Council Direction Request from the Director of Community Services, BE RECEIVED; AND FURTHER, THAT the potential lease of a digital bulletin board kiosk to replace the existing bulletin board at Town Hall, BE REFERRED to the 2021 Budget Process.

RECOMMENDATION NO. 6:

THAT the verbal report from the Director of Community Services regarding the 2021 budget for the Community Services Department, BE RECEIVED; AND FURTHER, THAT consideration of human resources and succession planning due to the new *Building Act*, BE REFERRED to the 2021 Budget Process.

RECOMMENDATION NO. 7:

THAT the Council Direction Request from the Director of Infrastructure Services regarding the level of maintenance on trails and boulevards, BE RECEIVED; AND FURTHER, THAT consideration of purchasing a boom mower to improve maintenance efficiency of trails and boulevards, BE REFERRED to the 2021 Budget Process.

RECOMMENDATION NO. 8:

THAT the Council Direction Request from the Director of Infrastructure Services regarding protecting sidewalks and curbs using a herbicide free weed control system, BE RECEIVED; AND FURTHER, THAT the potential purchase of a herbicide free weed control system, BE REFERRED to the 2021 Budget Process.

RECOMMENDATION NO. 9:

THAT the Council Discussion regarding projects to refer to the 2021 Budget Process, BE RECEIVED.

- c. Request for Decision from the Director of Community Services regarding the Woodstove Exchange Program

6. BYLAWS

- a. Zoning Amendment Bylaw 1916, 2020 (1516 Hillside St.) (Adoption)
- b. 2020, 2021, and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020 (Adoption)
- c. Revitalization Tax Exemption Bylaw 1918, 2020 (3rd Reading)
- d. Property Purchase Reserve Fund Expenditure Bylaw No. 1919, 2020 (1st and 2nd Reading)
- e. Property Purchase Reserve Fund Expenditure Bylaw No. 1919, 2020 (3rd Reading)

7. NEW BUSINESS

8. REPORTS OF REPRESENTATIVES

- Council Member Reports
- Staff Verbal Reports (first meeting of each month)

9. GIVING OF NOTICES

- Regular Council Meetings - Nov. 10 & 24, 2020
- Regular Committee of the Whole - Nov. 17, 2020
- Special Committee of the Whole (Budget) - Nov. 30, Dec. 1 & 4, 2020

10. ACTING MAYORS SCHEDULE - 2020

January: Cllr. Unruh
February: Cllr. Wilson
March: Cllr. DeBoon
April: Cllr. Tzakis
May: Cllr. Comer
June: Cllr. Elford
July: Cllr. Unruh
August: Cllr. Wilson
September: Cllr. DeBoon
October: Cllr. Tzakis
November: Cllr. Comer
December: Cllr. Elford

11. QUESTION PERIOD

12. RECESS AND MOVE TO CLOSED MEETING (if necessary)

Pursuant to Sub-Section 90(1)(c) labour relations and (90)(1)(i) client solicitor privilege of the *Community Charter*.

13. RECONVENE TO REGULAR MEETING

14. RESOLUTIONS FROM CLOSED MEETING

15. ADJOURNMENT

TOWN OF CRESTON

REGULAR COUNCIL MEETING MINUTES

Tuesday, October 13, 2020, 4:00 PM
Council Chambers, 238-10th Avenue North, Creston BC with Electronic Public Attendance via
Webex In Accordance with Ministerial Order No. M192

PRESENT: Mayor Ron Toyota
Councillor Arnold DeBoon
Councillor Jen Comer
Councillor Jim Elford
Councillor Ellen Tzakis
Councillor Karen Unruh
Councillor Joanna Wilson

STAFF: Mike Moore, Chief Administrative Officer
Steffan Klassen, Director of Finance & Corporate Services
Ross Beddoes, Director of Community Services
Jared Riel, Fire Chief
Marsha Neufeld, Executive Assistant
Bev Caldwell, Corporate Officer
Kirsten Dunbar, Community & Corp. Services Research & Policy
Coord.
Ferd Schmidt, Director of Infrastructure Services

GALLERY: Aaron Gregory, Creston Valley-Kootenay Lake Economic Action
Partnership
Andrea Wilkey, Creston Valley-Kootenay Lake Economic Action
Partnership
Hannah Dueck, Creston Valley-Kootenay Lake Economic Action
Partnership
Shana Riordan, Creston Resident
Mike Cooper, Legacy Productions

MEDIA Aaron Hemens, Creston Valley Advance
Jensen Shields, JuiceFM

1. CALL TO ORDER

The Mayor called the Regular Council Meeting to order at 4:07 pm.

2. MINISTERIAL ORDER NO. M192, LOCAL GOVERNMENT MEETINGS AND BYLAW PROCESS (COVID-19) ORDER NO. 3

Resolution #: 311-20

Moved by Councillor Unruh
Seconded by Councillor DeBoon

WHEREAS local governments must be able to conduct their business in accordance with public health advisories to reduce the threat of COVID-19 to the health and safety of members and employees of local government and related bodies and members of the public;

AND WHEREAS the Local Government Meetings and Bylaw Process (COVID-19) Order No. 3 made by Ministerial Order No. M192 under section 10 (1) of the *Emergency Program Act* came into effect on June 17, 2020;

AND WHEREAS the Town of Creston is unable to allow members of the public to attend an open meeting of the Regular Council Meeting and the Regular Committee of the Whole Meeting until the end of December 2020 at *Council Chambers*, located at 238-10th Avenue North Creston BC, despite best efforts, in a manner that is consistent with applicable requirements or recommendations made under the *Public Health Act*, due to the size of the facility and the need for members of Council, Town employees and the public to maintain a physical distance of two (2) meters at all times, to prevent the spread of COVID-19;

AND WHEREAS the Town of Creston will ensure openness, transparency, accessibility and accountability with respect to Regular and Special Council and Committee of the Whole Meetings, by broadcasting them on the WEBEX Platform, inviting the public and media to participate virtually in these meetings; and by posting the Regular and Special Council and Committee of the Whole Meeting Agenda Packages and virtual login details on the Town of Creston website and social media platforms;

THEREFORE BE IT RESOLVED, THAT the Regular and Special Council and Committee of the Whole Meetings throughout the months of October, November and December 2020, be held without members of the public in attendance; AND FURTHER, THAT Council directs staff to investigate other meeting venues for Council that would accommodate in-person attendance of members of the public, meeting the physical distancing requirements of the *Public Health Act*, during the restrictions imposed for COVID-19.

MOTION CARRIED

3. ADOPTION OF AGENDA

Resolution #: 312-20

Moved by Councillor DeBoon

Seconded by Councillor Tzakis

THAT the agenda for the Regular Council Meeting of October 13, 2020, BE ADOPTED as amended with the removal of item b. under "Bylaws", being Zoning Amendment Bylaw 1916, 2020 (1516 Hillside St.) (Adoption).

MOTION CARRIED

4. ADOPTION OF MINUTES

- a. Regular Council Meeting Minutes - September 29, 2020

Resolution #: 313-20

Moved by Councillor Unruh

Seconded by Councillor Comer

THAT the minutes of the Regular Council Meeting held September 29, 2020, BE ADOPTED.

MOTION CARRIED

- b. Public Hearing Minutes - September 29, 2020

Resolution #: 314-20

Moved by Councillor Comer

Seconded by Councillor Wilson

THAT the minutes of the Public Hearing held September 29, 2020, BE ADOPTED.

MOTION CARRIED

5. DELEGATIONS

- a. Creston Valley - Kootenay Lake Economic Action Partnership, regarding the Kootenay Region Economic Resilience Action Plans

Mayor Toyota welcomed the Creston Valley - Kootenay Lake Economic Action Partnership, including Aaron Gregory, Community Economic Development Coordinator for the Economic Action Partnership, Andrea Wilkey, Executive Director, Community Futures Central Kootenay and Hannah Dueck, Community Economic Development Intern, Selkirk College to the Regular Council Meeting at 4:10 pm.

A. Gregory noted that the Kootenay Region Economic Resilience Planning project is a collaboration between the Community Economic Development program at Simon Fraser University, the Applied Research and Innovation Centre at Selkirk College, and Community Futures Central Kootenay. He started the presentation by providing an overview of the COVID-19 economic response in the Creston Valley, including speaking to the strategies developed for tourism and agriculture, project performance measures, the COVID-19 immediate response plan outcomes and next steps.

A. Wilkey provided context for economic resilience planning in the Kootenays, indicating that the project worked with eight communities to develop Economic Resilience Action Plans specific to each community. H. Dueck overviewed the

Economic Resilience Action Plan (ERAP), including plan overview, governance, action group sections, action group leads and next steps.

Councillor Elford expressed his appreciation at the work completed on this initiative and asked if business training could fit under the projects mandate. A. Gregory noted that they work closely with the Creston Valley Chamber of Commerce and A. Wilkey furthered that Community Futures offers business training.

Councillor Unruh asked how the plan is activated. H. Dueck clarified that the plan becomes active if the Town establishes an Emergency Operations Centre (EOC) or, an economic disruption occurs, the ERAP Advisory Members, Political and Community Leaders or other members of the community may request that the ERAP be activated and the Executive Leadership and Advisory Members will decide together whether activation is necessary.

Mayor Toyota thanked A. Gregory, A. Wilkey and H. Dueck of the Creston Valley-Kootenay Lake Economic Action Partnership for their presentation and they left the meeting at 4:45 pm.

6. ITEMS OF BUSINESS

- a. Creston Valley - Kootenay Lake Economic Action Partnership, regarding the Kootenay Region Economic Resilience Action Plans

Resolution #: 315-20

Moved by Councillor DeBoon

Seconded by Councillor Tzakis

THAT the delegation from the Creston Valley-Kootenay Lake Economic Action Partnership regarding the Kootenay Region Economic Resilience Action Plan for the Creston Valley, BE RECEIVED. MOTION CARRIED

- b. Regional District of Central Kootenay, regarding the Regional Housing Needs Assessment for the Greater Creston Sub-Region

Resolution #: 316-20

Moved by Councillor Elford

Seconded by Councillor Tzakis

THAT the Regional District of Central Kootenay's Regional Housing Needs Assessment for the Greater Creston Sub-Region, BE RECEIVED; AND FURTHER, THAT Council DIRECTS staff to publish the Regional District of Central Kootenay's Regional Housing Needs Assessment for the Greater Creston Sub-Region on the Town of Creston website. MOTION CARRIED

- c. Town of Creston's Regional District of Central Kootenay Representative (see committee list)

Resolution #: 317-20

Moved by Councillor Unruh

Seconded by Councillor Elford

THAT Council APPOINTS Councillor Comer as the Town of Creston's representative on the Regional District of Central Kootenay Board for the 2021 term. MOTION CARRIED

Resolution #: 318-20

Moved by Councillor DeBoon

Seconded by Councillor Comer

THAT Councillor Wilson and Councillor Elford, BE NOMINATED for the position of the Regional District of Central Kootenay Alternate Director. MOTION CARRIED

Resolution #: 319-20

Moved by Councillor DeBoon

Seconded by Councillor Unruh

THAT Council APPOINTS Councillor Elford as the Town of Creston's alternate representative on the Regional District of Central Kootenay Board for the 2021

Regular Council Meeting Minutes – October 13, 2020

term.

MOTION CARRIED

Resolution #: 320-20

Moved by Councillor Unruh

Seconded by Councillor Comer

THAT the ballots used to vote for the alternate director position as the Town of Creston representative on the Regional District of Central Kootenay Board, BE DESTROYED.

MOTION CARRIED

- d. Ministry of Children and Family Development, regarding a proclamation request for Foster Family Month (October)

Resolution #: 321-20

Moved by Councillor DeBoon

Seconded by Councillor Comer

THAT the correspondence from the Ministry of Children and Family Development, regarding a proclamation request for Foster Family Month, BE RECEIVED; AND FURTHER, THAT the Mayor is AUTHORIZED to issue a Proclamation to declare October 2020, Foster Family Month in the Town of Creston.

MOTION CARRIED

- e. Creston Valley Rotary Club, regarding a proclamation request for World Polio Day (October 24, 2020)

Resolution #: 322-20

Moved by Councillor Unruh

Seconded by Councillor Comer

THAT the correspondence from the Creston Valley Rotary Club regarding the proclamation of World Polio Day, BE RECEIVED, AND FURTHER, THAT the Mayor is AUTHORIZED to issue a Proclamation to declare October 24, 2020 World Polio Day in the Month in the Town of Creston.

MOTION CARRIED

- f. Request for Decision from the Chief Administrative Officer, regarding Town Hall Christmas Closures

Resolution #: 323-20

Moved by Councillor Unruh

Seconded by Councillor Tzakis

THAT the Request for Decision from the Chief Administrative Officer regarding Town Hall Closures over Christmas, BE RECEIVED; AND FURTHER, THAT Council APPROVES the closure of Town Hall to the public on Thursday, December 24 and Monday, December 28, 2020.

MOTION CARRIED

- g. Request for Decision from the Director of Community Services, regarding an extension of the Temporary Expanded Service Area Authorizations

Resolution #: 324-20

Moved by Councillor Tzakis

Seconded by Councillor Wilson

THAT the Request for Decision from the Director of Community Services regarding Policy Directive No. 20-26 from Liquor and Cannabis Regulation Branch's with respect to the Extension of Temporary Expanded Service Area Authorizations from October 31, 2020 to October 31, 2021, BE RECEIVED; AND FURTHER, THAT Council DIRECTS staff to notify the Liquor and Cannabis Regulation Branch (LCRB) of Council's support of Policy Directive No. 20-26, being the extension of the Temporary Expanded Service Area Authorization to Food Primary, Liquor Primary and Manufacturer Licensees from October 31, 2020 to October 31, 2021 within the Town of Creston.

MOTION CARRIED

Regular Council Meeting Minutes – October 13, 2020

- h. Verbal Report from the Director of Community Services, regarding the proposed Rockin the Kootenays Festival

Resolution #: 325-20

Moved by Councillor DeBoon

Seconded by Councillor Tzakis

THAT the verbal report from the Director of Community Services, regarding the Rockin the Kootenays Festival, BE RECEIVED; THAT Council REFERS the request from Legacy Productions with respect to the proposed Rockin the Kootenays Festival to the Creston Valley Services Committee; AND FURTHER, THAT the Creston Valley Services Committee, BE ADVISED that Council would support this type of event being held in the Creston Valley. MOTION CARRIED

- i. Request for Decision from the Community and Corporate Services Research and Policy Coordinator, regarding the Creston Valley Farmers Market Licence of Occupation extension and renewal

Resolution #: 326-20

Moved by Councillor Elford

Seconded by Councillor Tzakis

THAT the request from the Creston Valley Food Action Coalition to extend their licence of occupation with respect to the use of Town Property for the operation of a Farmers' Market and to enter into a licence of occupation for the same, for the years 2021, 2022, and 2023, BE RECEIVED; THAT the licence of occupation for 2020 with the Creston Valley Food Action Coalition BE EXTENDED to December 19, 2020; AND FURTHER, THAT Council AUTHORIZES staff to issue a Licence of Occupation to the Creston Valley Food Action Coalition, for the use of the property legally described as Lot 2, Plan NEP87969 and Lot B, Plan 15256, District Lot 525, Kootenay District, and located at 115 Northwest Boulevard and 111 Cook Street, every Saturday during the period; May 1 to October 10, 2021, April 30 to October 9, 2022, and April 29 to October 8, 2023 for the purposes of hosting the Creston Valley Farmers Market.

MOTION CARRIED

- j. Request for Decision from the Community and Corporate Services Research and Policy Coordinator, regarding the Creston Valley Youth Network COVID-19 Re-Opening Policy Amendment

Resolution #: 327-20

Moved by Councillor Unruh

Seconded by Councillor DeBoon

THAT the Request for Decision from the Community and Corporate Services Research and Policy Coordinator regarding the Creston Valley Youth Network Centre Re-Opening (COVID-19 Pandemic) Policy (SER-003-054), BE RECEIVED; AND FURTHER, THAT the Creston Valley Youth Network Centre Re-Opening (COVID-19 Pandemic) Policy (SER-003-054), BE ADOPTED, as amended with respect to increasing the indoor occupancy maximum of the Creston Valley Youth Network Centre.

MOTION CARRIED

7. BYLAWS

- a. Zoning Amendment Bylaw 1916, 2020 (1516 Hillside St.) (3rd Reading)

Resolution #: 328-20

Moved by Councillor DeBoon

Seconded by Councillor Comer

THAT Zoning Amendment Bylaw 1916, 2020, BE READ a third time by title.

MOTION CARRIED

Regular Council Meeting Minutes – October 13, 2020

- b. 2020, 2021, and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020 (1st and 2nd Reading)

Resolution #: 329-20

Moved by Councillor Comer

Seconded by Councillor Unruh

THAT 2020, 2021, and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020, BE READ a first time by title, a second time by content.

MOTION CARRIED

- c. 2020, 2021, and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020 (3rd Reading)

Resolution #: 330-20

Moved by Councillor Unruh

Seconded by Councillor Wilson

THAT 2020, 2021, and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020, BE READ a third time by title.

MOTION CARRIED

8. NEW BUSINESS

- a. Town of Creston communication regarding celebrating Halloween Safely during COVID-19

Resolution #: 331-20

Moved by Councillor DeBoon

Seconded by Councillor Unruh

THAT Council DIRECTS the Emergency Operation Centre for the Town of Creston to develop and promote key messaging regarding the safe celebration of Halloween based on the guidelines provided by the BC Centre for Disease Control.

MOTION CARRIED

9. REPORTS OF REPRESENTATIVES

- Mayor Toyota reported on his attendance at the Creston Valley Services Committee Meeting, the Association of Kootenay and Boundary Local Government Education Workshop and a visit with Brittney Anderson, NDP candidate for the Nelson-Creston riding.
- Councillor Comer reported on her attendance at an Economic Action Plan Quarterly Meeting and a Creston Valley Tourism Society Meeting.
- Councillor DeBoon reported on his attendance at a Regional District of Central Kootenay East Resource Recovery Committee Meeting and a Technical Building Advisory Committee Meeting.
- Councillor Elford reported on his attendance at a Technical Building Advisory Committee meeting and the Association of Kootenay and Boundary Local Governments Annual General Meeting.
- Councillor Tzakis reported on her attendance at a Creston Valley Community Housing Society Meeting.
- Councillor Unruh reported on her attendance at a Winterfest Planning Meeting.

Resolution #: 331-20

Moved by Councillor Tzakis

Seconded by Councillor DeBoon

THAT the verbal and written reports of Council and staff, BE RECEIVED.

MOTION CARRIED

10. GIVING OF NOTICES

- Regular Council Meeting – Oct. 27 and Nov. 10, 2020
- Regular Committee of the Whole Meeting – Oct. 20 and Nov. 17, 2020

11. QUESTION PERIOD

There were no questions from members of the gallery.

12. RECESS AND MOVE TO CLOSED MEETING***Resolution #: 332-20***

Moved by Councillor Unruh

Seconded by Councillor Wilson

THAT the Regular Council Meeting of October 13, 2020, BE RECESSED at 5:28 pm and by the authority of the *Community Charter*, Council move to a Closed Council Meeting with this meeting being closed from the public and/or news media pursuant to subsection 90(1)(c) labour relations and (90)(1)(i) client solicitor privilege. MOTION CARRIED

13. RECONVENE TO REGULAR MEETING

The Regular Council Meeting reconvened at 5:50 pm.

14. RESOLUTIONS FROM CLOSED MEETING

None

15. ADJOURNMENT***Resolution #: 333-20***

Moved by Councillor Comer

THAT the Regular Council Meeting of October 13, 2020 BE ADJOURNED at 5:50 pm. MOTION CARRIED

CERTIFIED CORRECT

Ron Toyota

Mayor

Bev Caldwell

Corporate Officer

**MINUTES OF A PUBLIC HEARING OF THE TOWN OF CRESTON HELD ON
TUESDAY, OCTOBER 13, 2020 HELD ELECTRONICALLY VIA WEBEX IN
ACCORDANCE WITH MINISTERIAL ORDER NO. M192**

PRESENT	Mayor Toyota Councillor Jen Comer Councillor Arnold DeBoon Councillor Jim Elford Councillor Ellen Tzakis Councillor Karen Unruh Councillor Joanna Wilson
STAFF	Mike Moore, Chief Administrative Officer Ross Beddoes, Director of Community Services Jared Riel, Fire Chief Bev Caldwell, Corporate Officer Marsha Neufeld, Executive Assistant Kirsten Dunbar, Community and Corporate Services Coordinator
GALLERY	Kaspar Naef, Creston Resident Mike Cooper, Legacy Productions Aaron Gregory, Creston Valley-Kootenay Lake Economic Action Partnership Hannah Dueck, Creston Valley-Kootenay Lake Economic Action Partnership Andrea Wilkey, Creston Valley-Kootenay Lake Economic Action Partnership Aaron Hemens, Creston Valley Advance Jensen Sheilds, Juice FM
CALL TO ORDER	Ross Beddoes, Director of Community Services, Chair, called the Public Hearing to order at 4:00 pm.
PURPOSE OF PUBLIC HEARING PROPOSED ZONING AMENDMENT BYLAW 1916, 2020 (Party Wall)	<p>The Chair reviewed the purpose and intent of Zoning Amendment Bylaw No. 1916, 2020, advising the following:</p> <p>The purpose and intent of the proposed Zoning Amendment Bylaw, if adopted, is to amend Schedule “A,” being the Zoning Map, by rezoning the property legally described as Lot 5, District Lot 891, Kootenay District, Plan EPP85933, PID: 030-594-511 (1516 Hillside Street) from “Single Family Residential (R-1) Zone” to “Zero Lot Line Residential (R-2) Zone.” This would allow for subdivision and development of a two family dwelling with a shared party wall along the new proposed interior lot line.</p>
PUBLIC HEARING PROCEDURE	<p>The Chair reviewed the Public Hearing Procedure and stated the following:</p> <p>“This Public Hearing is to consider and receive submissions regarding proposed Zoning Amendment Bylaw No. 1916, 2020.</p> <p>Anyone who believes their interest may be affected by the proposed Bylaw will be heard, or may make a written submission. No one will be discouraged or prevented from making his or her views heard.</p> <p>Council members may ask questions of you following your presentation but our function tonight is to listen to the views of the public, not to debate the proposed Bylaw.</p> <p>After the Public Hearing has concluded, Council may, without further notice, give whatever effect Council believes proper to the representations.</p> <p>Council has received documents which are available for your review. Please refer to the Public Hearing Binder to review these documents. Written submissions received during the course of these proceedings will be read aloud by staff and subsequently will be added to the Public Hearing Binder.</p> <p>Your only opportunity to comment on the proposed Bylaw is during the Public Hearing. We are not permitted to receive further submissions once we have closed the Public Hearing.</p>

To maintain order and to ensure that everyone has an opportunity to be heard, here are our rules of procedure:

- a) Please begin your remarks by stating your name and address. If you are speaking on behalf of some other person or organization, please identify the name of that person or organization.
- b) Please limit your remarks to 5 minutes and to the subject of the proposed Bylaw. Please be respectful to others.
- c) After everyone has spoken once, you will have an opportunity to speak subsequent times to provide additional information, if you wish, and subject to the discretion of the Chair.
- d) If you have any concerns about the rules of the Hearing, please address your comments to me, as the Chair."

STAFF REPORT

The Chair provided information with respect to staff reports and written submissions, as follows:

- a) The statutory notice of Public Hearing was published in the Creston Valley Advance on October 1 and October 8, 2020. Additionally 45 notices were published mailed and delivered to owners and occupants within the 60m notification area.
- b) A Staff report was provided to Council for consideration prior to 1st & 2nd readings of the proposed Bylaw on September 29, 2020.

To view the report to Council, please refer to the Public Hearing binder.

- c) Written and verbal submissions were received by Staff up to 4:00 pm on October 13, 2020.

The Chair advised that there were no written and/or verbal submissions received.

The Chair called for first and/or second time speakers with respect to this application, to which there were none.

PUBLIC COMMENTS

There were no comments from the public.

COUNCIL COMMENTS

There were no comments from the Mayor or members of Council.

The Chair reminded Council that they are not permitted to receive further submissions following the close of the Public Hearing and stated the following:

"Therefore, all written and oral submissions regarding proposed Zoning Amendment Bylaw No. 1916, 2020, up to and including the September 29, 2020 Public Hearing be received and that the Public Hearing be closed."

ADJOURNED

The Public Hearing adjourned at 4:07 pm.

CERTIFIED TRUE AND CORRECT:

Mayor Ron Toyota

Bev Caldwell, Corporate Officer

TOWN OF CRESTON
REGULAR COMMITTEE OF THE WHOLE MEETING MINUTES

Tuesday, October 20, 2020, 3:00 PM
Council Chambers, 238-10th Avenue North, Creston, BC with Electronic Public Attendance via
Webex in Accordance with Ministerial Order No. M192

PRESENT: Mayor Ron Toyota
Councillor Arnold DeBoon
Councillor Jen Comer
Councillor Jim Elford
Councillor Ellen Tzakis
Councillor Joanna Wilson

REGRETS: Councillor Karen Unruh

STAFF: Mike Moore, Chief Administrative Officer
Ross Beddoes, Director of Community Services
Steffan Klassen, Director of Finance & Corporate Services
Ferd Schmidt, Director of Infrastructure Services
Jared Riel, Fire Chief
Joel Comer, Municipal Services Coordinator
Bev Caldwell, Corporate Officer
Kirsten Dunbar, Community & Corp. Services Research & Policy Coord.
Marsha Neufeld, Executive Assistant

GALLERY: Warren Bruns, Creston Resident
Steve Smith, Creston Resident

MEDIA: Aaron Hemens, Creston Valley Advance
Jensen Shields, JuiceFM

CALL TO ORDER

The Mayor called the Regular Committee of the Whole Meeting to Order at 3:00 pm.

ADOPTION OF AGENDA (and additional items if necessary)

Moved by Councillor DeBoon
Seconded by Councillor Comer

THAT the agenda for the Regular Committee of the Whole Meeting of October 20, 2020, BE
ADOPTED. MOTION CARRIED

DELEGATIONS

None

BUSINESS

Councillor Wilson arrived at 3:08 pm.

- a. Council Direction Request from the Manager of Engineering regarding the Traffic Study on 20th Avenue North and Hillside Street**

RECOMMENDATION NO. 1:

THAT the Council Direction Request from the Manager of Engineering regarding the results of the traffic assessment on Hillside Street and 20th Avenue North, adjacent to the Creston and District Community Complex, BE RECEIVED; AND FURTHER, THAT Council DIRECTS staff to bring forward information on the cost of traffic calming measures for Hillside Street and 20th Avenue for Council consideration within the Five Year Financial Plan.

2021 PRELIMINARY BUDGET SESSION

- a. Council Direction Request from the Director of Finance and Corporate Services regarding the 2021 Budget Strategy**

RECOMMENDATION NO. 2:

THAT the Council Direction Request from the Director of Finance and Corporate Services, BE RECEIVED; AND FURTHER, THAT Council DIRECTS Staff to prepare the 2021 Operational Budget, excluding one-time projects, to include a 3.54% increase to municipal taxation to cover known and obligated inflationary, infrastructure replacement reserve funding, police tax increase and the Creston Emergency Services Building debt servicing.

- b. Council Discussion regarding Service Level Review**

RECOMMENDATION NO. 3:

THAT the Council Discussion regarding Service Level Review, BE RECEIVED.

- c. Council Direction Request from the Director of Community Services regarding Market Park**

RECOMMENDATION NO. 4:

THAT the Council Direction Request from the Director of Community Services regarding the proposed development of Market Park, BE RECEIVED; AND FURTHER, THAT the consideration of committing additional reserve funding, contingent upon the successful award of the Community Economic Recovery Infrastructure Program Grant, to support the development of Phase 1 of the Market Park Project, BE REFERRED to the 2021 Budget Process.

d. Council Direction Request from the Director of Community Services regarding a digital community bulletin board at Town Hall

RECOMMENDATION NO. 5:

THAT the Council Direction Request from the Director of Community Services, BE RECEIVED; AND FURTHER, THAT the potential lease of a digital bulletin board kiosk to replace the existing bulletin board at Town Hall, BE REFERRED to the 2021 Budget Process.

e. Verbal Report from the Director of Community Services regarding the 2021 Community Services Department Budget

RECOMMENDATION NO. 6:

THAT the verbal report from the Director of Community Services regarding the 2021 budget for the Community Services Department, BE RECEIVED; AND FURTHER, THAT consideration of human resources and succession planning due to the new *Building Act*, BE REFERRED to the 2021 Budget Process.

f. Council Direction Request from the Director of Infrastructure Services regarding trail and boulevard maintenance

RECOMMENDATION NO. 7:

THAT the Council Direction Request from the Director of Infrastructure Services regarding the level of maintenance on trails and boulevards, BE RECEIVED; AND FURTHER, THAT consideration of purchasing a boom mower to improve maintenance efficiency of trails and boulevards, BE REFERRED to the 2021 Budget Process.

g. Council Direction Request from the Director of Infrastructure Services regarding infrastructure protection (sidewalks and curbs)

RECOMMENDATION NO. 8:

THAT the Council Direction Request from the Director of Infrastructure Services regarding protecting sidewalks and curbs using a herbicide free weed control system, BE RECEIVED; AND FURTHER, THAT the potential purchase of a herbicide free weed control system, BE REFERRED to the 2021 Budget Process.

h. Council Discussion regarding projects to refer to the 2021 Budget Process

RECOMMENDATION NO. 9:

THAT the Council Discussion regarding projects to refer to the 2021 Budget Process, BE RECEIVED.

QUESTION PERIOD

J. Shields asked for a description of the Market Park Project. Staff noted it is included in the Official Community Plan and available online.

ADJOURN AND MOVE TO A CLOSED COMMITTEE OF THE WHOLE MEETING

Moved by Councillor DeBoon

THAT the Regular Committee of the Whole Meeting, BE ADJOURNED at 4:20 pm and by the authority of the *Community Charter*, Council move to a Closed Committee of the Whole Meeting with this meeting being closed from the public and/or news media pursuant to Sub-Section 90(1)(c) labour relations and (1)(g) litigation or potential litigation affecting the municipality of the Community Charter.

MOTION CARRIED

AS THE MINUTES OF THIS REGULAR COMMITTEE OF THE WHOLE MEETING:

Ron Toyota, Mayor

Bev Caldwell, Corporate Officer



TOWN OF CRESTON DELEGATION REQUEST

File: Council File

I/WE REQUEST TO ATTEND THE FOLLOWING MEETING:

(NOTE: Items discussed at a PUBLIC Meeting are available to the press for publication.)

☐ REGULAR **OR** ☐ CLOSED COMMITTEE OF THE WHOLE **ON**, _____ 2019

@ 4:00 p.m. Third Tuesday of each month

☒ REGULAR **OR** ☐ CLOSED COUNCIL MEETING **ON** **October 27, 2020**

@ 4:00 p.m. Second and Fourth Tuesday of each month

NAME OF DELEGATION: The University of British Columbia – Okanagan Campus	
SPOKESPERSON(S): Dr. Joanne Taylor	
MAILING ADDRESS: 3333 University Way, Kelowna, BC V1V 1V7	
TELEPHONE NO.: [REDACTED]	EMAIL: [REDACTED]
DETAILS OF ISSUE TO BE DISCUSSED: Presenting on doctoral research conducted on food security, food sovereignty, and climate change in the Creston Valley between 2013-2016	
Your Delegation Request is <div style="display: flex; justify-content: space-around;"> <input checked="" type="checkbox"/> Confirmed <input type="checkbox"/> Declined </div>	

PLEASE READ CAEFULLY***Council Procedures Bylaw No. 1875 states:***

- (1) The Members may hear up to two (2) delegations at each Closed, Regular, Special, Council and/or Committee meeting, with a time limit of 15 minutes per delegation, unless additional time is approved by the Mayor or the Town Manager.
- (2) Requests by delegates will be reviewed by the Town Manager or designate to determine whether
 - i. the delegation concerns an administrative issue that should be dealt with by the Mayor, in which case the Town Manager will arrange a meeting between the requestor and the Mayor, or,
 - ii. the delegation should be heard by a Council Committee or by Council at one of the regular scheduled meetings, in which case the Town Manager will arrange for the delegation to be included on the agenda for the appropriate meeting. If there are two delegations already on the agenda for the next meeting, the matter will be put on the agenda of the following available meeting.

Food Security and Food Sovereignty in the Creston Valley of British Columbia

by

Joanne Taylor

BA, University of British Columbia, 2013

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

in

THE COLLEGE OF GRADUATE STUDIES

(Interdisciplinary Studies)

THE UNIVERSITY OF BRITISH COLUMBIA

(Okanagan)

October 2019

©Joanne Taylor, 2019

The following individuals certify that they have read, and recommend to the College of Graduate Studies for acceptance, a thesis/dissertation entitled:

**FOOD SECURITY AND FOOD SOVEREIGNTY IN THE CRESTON VALLEY OF
BRITISH COLUMBIA**

submitted by Joanne Taylor in partial fulfillment of the requirements of

the degree of Doctor of Philosophy .

Dr. John Wagner, Anthropology, Community, Culture, and Global Studies

Supervisor

Dr. Hugo De Burgos, Anthropology, Community, Culture, and Global Studies

Supervisory Committee Member

Dr. Mary Stockdale, Geography, Community, Culture, and Global Studies

Supervisory Committee Member

Dr. Kelly Struthers Montford, Sociology

University Examiner

Dr. Annette Desmarais, Sociology, University of Manitoba

External Examiner

Abstract

Food security is one of the most pressing challenges of our time with over one in ten people in Canada suffering from some form of food insecurity. While poverty, or the inability to purchase food, is often understood to be the most immediate cause of food insecurity, food sovereignty emphasizes ways in which industrial agriculture has led to a loss of local control over agricultural land and of opportunity for communities to feed themselves in culturally appropriate ways. In this dissertation, I incorporate food sovereignty principles into my definition of food security and develop a food security assessment matrix to assess the relative contributions of different food production systems to food security based upon the data I have collected.

Through a case study approach focused on the Creston Valley in British Columbia, I examine the relationships of three distinct food production systems to food security at local, regional, and national levels using focussed ethnographic methods. I conducted 87 semi-structured interviews with agriculturalists, water managers, and members of the Indigenous yaqan nukiy community, as well as 15 observational studies and one focus group with small-scale market gardeners. Industrial farmers grow a variety of crops for sale in global markets. Small-scale market gardeners grow food for local consumption. The yaqan nu?kiy, an Indigenous Ktunaxa community, rely on traditional foods to some extent but also participate in both industrial and market garden agriculture. All are affected by the management of the Libby Dam, one of four dams built under the auspices of the transboundary Columbia River Treaty.

My research findings suggest that a significant number of Creston Valley households are food insecure, and given the current configuration of farming practices, contradictory federal policies, climate change impacts, unresolved Indigenous issues, and water management challenges, the Creston Valley as a whole is at significant risk of higher rates of food insecurity

in the future. However, the current renaissance of small-scale farming in the Creston Valley represents a promising alternative to an over-reliance on industrial farming while the innovative approach of the yaqan nu?kiy offers hope for a more food secure future. I conclude with recommendations for the integration of federal food security policy with agricultural policy, stronger governmental support for small-scale farming, improvements to the management regime for the Kootenay floodplain, and full recognition of Indigenous rights in a renegotiated Columbia River Treaty.

Keywords: Food Security, Agriculture, Industrial Agriculture, Market Gardening, Small-scale Agriculture, Food Sovereignty, Creston Valley, Canada, Agricultural Policy, Climate Change.

Lay Summary

This dissertation examines the relationship of industrial agriculture, market gardening, and Indigenous food production in the Creston Valley of British Columbia to food security locally, regionally, and nationally. Through a case study approach, I examine the relationships of these food producing groups and use an assessment matrix specifically developed for this study in order to determine the relative contributions to food security of the different food producing systems. My research findings suggest that the current renaissance in small-scale farming provides an alternative to industrial farming praxis and offers hope to eradicating food insecurity in the future. I conclude by offering policy recommendations for the integration of a federal food security policy that offers stronger supports for small-scale farming, improvements to the management of the Kootenay River floodplain, and recognition of Indigenous rights in a renegotiated Columbia River Treaty.

Preface

This research project was approved by the Behavior Research Ethics Board (BREB) at the University of British Columbia (Okanagan campus), Certificate H14-03358.

This project was funded by two Social Sciences and Humanities Research Council fellowships:

766-2013-0827 - Joseph-Armand Bombardier Canada Graduate Scholarship Award
752-2014-2510 – SSHRC Doctoral Award

I also acknowledge the financial support of the University of British Columbia (Graduate Entrance Scholarship, University Graduate Fellowship, Graduate Student Travel Grant, and Dean's Thesis Fellowship).

I am solely responsible for the design and conduct of the research project, the analysis of the data and the writing of the dissertation. My research supervisor Dr. John Wagner and committee members Dr. Mary Stockdale and Dr. Hugo Deburgos have reviewed this manuscript.

I participated in one publication with my supervisor. Details of the article are provided below.

Wagner, John and Joanne Taylor. 2019. La Nation du Bassin du Columbia. Un Modèle de Gouvernance de L'eau pour le XXI^e Siècle. *Anthropologie et Sociétés* 43(3).

Table of Contents

Abstract	iii
Lay Summary	v
Preface	vi
Table of Contents	vii
List of Tables	xiii
List of Figures	xiv
List of Acronyms	xvi
Acknowledgements	xix
Dedication	xxi
Chapter 1: Introduction	1
Research Questions	10
Thesis Structure	13
Chapter 2: The Creston Valley	15
The Kootenay River	16
Ktunaxa Territory	19
<i>The yaqan nu?kiy Lower Kootenay First Nation</i>	<i>26</i>
History of Settler Agriculture	30
<i>First Settlers</i>	<i>30</i>
<i>Early Farmers</i>	<i>33</i>
Economic Diversification and the Decline of Agriculture	42

Alternative Food Producers in the Creston Valley	48
Chapter 3: Water and Development	52
Dam Development	52
Settlement and Food	58
Water Treaty and Food Security	63
<i>Columbia River Treaty</i>	65
<i>Libby Dam</i>	66
<i>The Libby Coordination Agreement</i>	69
<i>Creston Valley Irrigation</i>	72
<i>Columbia Basin Trust</i>	78
Chapter 4: Food Security and Food Sovereignty	80
Food Production Challenges of the 21st Century	80
Food Security	84
<i>Food Security in Canada</i>	92
<i>Community Food Security</i>	98
<i>Food Security in British Columbia</i>	107
<i>Food Security in the Creston Valley</i>	109
<i>Indigenous Food Security</i>	110
Food Sovereignty	113
<i>Food Sovereignty in Canada</i>	120
<i>Food Sovereignty in the Creston Valley</i>	123
<i>Indigenous Food Sovereignty</i>	125
Reconciling Food Security and Food Sovereignty	128

Chapter 5: Methods	133
Focussed Ethnography	133
Ktunaxa Research Protocols and Procedures	140
Research Methods	142
<i>Selection of Participants</i>	<i>142</i>
<i>Case Studies</i>	<i>143</i>
Sample Selection.....	145
<i>Interviews.....</i>	<i>147</i>
<i>Participant Observations.....</i>	<i>148</i>
<i>Focus Groups</i>	<i>150</i>
<i>Secondary Sources</i>	<i>151</i>
Ethical Concerns	154
Data Analysis and Interpretation	155
A Matrix for Analyzing Food Security in the Creston Valley	157
Chapter 6: Industrial Farming and Food Security in the	160
Creston Valley.....	160
Food Security Assessment Framework.....	160
Industrial Farmers.....	161
Economic Viability.....	169
<i>Land Values.....</i>	<i>169</i>
<i>ALR Impacts on Farmland Prices</i>	<i>170</i>
Crops and Markets	174
<i>Dairy Industry</i>	<i>174</i>

<i>Vegetables</i>	179
<i>Alfalfa, Hay, Seed</i>	180
<i>Grain</i>	181
Effects of The Columbia River Treaty on Canadian Agriculture	183
Lack of Agricultural Services	185
Crop Insurance	187
Technology and Chemicals	189
Land Availability	193
<i>ALR Effect on Land Availability</i>	193
<i>Wildlife Management Area</i>	194
<i>Non-food Crops</i>	195
<i>Community Values</i>	197
Industrial Agricultural Effects on the Environment	202
Summary Assessment: Industrial Agriculture and Food Security	206
Chapter 7: Market Gardeners and Food Security in the Creston Valley	209
Market Gardeners	210
Economic Viability	215
<i>Land Values</i>	215
<i>Crops, Markets, and Incomes</i>	217
<i>Local Food Markets</i>	227
<i>Agricultural Services</i>	231
<i>Government Partnerships</i>	233
Columbia Basin Trust	237

<i>Crop Insurance</i>	238
Land Availability	240
<i>Local Agriculture</i>	240
Community Values	241
<i>Non-Food Farm Crops</i>	241
<i>Resilient Regional Economies</i>	244
<i>Seed Sovereignty</i>	245
<i>Gender Equality</i>	247
Market Garden Effects on Environment	249
Summary Assessment of Local and Regional Food Production	253
Chapter 8: Ktunaxa Food Security in the Creston Valley	258
yaqan nu?kiy Traditional Food Procurement	258
Economic Viability	261
<i>yaqan nu?kiy Industrial Agriculture</i>	261
<i>Greenhouse and Food Store Sales Points</i>	263
<i>Cherry Orchard Collaboration</i>	264
<i>Alfalfa, Hay, and Seed Production</i>	265
<i>Agripocity Food Partnership Plan</i>	266
<i>Last Chance Foods</i>	267
Land Availability	267
Columbia River Treaty	269
Community Values	270
<i>Traditional Food Procurement Systems</i>	270

<i>Market Garden Initiative</i>	271
Yaqan nu?kiy Fish Revitalization Initiatives	275
<i>Kootenay River Floodplain Management Plan</i>	275
<i>Goat River Floodplain Revitalization Plan</i>	279
Kootenai Tribe of Idaho Fish Revitalization Initiatives	280
<i>Kootenai Tribe of Idaho Floodplain Management – Diking Districts</i>	280
<i>Kootenai Tribe of Idaho Burbot Fishery Revitalization Initiative</i>	284
Effects on the Environment	285
Summary Assessment	287
Chapter 9: Food Security in the Creston Valley	290
Industrial Agriculture	291
Market Gardeners	294
Ktunaxa - yaqan nu?kiy Nation	296
Columbia River Treaty and Libby Dam	299
Policy Recommendations	300
<i>Supports for Enhancing Small-scale Methods of Food Production</i>	302
<i>A Renegotiated Columbia River Treaty</i>	303
<i>Canadian Food Security Policy</i>	304
Gaps in the Literature and Future Research Priorities	304
List of References	310
Appendices	359
Appendix A	359
Appendix B	362

List of Tables

Table 2.1 B.C. Industry Sector Comparison (Lee 1925).	36
Table 2.2 Districts and Crops Produced within the Creston Valley in 1946.	40
Table 2.3 Crops and Acreages – Creston Valley – 1946 (Blair 1949).	40
Table 2.4 Demographic Information for Immigrants to the Creston Valley, 1947 – 1949 (Blair 1949).....	41
Table 2.5 Primary Agricultural Products in the East Kootenays, B.C. – 1961.....	45
Table 4.1 Measurement of Poverty in Canada According to OECD Standing.....	94
Table 4.2 Definitions of Food Security (Toronto Public Health, 2006).	100
Table 4.3 Historical Definitions of Food Security Combined (Taylor 2016).....	105
Table 4.4 Canadian Household Survey for Food Security (2004).....	112
Table 4.5 Food Security Evaluative Criteria for the Creston	139
Table 5.1 Interviews and Participant Observations Conducted in April – October 2016.....	143
Table 5.2 Schedule and Location of Observations in 2016.	150
Table 6.1 Total Number of Farms and Land Coverage in the Creston Valley.	165
Table 6.2 Industrial Farmers in the Creston Valley of B.C.	167
Table 7.1 Market Gardeners Interviewed for this Study.....	213
Table 7.2 Gender comparisons of Creston Valley and Bonners Ferry Interviewees.....	248
Table 8.1 yaqan nu?kiy Interviews in the Creston Valley of B.C.	259
Table 8.2 Number of reserve land acres and leased from yaqan nu?kiy by industrial farmers..	262

List of Figures

Figure 1.1 The Creston Valley with the Kootenay River Running North/South. Photo by author 2016.....	6
Figure 2.1 Map of Creston Valley in Canada by Gifex.com. Image Modified by Author	16
Figure 2.2 Kootenay River Shannon, used under CC BY-SA 4.0.....	17
Figure 2.3 Traditional Ktunaxa Territory. Ktunaxa Nation 2019 (permission granted).....	20
Figure 2.4 Map of the Creston Valley with Indian Reserves Indicated. British Columbia Data Catalogue Map iMapBC (permission granted).....	28
Figure 2.5 Creston Valley Iconic Grain Elevators. Photo by author 2016.	38
Figure 2.6 Map of Kootenay Valley and Creston Valley Floodplain. Regional District of Central Kootenay (permission granted).....	44
Figure 3.1 Location of CRT Dams - Adapted from a Map Created by Eric Leinberger, Department of Geography, UBC (permission granted).	64
Figure 3.2 Libby Dam, Libby Montana, U.S.A. looking southwest. Photo by author 2013	67
Figure 3.3 Map of Aquifers in the Creston Valley of B.C.....	73
Figure 3.4 Map of Goat River in the Creston Valley. Regional District of Central Okanagan (permission granted).	75
Figure 4.1 Common Components of Food Security Definitions (Toronto Public Health, 2006).	101
Figure 4.2 Intrahousehold Food Dynamics Amidst Diminished Resources. Adapted from Hamelin et al. (1999).	103
Figure 5.1 Matrix for Analyzing Food Security.	168
Figure 6.1 Map of the Creston Valley Showing Floodplain and Benchlands	166
Figure 6.2 Agricultural Land Reserve Zones One and Two. Minister of Agriculture’s Advisory Committee (permission granted).....	184
Figure 6.3 Industrial Milking Machine – Creston Valley. Photo by author 2016.....	190
Figure 7.1 Map of Creston Valley and Bonners Ferry, Indicating Small Market farm interviews. Produced by Joanne Taylor using ArcGIS 2019 (permission granted).....	212

Figure 7.2. Lamb farm in Lister B.C. Photo by author 2016.....	224
Figure 7.3 - Creston Valley Farmers Market 2017 (permission granted).....	228
Figure 8.1 - yaqan nuʔkiy organic gardens. Photo by author 2016.	272
Figure 8.2 - yaqan nuʔkiy 20 acre farm 2019 (permission granted).....	273
Figure 8.3 - Erosion along Kootenay River in the Creston Valley. Photo by author 2016.	276
Figure 9.1 - Inter-reliant connection between all contributing factors to food security.	301
Figure 9.2 – Creston Valley Benchlands looking North. Photo by author 2016.	309

List of Acronyms

AAFC	Agriculture and Agri-Food Canada
ACT	Adaptation to Climate Change Team
ALC	Agricultural Land Commission
ALR	Agricultural Land Reserve
B.C.	British Columbia
BCE	Before Common Era
BCFSN	British Columbia Food Systems Network
BCMAL	British Columbia Ministry of Agriculture and Lands
BREB	Behavioral Research Ethics Board
CBT	Columbia Basin Trust
CCA	Council of Canadian Academics
CCHS	Canadian Community Health Survey
CETA	Canada-European Union Comprehensive Economic and Trade Agreement
CMoA	Canadian Ministry of Agriculture
CRB	Columbia River Basin
CRT	Columbia River Treaty
CSA	Community Supported Agriculture
CSO	Civil Society Organization
CVFAC	Creston Valley Food Action Coalition
CVFM	Creston Valley Farmers Market
CVHSP	Creston Valley Harvest Share Program
CWB	Canadian Wheat Board
ECOWAS	Economic Community of West African States
ETC	Erosion, Technology, and Concentration Action Group
EU	European Union
FE	Focused Ethnography
FIAN	Food First Information and Action Network
FIRB	Farm Industry Review Board
FITFIR	First in Time, First in Right

FNFNES	First Nations Food, Nutrition, and Environment Study
FSC	Food Secure Canada
GHG	Green House Gasses
GM	Genetically Modified
GMO	Genetically Modified Organism
HFSSM	Household Food Security Survey Module
IFAD	International Fund for Agricultural Development
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
ISFS	Institute for Sustainable Food Systems
IAAKSTD	International Assessment of Agricultural Knowledge, Science, and Technology for Development
KBFA	Kootenay and Boundary Farm Advisors
KRHRP	Kootenai River Habitat Restoration Program
KRHRPMP	Kootenai River Habitat Restoration Project Master Plan
KTI	Kootenai Tribe of Idaho
KVRA	Kootenay Valley Reclamation Association
KWIC	Keyword in context
LCA	Libby Coordination Agreement
LIM	Low-income measure
LVC	La Vía Campesina
MMPR	Marijuana for Medical Purposes Regulations
NAFTA	North American Free Trade Agreement
NDP	New Democratic Party
NFU	National Farmers Union
NGO	Non-Governmental Organization
NWPCC	Northwest Power and Conservation Council
OECD	Organization for Economic Co-operation and Development
PFPP	People's Food Policy Project
RDCK	Regional District of Central Kootenay
SSHRC	Social Sciences and Humanities Research Council

SOTW	State of the World's Forests
TPH	Toronto Public Health
TPP	Trans-Pacific Partnership
TRT	Truth and Reconciliation Treaty
TRIPS	Trade-Related Aspects of Intellectual Property Rights
U.S.	United States
U.S.A.	United States of America
UBC	University of British Columbia
UK	United Kingdom
UN	United Nations
UNCHR	United Nations Commission on Human Rights
UNDESA	United Nations Department of Economic and Social Affairs
UNDRIP	United Nations Declaration of the Rights of Indigenous People
UNFAO	United Nations Food and Agriculture Organization
UNHRC	United Nations Human Rights Council
UP	Union Paysanne
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USMCA	US-Mexico-Canada Agreement
VAR-Q	Variable flow
VSJF	Vermont Sustainable Jobs Fund
WFC	World Food Conference
WHO	World Health Organization
WTO	World Trade Organization

Acknowledgements

I respectfully acknowledge that this research was conducted on the unceded and ancestral territory of the Ktunaxa Peoples and written on Syilx Territory on which my family and I are uninvited settlers. I would also like to acknowledge the financial support from the University of British Columbia Okanagan for ongoing graduate scholarships and the Social Sciences and Humanities Research Council of Canada without which the quality of this research would not be possible.

To procure food, whether for oneself, one's family, community, region, country, or indeed the world I have discovered that there exists but one thing in common; it is a labour of love. The people who procure food in the Creston Valley welcomed me with open arms into their lives and onto their lands and shared their stories of that labour. Thank you to your supportive families, and for all your efforts to offer such a range of sustenance.

Thank you also to the yaqan nukiy Nation for your respect and belief in the Creator who ultimately provides us with the nourishment our bodies and souls need. For the sharing of food, water, and their stories, I am forever changed and infinitely grateful. I am humbled and moved particularly by one family who welcomed me into their home where they served their family's traditional food - hunted from the very land that their ancestors had once procured nourishing foods freely. My heart was touched as I listened to each word of their poignant history of hunting and gathering food on the plains of the beautiful Creston Valley. Thank you Chief Chris Luke Sr. and to your family for the giving of your precious time, and most often the food that your hands had grown. Thank you also to the non-humans, the land, the water, and the environment that sustains us. We are all part of this system and in it together.

There are others; without my parents, I could not have accomplished the writing of this dissertation. Without my mother's unconditional love and care of my family while away on research trips and accompanying me on long road trips into the field, I could not have spoken to all the farmers who contributed to this dissertation. She listened patiently, and gently asked questions that helped me synthesize the knowledge articulated in this dissertation. I thank my father who once imparted the sage wisdom and priceless gift to never stop asking questions and to never stop learning all that I could. This advice has served me well. Thank you to both of you for providing a foundation of love and support. I thank my husband whose unwavering loyalty

and devotion to our family gave me the security in knowing I had the freedom to spend the years to produce this body of work. And to my children Nikita and Alexander who forgave my many absences and continue to love and support me and my life's work in spite of the time away from them; thank you from the bottom of my heart. I will forever love you.

For the many hours of guidance, supervision, and mentorship, I am eternally grateful to my supervisor Dr. John Wagner who is responsible in no small part for my continued success as an academic researcher. Dr. Wagner's intellectual support, thoughtful advice, and guiding words continue to inspire me and encourage me to do better. I am also thankful for my committee members Dr. Hugo De Burgos and Dr. Mary Stockdale whose enduring support has enabled me to learn much on my academic journey.

Thank you to the many colleagues who supported me through this labour of love; especially Nassiba whose friendship I have treasured throughout this dissertation process, and Dr. Kamali who came to my rescue at the last moment. Your kindness is appreciated immensely. Sumeet, Krista, Luke, Matt, Jody, Dilsora, Tina, and Laura. You listened and supported me during times when only you could understand the challenges of conceiving, researching, and writing a dissertation; I hold your friendship in my heart.

Dedication

Lovingly dedicated to my Mother Evelyn

For you Mom.

*For your encouragement,
your belief in me and my research,
and your Love.*

Chapter 1: Introduction

Food security is one of the most pressing concerns of the twenty-first century, with over 821 million people worldwide hungry and malnourished in 2017 (WHO 2018). Inextricably linked to starvation and malnutrition are the concepts of poverty, food security and insecurity as defined by the United Nations and other agencies that view global food security as dependent upon industrialized agricultural food production (UNFAO et. al 2013). Furthermore, in Canada, national agriculture and food security policies are not integrated and their disjuncture forces local community farming-based initiatives to develop and grow in opposition to the industrial food system, with inadequate support. Additionally, marginalization and exploitation of Indigenous¹ peoples' resources, inequitable development, and disadvantageous water treaties continue to oppress and challenge Indigenous food production systems (Morrison 2011).

In this doctoral dissertation I investigate food security in the Creston Valley of British Columbia during the renegotiation of the Columbia River Treaty. In this study, I describe and critically examine how radical shifts to climate destabilization and economic change, burgeoning populations, and land rezoning tensions interlock to create a complex pattern of collective responses to socio-political and economic pressures. As demonstrated by Wittman (et al. 2010; et al. 2011b; et al. 2017), I too show the way these changes are amplified by local ecological stresses related to the intensification of chemical inputs, water and soil pollution, deforestation, and resource exploitation within the industrialised food production system.

¹ I use the term 'Indigenous' to identify descendants of Nations that occupied the land of what is so-called Canada before the arrival of European settlers, colonizers, and state powers, and to refer to peoples united globally under this socio-political identity.

Within this context, my research elucidates the many physical, social, political, economic, and ecological transformations that have occurred in the Creston Valley of British Columbia since Indigenous people first occupied the area, to its more recent settlement by Europeans and other cultural groups (Dance 2015; Murton 2002). I also describe the settlement history of the Creston Valley floodplain by focusing on diked valley bottoms, dammed rivers, displaced Indigenous food systems, and modern industrialized export food production regimes that contribute to the local economy and thus assessments of food security. The Creston Valley benchlands have also undergone various physical and socio-political changes for the purposes of settlement and food production that contribute to the overall assessment of food security in the Creston Valley (Murton 2002).

Conceptually, my study includes food sovereignty principles within my definition of food security, emphasizing the rights of communities, people, and local governments to determine their food production policies and praxis. The definitions upon which food sovereignty is based, however, are myriad and contextual, and must therefore be reconciled with food security approaches that emphasize economic access to food. These approaches do so at the expense of food sovereignty principles and in order to achieve genuine food security, food sovereignty principles and practices are critical and urgent. Contingent upon specific geographical factors and starting points I articulate how food sovereignty can provide solutions to food security which I present within a food security assessment matrix specific to this study.

Between 2006 and 2008, the global food crisis was identified by skyrocketing food prices, food riots, and displacement of the impoverished indicating that the dominant neo-liberal food regime was not succeeding in eliminating poverty and food insecurity (Bello and Baviera 2010; Wittman et al. 2010). Subsequently, 125 million people in the Global South were driven

into extreme poverty (UNFAO 2008a). Food insecurity has been and continues to be prevalent in many parts of the world and has recently become a serious concern in Canada, where approximately 1.6 million Canadians experienced some level of food insecurity in 2011 (CCA 2014; Tarasuk 2016) as well as in other industrialized nations (Koc and Bas 2012). According to Desmarais and Wittman (2014) Canada imports about 45 percent of its domestic food supply while being the fifth largest food exporter in the world (Government of Canada 2018d). Given these complex statistics of the global and Canadian food marketing systems, accurately establishing the relationship between household food insecurity, poverty, and national farm productivity is a difficult task. The role of the state to provide economic security in order to enable food security is deflected through structural problems inherent in its agricultural production systems which are based on global export infrastructures. Legislation for food security policies ignore or are completely missing and are entirely out of step with the underlying issues of food production and food security.

Food security in Canada is compromised by a number of alarming trends. Farm income and the number of people who want to farm are both declining (British Columbia Food Systems Network 2012, Statistics Canada 2007). Soaring land prices force small-scale farmers to leave agriculture and enter other professions while valuable and productive agricultural land and fisheries habitat diminishes due to non-food agricultural growth based on changing lifestyles and consumption patterns (Flachs 2016). Adding to the precarity of food production, development continues to encroach on valuable farmland and market pressures. Economic conditions are also forcing farmers to grow industrialized food.

In Canada 20,000 to 25,000 hectares of farmland are lost each year due to urban encroachment and development (Canadians for a Sustainable Future 2019). In the Central

Kootenay Region alone, 10 percent of total agricultural land has been taken out of the agricultural land reserve since 1974, diminishing the potential to grow food on prime agricultural land and creating pressure on other soils that have serious limitations, requiring yet more chemical inputs to grow genetically modified crops for export. Landscapes of monoculture cropping also decrease the security of food producing areas by contaminating water and soil through use of petro-chemicals thus contributing to green house gases (GHG). Indeed, 75 percent of the food we eat is oil based (Canadians for a Sustainable Society 2019). Further, destruction of forests for the purposes of industrial agriculture contribute to desertification which ultimately speeds climate change. Caught in a negative feedback loop, urbanization is the largest contributing factor to land degradation and desertification exacerbates climate change (Canadians for a Sustainable Society 2019; IPCC 2019b; Qualman 2019; Shiva 2002a). Undeniably, the Creston Valley relies on the realities of food production for all inhabitants who depend on the area for food and economic security.

Food insecurity has become particularly prevalent among First Nations communities (Tarasuk et al. 2014; 2015). According to the United Nations Food and Agricultural Organization (FAO), almost one million First Nation people in Canada are in a food insecure situation due in large part to their loss of traditional food resources, as is the case in the Creston Valley. Adding to the precariousness of Indigenous people's food security is global warming which affects the relationship of water to land ecosystems, central to Indigenous fish based diets (IPCC 2019a; Schreier et al. 2016). In this study I also examine processes of exclusion of Indigenous people from the bilateral Columbia River Treaty (CRT) negotiations which results in the marginalization of the Ktunaxa Nations from their traditional fishing, hunting, and gathering sites (Cosens 2012). Despite this Treaty, there is an opaqueness within the consultation process,

along with a tendency to describe ecological knowledge at the expense of more complex issues of Indigenous sovereignties especially for the local yaqan nuʔkiy Nation on whose lands this study is based.

Situated within 70,000 square kilometers of unceded and ancestral territory of the Ktunaxa people, the local yaqan nuʔkiy² and non-Indigenous people have depended on a dynamic and increasingly complex food system for millennia favoured by the mild climate, the nutrient-dense soils, and the water rich environment. (Brunton 1998a, b; Choquette 1972, 1973, 2007; Kootenai Culture Committee Confederated Salish and Kootenai Tribes 2019; Lower Kootenay Band 2013; Schaeffer 1940; Turney-High 1941; Walker and Sprague 1998).

Within the Ktunaxa Territory, the Creston Valley runs contiguously north and south for approximately 30 kms from the south end of Kootenay Lake to the International U.S.A. border and 32 kilometers past to Bonners Ferry, Idaho at its most southerly end (Shurts 2012; Kootenai River Network 2019). Figure 1.1, looking easterly, shows the Creston Valley with the Kootenay River runs North/South.

² In order to respect the cultural integrity of Indigenous people, to give authority to the voices of all people involved in this research study, and for the purposes of this paper, I will use the Indigenous Nation name of yaqan nuʔkiy rather than the colonial name of Lower Kootenay Band when referring to their community in the Creston Valley of B.C.



Figure 1.1 - The Creston Valley with the Kootenay River Running North/South. Photo by author 2016.

The Creston Valley, as it is referred to in Canada, and the Kootenai Valley, as it is known in the US, is by far the largest agricultural area in the Purcell Mountain Trench at approximately 75,000 acres in area size (Sorboe 1967:14). In Creston, roughly 2,000 acres is fertile floodplain combined with 17,000 acres of upper benchland, providing 19,000 acres of prime agricultural farmland within the Creston Valley area (The Creston Museum 2013).

The Valley includes pastoral rolling benchlands, flat valley bottoms, and two mountain ranges running north and south, the Purcells flanking the eastern side, and the Selkirks on the west. A portion of the Purcell Mountains bordering the benchlands is called the Skimmerhorns by locals because of its jagged edged shapes and interesting outcrops.

Pinned between the regulated flow of water from the Libby Dam on the Kootenay River upstream from Bonners Ferry, Idaho, and the series of dams on the Kootenay Lake in B.C., the Creston floodplain is controlled by large technological advancements. The Libby Dam was built in 1975 as part of the Columbia River Treaty (CRT) between Canada and the U.S. (Cosens 2012) and like the three other CRT dams, it was built to generate hydropower and to control annual flooding.

In 2016, I was fortunate to find accommodation in an apartment on the Western side of the beautiful Creston Valley which provided stunning easterly views of the early morning, sun-drenched floodplain where most of the land is comprised of industrial agriculture. It was during the intense heat of the summer that I spoke with 87 farmers, water managers, and yaqun nuʔkiy who, to varying degrees and historical pasts, have procured food within this fertile valley floodplain. From a family of traditional Doukhobor³ food provisioners, I began my dissertation studies to discover what food security means to those whose lives and livelihoods I came to know that summer. It is in this body of research, that I situate myself in my research and writing. As part of my culture, I understand that I am responsible and accountable to my research participants, but also to the environment, land, water, sky, and beyond. The relationships I formed during this research supported my own cultural identity and was a catalyst for me to understand the ways that identity and self-determination intersect.

Presently, little comprehensive analysis has been conducted in the Creston Valley area, and few books have been written, let alone a discussion offered on food security and food sovereignty in comparable farming communities and regions all across the country. Given the

³ Known for their farming abilities, the Doukhobors are a religious group of radical pacifists who immigrated to Canada in the early 20th century and now live in Western Canada, predominantly in the Kootenays of British Columbia.

lack of research and the urgency required to address food security and poverty in B.C. this study is particularly significant. I consequently provide various theories of food security as they apply to the Creston Valley, Canada, internationally, and globally (Evans 2009; Fieldhouse and Thompson 2012) and parse the problem of both industrial and small market food producers, while also discussing diverse Indigenous food production systems as they become entangled within notions of Indigenous food security and food sovereignty. Clearly, these notions do not operate in a vacuum but become problematic within the context of the current colonial and reconciliation discourse (Fairbairn 2010; Morrison 2011).

I also analyze how the operation of the Libby Dam, in Montana, U.S., upstream of the Creston Valley floodplain, threatens the integrity of European settlers' diking infrastructures thus perilously transforming the floodplain into a food insecure area (Jamison 2004). While dam development along the Kootenay River has brought flood control to thousands of inhabitants on the Creston Valley floodplain, and continues to provide hydroelectricity to the Pacific Northwest, it largely ignores the experiences and voices of settler farmers and the *yaqun nu?kiy* who live and procure food in the Creston Valley floodplain. As a result, dam development has also decimated once thriving fisheries and created a precarious dike erosion situation which threatens farmers' lands and food production (Dance 2012; Murton 2007).

While a generally ample supply of water bodes well for industrial farm production for Valley bottom farmers, in any given year, climate change induced drought can threaten the livelihoods of benchland and small market farmers. Undeniably, devastating environmental impacts are calamitous to ecosystem function, and ongoing expansionary tendencies and capital accumulation of hydro wealth continue to subordinate Indigenous People' and local food producers decision-making powers (Peery 2012).

The destruction of land and water systems in the Creston Valley due to dams on the Kootenay and Columbia Rivers is also compounded by diminishing glacial snow packs which supply the Kootenay River and the many other local creeks, rivers, and aquifers (Heikkila and Gerlak 2012). Decreased water supply due to global warming will undoubtedly force governments to become much more competitive in their negotiation for scarce water resources (Cosens 2012; Nolin et al. 2012, Postel 2001).

It is now estimated that by 2050, four billion people will experience chronic shortage of water because of population growth and per capita consumption (Evans 2009:7). Although population growth has slightly abated since the 1960s, world population is expected to peak at roughly ten billion people by the year 2200, increasing the number of people dependent on rapacious 'Western' diets rich in meat and dairy agriculture which depend in turn on animal feed crops and ultimately water (Evans 2009:8). These perilous circumstances will invariably impede the safety and viability of agricultural food production which currently accounts for 70 percent of global fresh-water use (Evans 2009:7). Canada will also not be spared the effects of global warming on food shortages and price shocks if climate change is not immediately addressed (UNIPCC 2019a, b).

My study is particularly concerned with finding alternative food security policies and practices in the face of how unpredictable climate change will inevitably have a significant impact on agriculture in irrigation-dependent regions such as the Creston Valley where water is expected to decline because of growing water scarcities (Rajagopalan et al. 2018). Climate scientists are predicting further melting of glaciers will increase changes in weather and flood patterns (Nolin et al. 2012) creating erratic weather events that inarguably affect local agricultural production for farmers, First Nations, and other groups. Unless more inclusive and

people centred agricultural policies and practices are designed and implemented, unpredictable flooding of the Valley bottom will continue to erode the fragile integrity of the Valley dike system and create a precarious situation for floodplain inhabitants and farmers. Ultimately, farmers will bear the negative consequences of state and local decisions, thus making their traditional systems of growing food an economic burden rather than a source of abundance and an opportunity for genuine food security for the Creston Valley.

Research Questions

In order to investigate the relationship of local farming practices and Indigenous food procurement to relative levels of food security in the Creston Valley, I frame my research questions through the lens of political ecology to examine the experiences and cultural processes of food producers. By speaking with food producers, water managers, and policy makers I was able to articulate a mapping of which food production regimes are used by various agricultural groups. Using a food security definition I develop in Chapter 4 and a food security matrix I outline in Chapter 5, I set out to answer the following research questions.

Question 1: What is the relationship of industrial agriculture to food security locally, regionally, and nationally?

Within farming communities, access to land by developers, industrial farmers, or governments forms a nexus that transforms productive farmland for food into trade and export related economies, corporate and provincial interests, and resource extractive initiatives. This can begin to obfuscate the boundaries between such dualities as food production for local consumption and food production for trade, giving rise to varying forms of partnerships and non-food crop

production regimes. Industrial food crops such as timothy hay and seed, cherries, and wheat, produced in the Creston Valley are mainly exported to other countries, but some are sold elsewhere in British Columbia and the rest of Canada. Nevertheless, this form of agriculture contributes to local food security because it provides income for farmers, their employees, and local businesses. Farm income security is thus a major factor in my analysis of industrial agriculture but is considered in relation to other major factors that include land availability, community values, and environmental impacts.

Question 2: What is the relationship of small market gardeners to food security locally, regionally, and nationally?

Creston Valley small-scale farmers form a group of food producers that counter industrial food production values and processes. Their practices constitute a core tenet of food sovereignty principles that are predicated upon farmer's rights to define their own food production policies and to determine the extent on which they choose to be reliant upon external markets. Market gardeners do not produce for globalized export chains and instead choose to produce food for local and regional consumption (Trauger 2014). I use the term *local* throughout this dissertation to refer to the Creston Valley and *regional* to refer to the total area in which Creston Valley growers sell their food, mainly the Central and East Kootenays. The community values that inform market gardening are distinct from those of industrial farming in respect to community resiliency, gender equality, and sustainable food production practices. Notwithstanding, like industrial farmers, they face serious economic challenges and some of their practices also have negative environmental impacts.

Question 3: How has the sovereignty of the local yaqan nu?kiy traditional food systems been affected by colonization, how food secure are they today, and what is the relationship of their food procurement strategies to food security in the Valley as a whole?

The yaqan nu?kiy have retained some of their traditional food gathering systems but also operate within capitalist economies responsible for violations of Indigenous rights through colonization, assimilation, and denial of the right to Indigenous self-determination (Alfred 2009; Escobar 1995). The yaqan nu?kiy occupy a unique position in the Valley by virtue of the fact that they are leasing several thousand acres of reserve lands to industrial farmers while at the same time growing food for themselves, as a community project, and attempting to restore fisheries and in other ways recover their ability to rely on traditional food procurement practices.

Question 4: How does the management of the Libby Dam affect food security for farmers and local communities, both Indigenous and non-Indigenous, on the Creston Valley Floodplain?

I ask whether the benefits of hydropower and flood control offered by Libby Dam can be reconciled with other factors that affect food security. While Libby Dam undoubtedly provides protection from annual flooding, it undermines Indigenous food sovereignty and fisheries restoration initiatives, creating challenges for all farmers within the floodplain. Dike erosion, for instance, has become a major issue since no level of government has been willing to take responsibility for dike maintenance on the Canadian side of the border.

Thesis Structure

I have structured this dissertation in the following way. In Chapter 2, I provide a socioeconomic and agricultural history of the Creston Valley. I discuss the archeological history of the area and shed light on the historic relationship of the Ktunaxa to the Columbia River Basin while introducing the local yaqun nu?kiy Nation. I provide a socio-historic analysis from settler agriculture to current day food production systems. I also describe the current Columbia River Treaty negotiations which will ultimately control the flow of water on the Creston Valley floodplain and affect food production. In Chapter 3, I review literature and theories on the impacts of dam building and settler development as they have occurred over the last century in British Columbia. Dams built under the terms of the Columbia River Treaty (CRT) inarguably have influenced, defined, shaped, and determined the meaning of food security in the Creston Valley. In Chapter 4, I review food security and food sovereignty literature from several governmental and non-governmental organizations such as the United Nations Food and Agricultural Organization (UNFAO) (2013), the International Assessment of Agricultural Science Technology and Development (IKAASTD) (2009) and the Nyéléni (2007) who seek to define food sovereignty and food security, and I reconcile them in my own definition of food security.

In Chapter 5, I describe my research methodology and the specific methods used to gather data - participant observation studies, focus groups, and semi-structured interviews. I centered these methods around five case study groups which consist of industrial and small market farmers on both sides of the international border, water managers, the Ktunaxa First Nation and the yaqun nu?kiy in the Creston Valley. I also operationalize the food security definition I develop in Chapter 4 by using it to create a matrix for analyzing my fieldwork data.

The matrix includes only those factors for which I was able to gather data during the course of this dissertation.

In Chapters 6 through 8, I present my research findings, organized on the basis of the food matrix factors. Chapter 6 describes the interaction of industrial food producers with the local, provincial, and national trade economies and provides a discussion on how some of these farmers relate their products to the global market economies of food production. Chapter 7 provides an analysis of local food producers and the relationship their products have to local small market economies within the community and region. Chapter 8 builds upon the findings of these two groups and discusses the food procurement systems of the local yaqan nu?kiy and its relationship within a broader socioeconomic agricultural context within the food security discourse. Information about the impact of the Libby Dam on food security is provided throughout these Chapters, since all groups are affected by the dam and its management regime.

In Chapter 9, my concluding Chapter, I provide answers to my four research questions and compare my findings for each food production group. In order to fully account for policy issues, I develop a slightly modified version of the food security matrix and provide policy recommendations directed towards achieving food security for all Canadians. I conclude with an analysis of gaps in the food security literature and suggestions for further research.

Chapter 2: The Creston Valley

In this Chapter, I provide an historical analysis of food procurement in the Creston Valley as it has occurred over 12,000 years, beginning with a brief description of the environmental history of the region before human occupation. This history includes an account of the Kootenay River which flows through the Creston Valley, followed by a description of the history of the Indigenous Ktunaxa Nation in relation to the Kootenay region, and specifically the adaptation of the yaqun nuʔkiy, a Ktunaxa community to the Creston Valley. After this historical description, I focus on three central issues. First, I provide an analysis of non-Indigenous culture in the Creston Valley, which includes the evolution of diverse expressions of settler society to understand the cultural and socio-economic characteristics of this area. Secondly, I address the impact of agricultural development, and thirdly, I explain the relationship of the local agricultural industry to pressing regional and global food-security and food-sovereignty matters since the late nineteenth century. Additionally, I describe the alternative food producers in the Creston Valley and the history of Creston Valley irrigation. Lastly, this Chapter presents an historical analysis of international treaty-making and dam construction in the area, a notable contribution to the large-scale transformations of the Creston Valley floodplain.

The Creston Valley is located in the southeast corner of the most westerly Province of British Columbia, Canada as indicated in Figure 2.1. The Creston Valley is located within the Kootenay region and rests between the Purcell and Selkirk Mountain Ranges in the Central Kootenays. It is located on the Canada – U.S.A. border directly north of the State of Idaho (Creston and District Historical and Museum Society Creston, B.C. 2015).



Figure 2.1 - Map of Creston Valley in Canada. Gifex.com. Image Modified by Author.

The Kootenay River

The Kootenay River is the third largest river within the Columbia Basin in terms of its watershed area, 36,000 km² or 8.96 million acres, or 18,000 square miles (Kootenai River Network 2019).

Beginning and ending its flow in British Columbia, two-thirds of the river or 75 percent of its

watershed area is located within B.C. as shown in Figure 2.2 (Kootenai River Network 2014). Its runoff volume is the second largest of the Columbia River tributaries.



Figure 2.2 - Kootenay River. Shannon used under CC BY-SA 4.0.

The Kootenay arises high in the Canadian Rocky Mountains, just north of Kootenay National Park, approximately 12 kilometers southwest of Lake Louise, Alberta (Thorington et al. 1931). It then flows south over 100 km to Canal Flats, B.C., where it passes near to the source of the Columbia River, only separated by a marshy suburban area of 1.6 kilometers long (Kootenai River Network 2019; Columbia River Treaty Review 2018; Shurts 2012). From Canal Flats, the Columbia River flows north, and the Kootenay River flows south. After the Kootenay River leaves Canal Flats, it flows south along the Rocky Mountain trench into Lake Koocanusa (a combination of the words Kootenay, Canada, and the U.S.A.), which dissects the Canada/U.S. border (Crickmay 1964). Lake Koocanusa is a reservoir formed by the building and impoundment of Libby Dam as part of the 60-year, 1964 Trans-boundary Columbia River Treaty (Shurts 2012). The river then continues south through the U.S. states of Montana and Idaho.

After flowing south in Montana for about 200 km, the river makes a U-shaped arc, entering Idaho and changing its direction to run due north where it flows through the Kootenai River Valley (as known in the U.S.), to Bonner's Ferry, the most southern portion of the Valley. Approximately 30 km later, the river again crosses the Canada/U.S. border at Creston, B.C. The river continues its flow north of the geopolitical border for another 30 km until it reaches its most northern portion of the Creston Valley (as known in Canada). The Kootenay River then empties into the southern portion of the glacial Kootenay Lake before leaving a centrally located western arm to continue its westerly journey until it merges 30 km later with the Columbia River at Brilliant, B.C., located just north of Castlegar (Coleman 2013). The Columbia then begins its journey to its mouth at Astoria, Oregon (Dietrich 1995).

Due to the Kootenay River's primary water source located within 250 km of the Continental Divide Range, and the abundant amount of snowfall each year, the Creston Valley

has a moist climate with warm, wet air masses bringing roughly 80 to 120 inches of rain annually (Nolin et al. 2012). However, due to climate change, its lush and pristine growing environment is susceptible to changes in snowpack and water flow, creating an uncertain future for food producers in the Columbia River Basin (Nolin et al. 2012).

Ktunaxa Territory

Located in a multitude of vast and divergent terrains of forested areas, rolling mountains, and many watersheds, the various environments, and ecosystems provide abundant game and fish, allowing the Ktunaxa to have subsisted as hunters and fishers for as many as 12,000 years ybp (Choquette 2007, 1973, 2007; Kootenai Culture Committee Confederated Salish and Kootenai Tribes⁴ 2019). Commissioned by the Ktunaxa/Kinbasket Treaty Council, archeological analyses conducted by Dr. Wayne Choquette in 1972, 1973, and 2007 strongly suggests that large swathes of land within the traditional Ktunaxa area are sites of the significant discovery of human habitation since the last great ice age around 11,000-8,000 years before present (BCE). This discovery is evidenced by large quantities of spear points found above Kootenay Lake on the Purcell Trench side, otherwise known as the easterly side of the lake (Choquette 1972; 1973; 2007).

The Ktunaxa Territory can be defined by three central physiographic regions running north to south: The Rocky Mountains to the East, The Rocky Mountain Trench designated as the East Kootenays, and the Purcell Mountains on the Eastern side of the Creston Valley as indicated in Figure 2.3 (Mah 1997).

⁴ In Canada, some Indigenous People use Tribe as a way to refer to themselves such as the Blood Tribe or Tribal Police. These are acceptable uses. In the United States among Indigenous People, Tribe is an accepted term and used as a proper name.

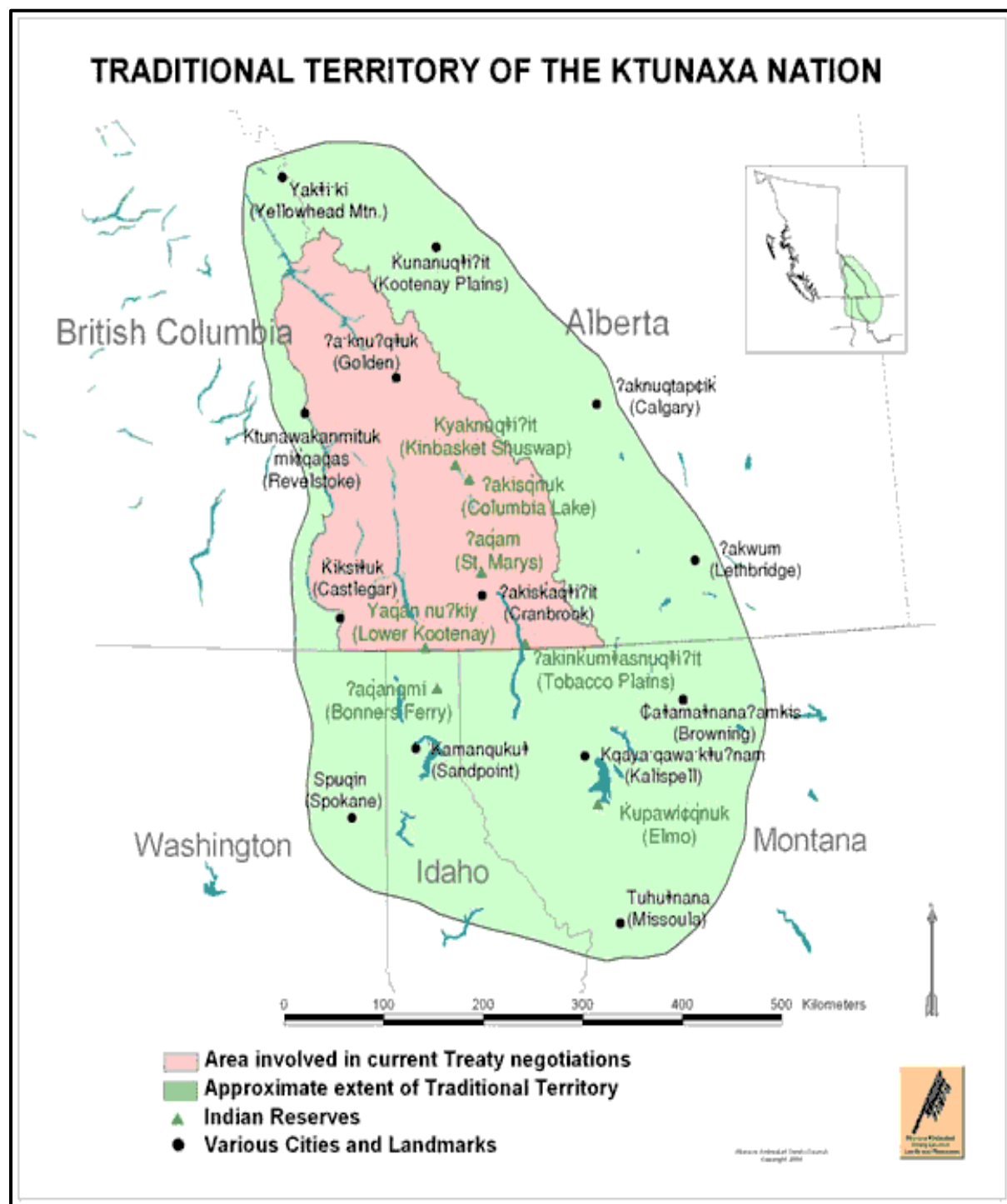


Figure 2.3 - Traditional Ktunaxa Territory. Ktunaxa Nation 2019 (permission granted).

To the south, the Ktunaxa traditional territory includes Missoula, Montana and to the north, Yellowhead Mountain. The Ktunaxa Nation is comprised of four British Columbia Nations and two United States Nations. They are:

ʔakisq̓nuk – Columbia Lake Nation (Windermere, B.C., Canada)

ʔaq̓am – St. Mary's Nation (Cranbrook, B.C., Canada)

ʔakink̓umʔasnuq̓iʔit – Tobacco Plains Nation (Grasmere, B.C., Canada)

yaqan nuʔkiy – Lower Kootenay Nation (Creston, B.C., Canada)

ʔaq̓anq̓mi – Kootenai Tribe of Idaho (Bonners Ferry, Idaho, U.S.A.)

k̓upawiçq̓nuk – Ksanka Band (Elmo, Montana, U.S.A.)

The Ktunaxa are a hunting-gathering group who followed a subsistence way of life, managing their resources through an intricate and intimate knowledge of game animals, fish, and waterfowl as well as over two hundred species of plant resources including berries and roots. This way of life also included the dominant subsistence of the bison hunt on the Plains (Mah 1997). The adaptation to the environment created cultures that were predicated on seasonal and unpredictable food supplies. The migratory food routes created were traveled extensively in these areas.

Several theories exist as to the fluidity of the first occupation of this land as espoused by Baker (1955); Brunton (1998a, b); Choquette (1973, 2007) and possibly cohabitation with other distinct First People such as the coastal Salishans who moved into the northern Plateau from the Fraser Delta sometime after the Columbia Plateau people inhabited the area. It is possible that the culturally distinct Sahaptins from the now geopolitical areas of Northern Idaho, Washington

State, and Oregon had already traveled these areas prior to the Columbia Plateau people however the Salishan and the Sahaptian groups differed in culture and language from the linguistically distinct Ktunaxa whose language is considered an isolate (Kinkade et al. 1998; Language Map of British Columbia 2019; Walker 1998).

Still, some members of the Bonners Ferry Kutenai (U.S. spelling), just south of the U.S./Canada border from Creston into Idaho, say that the Kutenai had originated on the Great Plains, slowly moving westward into the present Ktunaxa Territory (Turney-High 1941).⁵ However, it is generally theorized that the Upper Kootenai (as defined by the area of the Kootenay River Headwaters near present-day Fairmont, B.C., and as referred to by Turney-High [1941]), was the original Kutenai area and migration occurred westward into the lower Kootenay Valley (as defined by the downstream reaches of the Kootenay River in the Creston Valley). Distinctly then, the Upper Kutenai took full advantage of a wide range of floral and faunal environments including fishing and berry picking while the Plains' tribes (Bennett 1969; Boas 1918) relied heavily on the bison hunt (Mah 1997).

Many ongoing contestations have arisen in recent decades because of encroachment by resort and extractive resource industries into these Ktunaxa areas, not only in the Purcell Mountain ranges but also the Selkirk Ranges along the western shores of the Kootenay Lake. These areas contain significant artifacts that attest to the Ktunaxa being the first people to inhabit this area (Choquette 2007). Large flake blanks, side scrapers, and spear points are found in abundance, exemplifying the cultural ties of the Ktunaxa to the Great Basin and eastern slope of

⁵ Ktunaxa is the traditional Indigenous Nation name and the anglicized name is Kootenay. I have used the original names and spelling as sourced in my references. The Canadian spelling is Kootenay while the U.S. spelling is Kootenai.

the Purcell Mountains. Lakeside camps, summertime hunting, gathering, and quarrying in this area are a testament to the Ktunaxa people who have lived in this area (Choquette 2007).

Furthermore, the multivalence of artifacts and rock paintings that were found in and around Creston, northern Idaho, Libby, Montana, and the northern arm of the Kootenay Lake infer that these were important Indigenous seasonal areas where aquatic resources and riparian habitats supported Ktunaxa populations' subsistence routes (Choquette 2007). Along the Kootenay River and its tributaries, from the U-shaped arc in Libby, Montana, all the way to the northern arm of Kootenay Lake, projectile points are associated with the use of canoes (Choquette 2007). The seasonal round of the Ktunaxa consisted of wintering at the southern end of the Purcell Mountains and summering on the salmon fishery at the falls along the lower Kootenay River. This seasonal movement is evidenced by the location of tools at various points along the Kootenay River, together with the climatic conditions and fauna of the area. The tools along the Kootenay River point to the importance of water travel as a practical and substantial mode of transportation. In late fall, before returning to the winter locations, a trip to the quarries at the north arm of Kootenay Lake would provide sufficient and abundant materials for hunting and gathering. The east side of Kootenay Lake was also used as a hunting site during this time (Choquette 2007).

Sites of fishing, especially for the Lower Ktunaxa around the European communities of Creston and Bonners Ferry became evermore important as climatic shifts occurred within the last 5,000 years (Brunton 1998a, 1998b; Choquette 2007; MacDowell 2012; Schaeffer 1940; Walker and Sprague 1998). Main tributaries of the Kootenay River, the Lardeau, Duncan, and Goat Rivers, among others, provided an abundance of fish that were able to sustain the Ktunaxa for thousands of years (Choquette 2007, Walker and Sprague 1998). Approximately mid-nineteenth

century, the Kootenai fished their traditional sites for infinite numbers of salmon, white sturgeon, suckers, whitefish, and trout caught in wicker weirs and basket traps (Brunton 1998a, 1998b; Schaeffer 1940).

The Kootenay Lake contained high quantities of the iconic land-locked salmon (Baillie-Grohman 1884, 1900, 1918). The Arrow Lakes area traditionally inhabited by the Salish speaking Sinixt in the Western Kootenays were also sites of winter pit house villages that have been dated to about 4,000 and 2,500 years ago (Choquette 2007). These sites coincide with high numbers of salmon within the upper Columbia drainage area for 6,000 years but declined about 2,500 years ago due to further climatic changes (Choquette 2007). Bird hunting for cranes, ducks, seagulls, fool hens, and geese were also essential sources of food for the Lower Ktunaxa, and in the late summer, women would gather chokecherries, red currants, gooseberries, Oregon grapes, raspberries, and huckleberries as well as onion, pinenuts, and tree lichen. Medicinal plants included mullein (introduced in the 18th century) and willow bark (Brunton 1998a, 1998b).

The well-documented landscape burning corroborates with evidence of the abundance of food available to the Ktunaxa. Landscape burning extended the growing season of plants; encouraged the growth of essential foods and medicinal plants; encouraged the forage species that attracted game; and diverted game. Moreover, it improved management of crops for harvesting, cleared grass and brush for acorns; fireproofed areas; collected insects for food; managed pests; cleared areas for travel; felled trees; cleared riparian areas for growth of grasses and tree sprouts; and, protected the Ktunaxa from enemies (Mah 1997).

The Upper Ktunaxa areas along the western flanks of the Rocky Mountain Trench were sites of prolific numbers of big game animals such as caribou, mountain goat, deer, elk, antelope, caribou, moose, and bison. The bison was exceptionally notable on the Plains (Brunton 1998a,

1998b; Schaeffer 1940). The Upper Ktunaxa also caught beaver, muskrats, mountain goats, gopher, bear, lynx, and wolf, which provided food and material for clothing. As one of the earliest settlers to the area, William-Adolph Baillie-Grohman (1884) described how the Ktunaxa subsisted entirely upon game, fish, and berries. The Kootenai may have been involved in enemy warfare with the Blackfoot precisely because of the abundant game, and their heavily guarded rights to hunting sites (Brunton 1998a, 1998b). Turney-High (1941) describes the introduction of the horse by acquisition from the Cree when they first began trading muskets and tobacco. According to Walker and Sprague (1998), the horse came up through New Mexico, U.S.A., soon after it was reintroduced into the Americas when Cortez came from Spain in 1519.

The abundant supply of qualitative archaeological data indicates that the Ktunaxa were, and continue to be, the first Indigenous People in this area, providing evidence for the continuing and original presence and occupation of the Ktunaxa. Not only are quantitative sources available but so too are qualitative sources provided through ongoing origin stories passed down through the millennia by traditional oral tradition. Traditional stories provide a historical and spiritual connection to the land that the Ktunaxa have depended on for a way of life, and for life itself.

As European values encroached upon the traditional cultures of First People in this area, the social structures of their societies began to change forever. The devastating effects of epidemic disease, colonization, broken treaty promises, religious conversion, cultural genocide, and devastation of nature and food systems had never been experienced on this scale before (Cannon and Sunseri 2011). These forces radically altered the subsistence patterns of the Indigenous People in the area and set in motion historical processes seen today in how people of this region grow and obtain food (Morrison 2011).

The yaqan nu?kiy Lower Kootenay First Nation

The Ktunaxa people of the Creston Valley, the Lower Kootenay First Nation, or yaqan nu?kiy, or yaqan nu?kiy nation, were the first to adapt to navigating the unique reedy waters of the Kootenay river. Literally meaning “where the rock stands” their name refers to an important place in the Creston Valley (Lower Kootenay Band: Community Constitution 2013). The yaqan nu?kiy historically ate wild game, especially deer, balanced with fish and waterfowl, and supplemented their diet with berries and roots (yaqan nu?kiy 2019). The most sought-after fish species included trout, kokanee, bull trout, burbot, and sturgeon. The Ktunaxa altered their environment, as Mah (1997) explains, by traditional burning of grasses to improve the soils so that other plants could grow (Mah 1997). Nevertheless, fire burning methods were never as destructive as the transformations to the landscape that came later through the industrialization of agriculture. The traditional burning methods did not interfere with the natural ecosystem, ecological communities of fish and wildlife, and pristine waters that flowed in this area. Instead, the yaqan nu?kiy lived holistically with nature, never seeing the need to acquire surplus resources, and leaving the ecosystem more or less intact.

The Kootenay River once had large numbers of anadromous fish which were harvested respectfully and sustainably by Indigenous people for thousands of years. Habitats that independently supported these ecosystems for generations have been altered, endangered, and in some cases, even eliminated due to dam construction. Fish passages that were once able to be used by spawning fish returning from the ocean to their hatching sites deep in the interior of the Columbia River were destroyed, thus decimating a whole sustainable food source. Reliance on this once abundant food source is now replaced by the firmly entrenched, neoliberal, industrialized food system (Beuchelt and Virchow 2012; yaqan nu?kiy 2019). Rituals for the

arrival, harvesting, and preparing the fish was embodied spiritually, physically, and culturally within the family and community. When families were together, the passing down of oral histories and knowledge was transferred from fathers to sons, mothers to daughters. The cultural traditions and transference of traditional knowledge systems continue to decrease when fish populations are decimated. Fish is now stocked in the lakes, which is mainly done to provide for the sport and tourist, fly fishing industry.

In 2019 the population of the yaqun nuʔkiy in the Creston Valley was 246 persons; 112 on reserve⁶ and 122 off reserve; and 12 other registered persons on other reserves (Government of Canada 2019a). Figure 2.4 indicates the eight yaqun nuʔkiy reserves along the Kootenay River where over 6,063 acres (2,453.80 hectares) stretch from Wyndell in the north down to the U.S.A. border in the southern part of the Valley (Government of Canada 2019b). Of these 6,000 acres, 4,000 are comprised of some of the most fertile farmland in southern B.C. (yaqun nuʔkiy 2019)

⁶ A Reserve is a tract of Crown land which is not owned but set aside for the use of a First Nations Community.



Figure 2.4 - Map of the Creston Valley with Indian Reserves Indicated. British Columbia Data Catalogue Map iMapBC (permission granted).

The Ktunaxa Nation is now engaged in self-government treaty negotiations with the B.C. and Canadian governments, advocating for their right to manage land, water, and natural resources in their traditional territory, which includes much of the Columbia River Basin (yaqun nu?kiy 2019). The Ktunaxa, in partnership with the Sylix and Secwepemc Nations, released a public statement announcing their intention to also open negotiations on the Columbia River Treaty in 2014 (ACT 2019). Their main goals are to highlight the historical significance of salmon to their culture and way of life and to restore salmon and traditional salmon fisheries on the Kootenay River through treaty re-negotiations and beyond (Pearson 2012). As the only First Nation groups within the Canadian portion of the Columbia River Basin to have negotiating rights, the three Indigenous Nations' contributions and goals could have a significant influence in the negotiating process.

Since the original treaty ratification in 1964 and the subsequent construction of several large dams near the U.S. border, salmon south of the Grand Coulee Dam have not been able to return to the B.C. portion of the river, with great detriment to the traditional Indigenous way of life and the river ecosystem. On May 17, 2018, Global Affairs Canada announced that the Ktunaxa, Secwepemc, and Sylix Nations were excluded from directly participating in current Columbia River Treaty negotiations, proving once again, that Indigenous people continue to be systematically marginalized and excluded from reconciliation and land treaty initiatives (McLash 2018)⁷.

⁷ On April 26, 2019 Global Affairs Canada announced that the Columbia River Basin Indigenous Nations – Sylix, Secwepemc, Ktunaxa - would be included with “observer” status only in Columbia River Treaty negotiations (Government of Canada 2019c).

History of Settler Agriculture

First Settlers

In June of 1807, David Thompson, the chief geographer for the Hudson Bay Company, crossed the Rockies over Kootenai House Pass at the headwaters of the Columbia River and canoed down to present day Fairmont Hot Springs, setting up Kootenae House (Nesbit 1994). David Thompson called present-day Canal Flats, McGillivray's Portage, after his partners William and Duncan McGillivray. The following year, in May of 1808, Thompson paddled down the Kootenay River into the Creston Valley where he was greeted by the Ktunaxa (The Creston Museum 2014). Other explorers followed in search of rich minerals lining the mountains surrounding Kootenay Lake. In 1865, this area again encountered significant change when the Dewdney Trail (now called the Crowsnest Highway) was blazed from the Lower Mainland Vancouver, B.C., and where Highway Three is now located to the southeast corner of the province (Merriam 1989). Undoubtedly, this was the first European attempt to develop and modernize the Creston Valley, and arguably communities in the Creston Valley were more profoundly affected than any of the other towns or villages along this trail.

In 1882 William Adolph Baillie-Grohman, a British-Austrian entrepreneur, adventurer, and settler attempted to reclaim 35,000 acres of the Creston Valley floodplain by building a canal between the Kootenay and Columbia Rivers at Canal Flats, B.C. to divert the flow of the Kootenay River into the Columbia and thus eliminating southerly water flows into the lower reaches of the Kootenay River Basin (Welwood 2003). His motive was to be able to create a fertile agricultural plain at Creston for farmers and settlers working in the mining industry and to resell these lands (Baillie-Grohman 1900, 1918; Jordan 1956; Kluckner 2005). The idea of a canal in this location was first conceived some 20 years earlier around 1862 by a group of

twenty-5 men who also wanted to drain the Kootenay River so that they could pan for gold (Jordan 1956). Baillie-Grohman (1918) also dredged the narrow opening on the west side of Kootenay Lake, now called Grohman Narrows, to alleviate the water pressure on the flats by increasing the flow of water through Kootenay Lake and into the confluence of the Columbia and Kootenay Rivers at Castlegar, B.C. (Jordan 1956; Kluckner 2005). Although the canal finished at Canal Flats, Baillie-Grohman quickly abandoned the project due to pressure by settler farmers along the Kinbasket Lake region who realized that higher lake levels from the canal itself along with mountainous glacier run-off into the lake, would cause flooding on their farms and acreages (Kluckner 2005).

Baillie-Grohman hoped to engineer the type of hydraulic society described by environmental historian Donald Worster in his book *Rivers of Empire* (1985). Worster (1985, 1993) compared the development of the American West, shaped by the technological mastery of water and the social transformations that followed on that technology, to the ancient hydraulic civilizations of Egypt and Mesopotamia described by Wittfogel (Wittfogel 1957, 1971). Although Worster's (1985, 1993) research site is within the Great California Basin, the Creston Valley Floodplain, on a smaller scale, is not unlike that which Worster discusses.

Early settlers, beginning with Baillie-Grohman, have sought to overcome the challenges of their environments through technological means. Thereby they created the large social organizations that we see today on the Kootenay River: the entities that control the water flow from Libby Dam; the various diking districts that maintain the infrastructures necessary to control the water for the agriculturalists; and the hydropower corporations. The Creston Valley Floodplain is exemplary of Worster's (1985, 1993) phenomenon of dynamic, scalar shifts to the environment and the inexorable, social processes that organize and control it. Worster's (1985)

thesis further articulates the neo-liberal mindset of the current government, which seeks to develop the floodplain through agro and hydro technology initiatives and projects.

The Dewdney Trail, constructed in 1865, allowed the earliest settlers from the Pacific to begin farming, mining, and logging in the province (Merriam 1989). After unsuccessful attempts at discovering gold, many prospectors settled in the area. Mr. John C. Rykerts was the first European settler to build his homestead in present-day Porthill, at the U.S. border, where he set up the first customs and immigration office in 1883 (The Creston Museum 2014).

As settlers expanded into this area, so did their subsistence patterns (Murton 2002, 2007). Settlers attempted to live off the land using European agricultural systems but soon realized that additional land needed to be cleared in some areas, and that fertile Valley bottom soil would be essential to growing wheat, and grasses for milk and beef cattle (Murton 2007). Dikes, therefore, became a necessity along the Kootenay River floodplain. In 1891 at the southern end of the Creston Valley, in an attempt to till land for farming, “Reclamation Farm⁸” was established by the Alberta-BC Exploration Company, which took over from William-Adolph Baillie-Grohman who by now had returned to England (Bowden 1971; Creston and District Historical Museum Society 2015; Kluckner 2005).

At the southern end of Reclamation Farm, the first manipulations of the Kootenay River began in earnest in 1893, where 7,700 acres of the sediment-rich, alluvial floodplain was diked by the Alberta and British Columbia Exploration Company (Creston and District Society 2015). However, due to a massive flood that struck in 1894, the dikes failed, and this “ideal” agricultural setting was entirely flooded. Some crops in some parts of Reclamation Farm did

⁸ Reclamation is a term used in 1891 by local colonial settlers and does not represent current language

survive the flooding of 1894 up until at least 1935 when diking was finally completed. The area where Reclamation Farm was located is now The Reclamation Diking District.

Again in 1894 the company was issued a Crown grant for this area, and the first farmhouse - Reclamation Farmhouse - on the flats was built in the 1890s, possibly as early as 1892 as a residence for the farm owners and farm hands (private conversation with Tammy Hardwick, Manager Creston and District Historical Museum Society 2015). This house changed hands many times throughout the years indicating that some settlers carried on farming in the Valley bottom, but it was finally torn down in 1947 as repeated flooding all but destroyed the house (private conversation with Tammy Hardwick, Manager Creston and District Museum Society 2015).

In 1895 the Great Northern Railway built a spur line from Bonner's Ferry, Idaho through to Kooskanook on the East side of Kootenay Lake, where minerals would be shipped, and passengers could travel via the many steam-boat paddle-wheelers that now plied the waters. Three years later, in 1898, the Canadian Pacific Railway built its extension line along what is now the Crowsnest Pass (Hwy 3) (Merriam 1989). Interestingly, just as quickly as transportation developed, so too did it come to an end; all steam-boats would be retired by 1910 (The Creston Museum 2014).

Early Farmers

By the early twentieth century, national and international market economies were already exerting a strong influence over agricultural development in Western Canada, as described by Bennett (1969) in his account of Jasper, Alberta. As in the case of Jasper, export markets became

part of “the total ecological system” (97) in the Creston Valley from early on and are firmly embedded in the economic landscape, both socially and culturally.

Early settlers used steamships as well as roads, on Kootenay Lake as well as other waterways, to transport the produce grown in the Valley. In 1901 the first apple trees were planted, and in 1908 the first Fall Fair was held, and the first Board of Trade was established. By 1906 Crown land was being auctioned for \$20 - \$150 per acre most notably on the eastern side of the Valley on the benches in an area called Lister Camp about five miles south of the Creston townsite (Wallach 1988:27). The camp was named after Colonel Robert Lister who was put in charge of the veteran’s settlement scheme to “encourage agricultural settlement” which existed within a larger scheme to expand the “great west” (Murton 2007: xxi). At this time, there were about 200, 40-acre lots covering an area of approximately 8,000 acres (Bealby 1911; The Creston Museum 2014; Wallach 1988:27).

The growing influence of the market economy also had profound federal influences which precipitated the growth in the Creston Valley. Bennett (1969) explains that Clifford Sifton, Minister of the Interior, began the great “colonization experiment” of the western Prairie Provinces (103). This experiment also included parts of the British Columbia Interior to which Doukhobors were brought from the Ukraine and Russia (Cran 2006; Makortoff) where the environment was similar to British Columbia (Bennett 1969). The settlers left families behind to come and settle the land first, bringing their families when the farms were ready to be occupied. They would clear half the land for fruit trees and the other half for the homestead. Wells were dug, and mostly apples were grown (Wallach 1988). The Camp Lister scheme failed drastically as no one considered the cold winds that the Goat River Canyon carries when they enter the Valley from the Purcells, spreading not northward to Creston, but southward to Lister directly

towards the 200 orchards in Old Lister (Wallach 1988:27). By 1988 no orchards existed in Lister, though about 1,500 acres were in production in other parts of the Valley (Wallach 1988:27).

By 1915, agriculture was well developed. The small hamlet of Wynndel earned the title “Strawberry Capital of the World” with over 17,000 cases of strawberries being grown each year and distributed to the far reaches of the United States (Creston and District Historical and Museum Society 2015). There were also approximately 1500 cattle and 300 horses in the Valley during this time, indicating growth in this sector and over 2500 tons of hay was grown every year. With such agricultural growth and economic development, Creston received a Village Charter and was incorporated in May 1924 (The Creston Museum 2014). Along with this growth, water infrastructures were necessary both on the flats and on the benches. First-in-time, first-in-right water systems were put in place, where the first farmer on the land had the first right to the water. According to interviews with Creston farmers in 2013, irrigation districts formed in the early settlement period where sometimes only two or three farming families used the available well water and irrigation infrastructure. Perhaps because of the organization of water districts, one crop that eventually did quite well in this area and continues to be important to this day is alfalfa (Wallach 1988). In 1927 1800 tons of alfalfa were produced on the Kootenay Flats (Creston and District Historical Society Creston 2015).

In 1925, 50 million acres of arable land existed in the Province of B.C., half of which was fit for raising livestock and the other half for specialized farming, specific to the local soil and weather conditions. About two million acres were used for growing fruit (Lee 1925). As Lee (1925) points out, B.C. agriculture was a vital industry at the time, producing \$59,159,798 worth of farming dollars in 1923 (Lee 1925:4). At this same time, only 12.7 percent of the population

was engaged in agriculture (Lee 1925). The following Table 2.1 shows the value of net production:

Table 2.1 – B.C. Industry Sector Comparison (Lee 1925).

Sector	Values of Net Production
Forestry	37.9 %
Agriculture	17.8 %
Mining	17.2 %
Fisheries	9.8 %

Transportation considerably changed the organization of farming, including the ability to transport surpluses to market. The high cost of producing food and the ease of transportation made it necessary to produce for the market rather than just producing enough for the family. As Bennett (1969) explains, agriculture, like any other market economy, is capitalist and based on the institutions of private property, and private entrepreneurship. Just as in Bennett's (1969) Jasper, Creston's farming ventures, from the outset, were owned and operated by families who had clear title to their land and holdings, which allowed them to have secure income under a stable government in a free market economy. The entry into more commercial and industrial modes of operation was one of the most notable changes that contributed to food production in the Creston Valley and in North America in general.

The next decade saw much agricultural activity and development in the Creston Valley and by 1935 the Creston Valley Flats were finally reclaimed from the annual flooding. Both the Kootenay and Goat Rivers were diked, echoing Richard White's argument in *The Organic Machine* (1995) that it is work that most fully connects Europeans to nature (White 1995). White (1995) states, the general philosophy of pre-WWII society was shaped by the idea that modern technological inventions or machines controlled nature. In this way, for example, the damming

of the Kootenay River for agriculture and electricity made it part of a unified whole comprised of nature and machine – an “organic machine” (White 1995). In this sense, according to Europeans, nature was improved to this higher state of techno-modernism and development. White’s (1995) ideas were instrumental in British Columbia from 1910 to the 1920s in developing the Creston Valley. In the 1930s and 1940s, the flats were reclaimed and diked, and the subsequent control of the Kootenay River enabled the cultivation of 165,000 bushels of wheat. As agriculture grew, so did modern buildings grow to accommodate its growing crops. The first grain elevator was built in 1935 with a second one following in 1936. Figure 2.5 shows the iconic Creston Valley grain elevators.



Figure 2.5. - Creston Valley Iconic Grain Elevators. Photo by author 2016.

However, in June 1938, flood waters once again destroyed the Creston Valley dikes and flooded 14,500 acres of reclaimed grain land which prompted local farmers to construct further

mazes of channels and dikes that provided transport in all directions (The Creston Museum 2014). The rebuilding of the dikes cost \$150,000 but was considered essential enough to justify the expenditure in 1938. This decision stands in stark contrast to the present British Columbia government, which ignores dike maintenance and relegates the issue to the margins of most conferences and discussion panels that I attended. In today's resource extractive economy, Creston Valley is insignificant compared to the far more lucrative deals taking place in the liquid natural gas projects dotting the province.

Agriculture continued to proliferate after the dike repairs, and in 1940, a creamery was built, and the Future Farmers of Canada in the Creston Valley was formed (Connors 2013; The Creston Valley Museum 2014). Agriculture expanded inexorably into the mid-1940s, and agricultural labour shortages occurred when a plant to process peas was opened in 1941 (The Creston Museum 2014). In 1946, the area of Creston, Erickson and Canyon districts comprised roughly 311 square km and was serviced by the Trans-Canada Highway Number 3 (Crow's Nest Pass) and the Kettle Valley branch of the Canadian Pacific Railway.

A survey conducted in 1946 and 1947 by the Economics Division, Dominion Department of Agriculture, the British Columbia Department of Lands and the Department of Agricultural Economics, University of British Columbia revealed that approximately 132 farms existed at this time in the Creston area (Blair 1949; Wallach 1988). The total arable land was 70,000 acres; 40,000 acres – a little over half of all arable land - being in the Kootenay River Flats and 30,000 acres in Creston, Erickson, and Lister, with an additional 1,000 acres in Wynndel and Alice Siding on the slopes of Goat Mountain for a total of 71,000 acres. About 30 percent of this land was under cultivation (Blair 1949). The following districts were producing various crops, shown in table 2.2 - Districts and Crops Produced within the Creston Valley in 1946.

Table 2.2 - Districts and Crops Produced within the Creston Valley in 1946.

District	Acreages	Crop
Creston and Erickson	2,000 acres under cultivation	Delicious, McIntosh, Wealthy apples, Bartlett pears, Bing and Lambert cherries, Italian prunes. Irrigated.
The Flats	17,200 acres of reclaimed land	Wheat, oats, barley. No houses, few farm buildings, few farms and large in size. Floods occurred in 1930, 1932, 1938, and 1948.
Wynndel		Strawberries, raspberries, currants, flowers and bulbs. Abundant water supply.
Canyon		Mainly tree fruit production – see Creston and Erickson. Limited irrigation capacity
Lister		Mixed farming area. High-grade alfalfa. No irrigation. No irrigation supply.
West Creston		No agricultural development. Some pioneer farms. Steep, rugged, and forested area.

As indicated by Table 2.2, the majority of tree fruit farms were in Creston, Erickson, and Canyon on the elevated benchlands. Most of the small fruits were grown in the Wynndel district while about 60 percent of the mixed farms were in the Lister area.

Table 2.3 – Crops and Acreages – Creston Valley – 1946 (Blair 1949).

Crops	Acres
Reclaimed land (mostly grain)	17,200 acres
Mixed Farming	2,500 acres
Tree Fruits	1,900 acres
Small fruits	150 acres
Other	49,250 acres
TOTAL Arable Land	71,000 acres

As shown in Table 2.3, at this time, of the 132 farms, roughly a little over half of the land was improved equally amongst the five farm groups and the little hay produced was not sold commercially (Blair 1949). Orchardists had the highest gross annual income of all farm groups

earning roughly \$1,418 (Blair 1949). At this time Lister area had the potential to increase its improved acreage and was being cleared by the Provincial Land Clearing Units. There was also at this time, a proposal to reclaim Duck Lake, which would bring 22,000 acres of land into use (Blair 1949). Presently, occupying this same area is 17,000 acres of ecosystem reserve which is managed by Ducks Unlimited (Dance 2015).

During 1949, immigration numbers increased in Canada by 58.6 percent, and from 1947 to 1948, the Creston Valley population increased from 79,194 to 125,603 (Blair 1949). As Table 2.4 indicates, agriculture was by far the largest sector for incoming persons with a significant number of immigrants coming from traditional horticultural backgrounds, bringing this knowledge with them into Canada, and undoubtedly into the Creston Valley (Blair 1949).⁹

Table 2.4 – Demographic Information for Immigrants to the Creston Valley, 1947 – 1949 (Blair 1949).

Origin	Numbers	Numbers
Great Britain	40,015 persons	
United States	7,306 persons	
Northern Europe	18,450 persons	
Holland	(9,866 persons)	(7,000 persons)
Others (mostly Polish and Ukrainians)	59,832	

In 1950 572 ha were devoted to tree fruits bearing 5,055,400 kg of fruit, while 29 ha were listed as residential usage and 154 ha was classified as miscellaneous in Creston (Murphy 1983).

In comparison, by 1980 approximately 336 ha produced 3,995,500 kg of fruit where 97 percent of the fruit packed at the cooperative were apples possibly indicating that more acreage was devoted to growing cherries, peaches, and pears (Murphy 1983). Other possibilities may

⁹ Note that of the roughly 9,000 Dutch persons, 7,000 were farm families indicating a large body of traditional horticultural methods brought to Canada. Also, as the table indicates, of the roughly 60,000 other immigrants, mostly were Polish and Ukrainian.

include roadside sales and many non-productive trees in the older orchards (Murphy 1983). In 1957 Creston received its first parking meters in 1957, an indication of further growth within the Valley and the future growth of agriculture (Private conversation with Tammy Hardwick 2018).

Economic Diversification and the Decline of Agriculture

Since 1950, a large amount of the agricultural land base in the Creston Valley has been transferred to other uses due to an uncertain market and a decreased rate of return to investment in agriculture (Murphy 1983). Transfers have continued after 1973 despite the implementation of the Agricultural Land Reserve which was intended to protect agricultural land in perpetuity. Competition for land usage has led retiring farmers to convert their land to trailer parks, hobby farms, and subdivisions, as well as other uses that follow on changing socio-economic conditions urban encroachment.

In 1961 the population of the Creston area was approximately 7,990 persons while the village of Creston proper had a population of 2,460 (Sorboe 1967). Of this population, about 570 persons were farmers, and the remainder found employment in the service industries (Sorboe 1967). By 1966 the Village of Creston had grown to 2,850 persons (Sorboe 1967) and became incorporated, an indication of continued growth in the region. Because there is a paucity of historical information regarding the Central Kootenays, where Creston is situated, I rely on information from a Canadian Land Inventory Survey conducted for the East Kootenays in 1966. Despite the scale at which the data was gathered and aggregated, it sheds light on the situation in the Creston Valley at that time, since the same trends were occurring throughout the region. The survey indicated that, by 1966, 40 percent of 124 households “worked only in agriculture,” and 60 percent were non-farm households (Verner and Dickinson 1969).

At this time, 11 percent of the respondents were from the United Kingdom (Verner and Dickinson 1969) indicating the influence of European land settlers in the farming sector in the East Kootenays. Based on my research, conducted in 2013, this figure remains relatively accurate for the Creston Valley, where a similar percentage of the farmers interviewed had familial ties to the UK. Also, at this time, 41 percent of these farmers held other jobs which included carpentry, business management, and equipment operation as was necessary to compete in the market economy (Verner and Dickinson 1969). Over 75 percent of the farmers had been in agriculture for over 20 years whereas only 17 percent of those who held non-farm jobs had held their professions for that length of time (Verner and Dickinson 1969). Of the 75,000 acres of land in the Creston Valley (Sorboe 1967:14), 30,000 acres were surveyed and classified by the Economics Branch of the Canada Department of Agriculture in 1965, as cultivatable land (Sorboe 1967:14). There were dairies on the benchlands and floodplain indicating the presence of cattle, so lands were most likely also used for cattle ranching and included in these statistics.

The Creston Area floodplain at the time of the 1966 survey was comprised of approximately 18,000 acres, with the upper benchlands containing approximately 12,000 acres most suitable for hay, hay-beef, and dairy, while the Indian Reserve, as defined by the Federal Indian Act, held 5,000 acres, 3,000 of which were farmed by the Kootenay Indian Band in the mid-1960s. Figure 2.6 indicates the floodplain in blue while the upper benchlands are indicated in green.

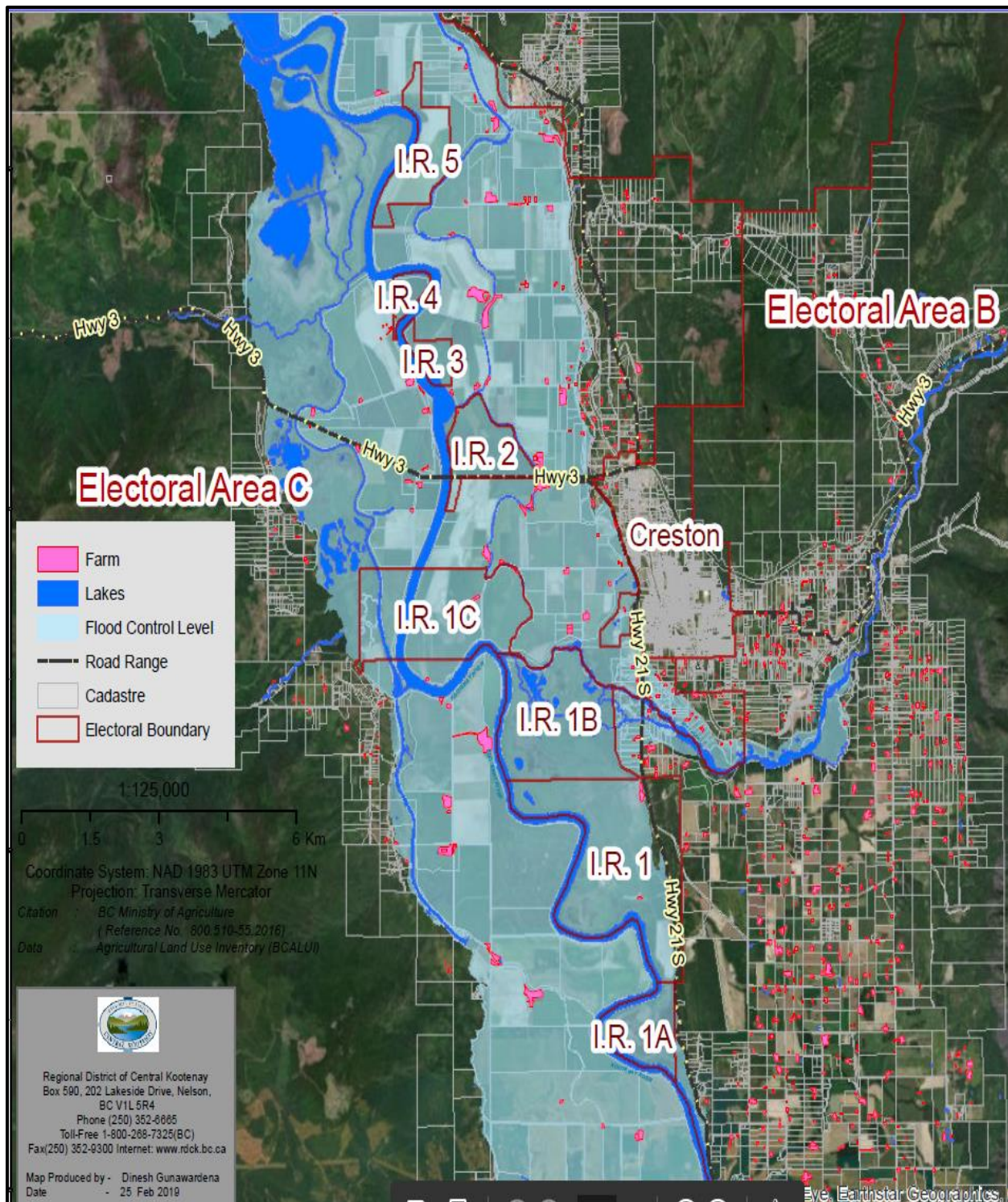


Figure 2.6 – Map of Kootenay Valley and Creston Valley Floodplain. Regional District of Central Kootenay (permission granted).

In addition, two thousand further acres were later reclaimed by Indigenous People for Indian Reserves for the purposes of cultivation. The Upper East Side benchlands are at an elevation of 640 meters (2100 feet) whereas, the Valley bottom is 597 meters (1,959 feet) above sea level where all Indian Land Reserves are located (Wikipedia 2018).

The average income reported by all families, farm, and non-farm in 1965 was \$4,994, whereas farm families averaged \$4,169 per annum with \$5,533 for non-farm families (Verner and Dickinson 1969). Medium gross farm income was \$3,500 - \$5,499 amount with a median net farm income of \$1,000 - \$1,999 (Verner and Dickinson 1969). Higher farm family incomes of above \$9,000 were earned by those families who also supplemented their income with non-farm incomes (Verner and Dickinson 1969). As Table 2.5 indicates, the primary agricultural products at this time were beef cattle – 44 percent, woodlot products – 24 percent, field crops – 18 percent, fruit and vegetables – four percent, dairy – two percent, and other products at eight percent (Verner and Dickinson 1969).

Table 2.5 – Primary Agricultural Products in the East Kootenays, B.C. – 1961 (Verner and Dickson 1969).

Product	Percentage of the chief source of agricultural products
Beef Cattle	44%
Woodlot Products	24%
Field Crops	18%
Fruit and Vegetables	4%
Dairy	2%
Other	8%
TOTAL	100%

This data is representative of the East Kootenays which borders the Central Kootenays and quite closely mirrors the agricultural composition of food products of the Valley bottom of

the Creston Valley today. Farm interviews conducted in 2013, represent this information reasonably, with dairy and cattle situated predominantly in the Valley bottom. Field crops at this time were comprised mainly of wheat, oats, and barley, while hay, seed peas, and potatoes were secondary crops. A few farmers grew both field crops and raised beef cattle (Sorboe 1967). On the benchlands tree fruits – apples, pear, apricots, peaches, prunes, and cherries - were predominantly grown north of the Goat River, where primarily McIntosh and Red Delicious was grown at this time. South of the Goat River, three types of farming existed: hay; hay-beef; and dairy, with all fluid milk shippers located in Lister (Sorboe 1967). Dairy and cattle quickly increased and were prosperous with an estimated 2,000 head of cattle in the area. Of these head of cattle, 600 were milk cows on 17 licensed fluid milk farms (Sorboe 1967).

As indicated by Sorboe (1967), the trend during the 1960s was towards part-time farming partly because of the demand for home sites and the rising cost of living. Coupled with the booming logging and lumber industry along with a new brewery in Creston, people were moving to the labor industry where they could earn higher wages. The labour industry was growing, accompanied by an increase in specialization and financialization of operations, an increasing dependence on chemical fertilizers, pesticides, and herbicides, and an increase in the acquisition of sizeable industrialized farm equipment. Alongside this mechanisation, the area witnessed urbanization and the increasing expansion of the suburbs into farmlands, creating the impetus for the creation of the Agricultural Land Reserve in the next decade. Since cultivation of land was no longer dependent on laborious hand-methods of sowing, many orchardists began to subdivide their land which freed up their time to make themselves more available in the labour sector. This trend was coupled with decreasing land availability for farming, also enabling them to spend more time outside of farming (Sorboe 1967). Presently, however, many smaller, more diversified

farms are growing in numbers in the Central Kootenay Region while continued economic and political forces are placing pressure for land development for profit. Real estate values of agricultural land are already predicted to skyrocket in many locations throughout the province and particularly in the Creston Valley - an area which provides a critical agricultural land base for West Kootenay residents and an important economic driver of the region's food system.

According to interviewees, agricultural extension agents employed by the provincial government were plentiful in the area during the 1960s, but these services were privatized since. At one time, farmers were able to receive advice and support from provincial representatives and management programs, whereas now farmers can obtain information only from their chemical suppliers (Interviews with Creston Valley farmers 2013). Thus, Creston farmers have become even more firmly entrenched within a network of capitalist agricultural economies and institutions within the broader North American agrarian economy (Bennett 1969; Creston Valley interviews 2013). Agriculture became commoditized and financialized with the reshaping of the province and decreasing support for agriculture. In fact, in 1983, 190 fewer hectares classified as agricultural land existed since 1950, and a further 150 ha sit idle (Murphy 1983). Furthermore, by 1980, 33 percent of the 1950 land base was out of orchard production, and 306 acres was used for residential development (Murphy 1983).

Today much of Canada's food comes from other sources outside of local food procurement systems. For example, more than half of all food (57 percent) is imported from the US, and likewise, almost 45 percent of domestic food is exported (Qualman 2011:21). In B.C., there has been a significant shift of food grown for export markets, most notably greenhouse vegetables and blueberries (Wittman and Barbolet 2011:191). This increase has come at the expense of staple fruits and vegetables, while the volume of wine grapes continue to grow

sharply alongside dairy products and grain production (Wittman and Barbolet 2011:191). Brynne (2011) also reminds us that in the Creston Valley, 95 percent of food is exported, creating a varied landscape of food production for export at the expense of locally grown food for local consumption.

Alternative Food Producers in the Creston Valley

Although food production in the Creston Valley is dominated by extensive industrial agricultural¹⁰ and commercial methods of cultivation, several alternatives¹¹ to this industrial system are present and growing in numbers. Most importantly, for this study, they include a vibrant network of small-scale farms producing food mainly for local markets. Defying the use of fertilizers, pesticides, and specialized farm equipment, this movement to a more holistic, sustainable style of gardening is visible especially on Saturday mornings at the Creston Valley Farmer's Market and the multitude of roadside fruit and vegetable stands that dot the highways coming into Creston during the spring to late fall months. Historically, alternative farming methods were pursued by small communities of Mormon, Mennonite, Hutterite and Doukhobor settlers, but the descendants of these groups today are just as likely to be industrial as alternative farmers.

The Creston Valley Food Action Coalition (CVFAC), a non-profit organization, as well as a network of local food producers, agricultural agencies and concerned citizens are “working

¹⁰ My own research together with statistics provided by the Agricultural Land Commission Auditor Everett Lew explains that the farm size data cannot be broken down into each Regional District of Central Kootenay Area A, B, and C and specifically within the Creston Valley – see discussion on page 245.

¹¹ In the Creston Valley market gardeners and alternative farmers are equivalent terms, while market gardeners do position themselves as alternative to industrial farmers.

to create awareness of how we can better feed ourselves through local resources in a sustainable, healthy, secure and environmentally sound way” (Creston Valley Food Action Coalition 2018). A large number of small farms exist in the Valley, and, arguably, many of them contribute to food security in the Creston Valley and the East Kootenays. Most of the food sold at the Saturday morning Farmers’ Market, along with farm-gate sales and shipments going to Nelson, B.C., a Central Kootenay hub for locally produced food, provide a sustainable solution to the ongoing degradation of soils, climate change, deteriorating infrastructure, and burgeoning food prices.

The United Nations Food and Agricultural Organization (UNFAO 2009, 2017a) states that small food producers and family farms contribute to sustainable development through sustainable agriculture and food systems. The multitude of alternative small food producers in the Creston Valley offers a sustainable alternative to the large-scale industrial producers. As an agricultural economist, Jes Weigelt states, sustainable development goals must include “the important role played by small food producers and family farmers in attaining food security and reducing poverty” (UNFAO 2015). More farm dollars are kept locally, making small local farms a viable and sustainable “life-giving alternative” (Wiebe and Wipf 2011:3). In 2006, 77 percent of B.C. farms were less than ten acres, and organic farms comprised 16 percent of B.C. agriculture, the most significant percentage of any province in Canada (Morton 2008) as analyzed by Wittman and Barbolet (2011). The rising demand for local and organic food is supported by neighborhood associations and several innovative municipal and provincial production initiatives who view food as inescapably linked to climate change, energy, and health and nutrition providing the impetus for food sovereignty conversations to take place (Wittman and Barbolet 2011).

An example of a contribution to food security by farmers in the Creston Valley is the Harvest Share Program, which has run since 2008. The share program stands as a testament to the abundance of locally produced food. The Harvest Share Program, sponsored by the Creston Valley Food Action Coalition, attempts to recover, and distribute food that is not economically viable to pick and would otherwise go to waste. The sustainability of this program is in the numbers: in 2014, 38,248 pounds of food were distributed locally by 18 partner organizations who donated 597 hours of their time thereby contributing to reducing food insecurity and increasing food resiliency in vulnerable populations within the Creston Valley (Creston Valley Harvest Share Program 2014). However, despite Creston's growing market for locally produced food, the growth of its Farmers' Markets, and local food movements, only a small percentage of food grown in Creston and B.C. generally is consumed locally (BCFSN 2019).

The Community Supported Agriculture (CSA) program is also thriving in Creston. The first of its kind in Canada, it is a community-based model organized in various regions of B.C. between farmers and shareholders who purchase a share in the early spring when farmer's source of income is lowest, and expenses are highest (Farm Folk City Folk 2018). Shareholders then receive a weekly share of fresh, local, seasonal food. In Creston, there are presently two farmers who belong to the CSA. However, several challenges inhibit the ability of B.C. farmers to meet the growing demand for local foods. Neoliberal policies that purport to foster local food productions through the ALR or the Buy BC Program undermine the ability of farmers to grow food successfully because of land exclusions, trade agreements, and other restrictive policies such as meat inspection regulations (Wittman and Barbolet 2011).

Within this research project, I investigate the food procurement systems of the industrial farmers, small-market gardeners, and the yaqun nu?kiy Nation in relationship to food security

and food sovereignty during the renegotiation of the Columbia River Treaty. After having provided a socio-cultural, economic, and historical context for these three groups, I provide a political ecology theoretical framework in Chapter 3 to understand how the control of water and its various infrastructures have inextricably altered the way in which people procure food along the Creston Valley of B.C.

Chapter 3: Water and Development

This Chapter reviews the most relevant literature and theories on the impacts of dam building and water management on settler development as it has occurred over the last century in British Columbia. Dams built under the terms of the Columbia River Treaty (CRT) inarguably have influenced, defined, shaped, and determined the meaning of food security in the Creston Valley (Bennet 1969; Cosens 2012; Harden 2012; Mouat 2012; Murton 2007; White 1995; Worster 1985, 1993). Paradoxically, one of the CRT dams, the Libby dam, has secured the international Kootenay River floodplain (spelled Kootenai in the U.S.) for agriculture but contributed to new risks as a result of climate change induced flooding (Christenson and Hewitson 2007; Easterling and Apps 2005; Fader et al. 2013; Heckelman and Wittman 2015; Nolin et al. 2012; Ostry et al. 2011; Parry et al. 2005; Rajagopalan 2018; Taylor 2014; Thompson et al. 2003; Tsosie 2007; Weber and Matthews 2008). Although briefly reviewed, the theories contained here reflect my position within the water security discourses which rarely work in isolation but serve to further the debate on the control and demise of traditional food procurement pathways for those who have depended on water security in the region for decades: settler farmers and the Indigenous Ktunaxa people (Galt 2016).

Dam Development

This section draws on the theories of *Rivers of Empire* (Worster 1985, 1993), *The Organic Machine* (White 1995) and *A River Lost* (Harden 1996) which describe the deleterious socio-economic, cultural, and environmental effects that dam building has wrought on the Columbia River. Other theoretical works such as *The Columbia River: Operation under the 1964 treaty* (White 2012) promote the treaty as a legal agreement symbolic of centuries of successful

international relations between the United States and Canada. Depending on which view one takes upon analyzing the positive or negative effects, dams were traditionally a successful technology that had contributed to humankind for centuries. For example, the Sadd-el-Kafara on the eastern shore of the Nile is the oldest, large dam in the world and dates to approximately 2600 BC to 2700 BC (Garbrecht 1997). Nonetheless, the earliest dams allowed civilizations to grow by providing irrigation for agriculture and drinking water, and protected regions from excessive flooding (Garbrecht 1997).

The modern development of large-scale dams and reservoirs, however, has brought a plethora of negative effects that have created socio and ecological damage not only for European settlers but also for Indigenous people who have lived in the area for millennia. Pearson (2012) explains,

dams on the Columbia River...have had a devastating impact, both mental and physical on thousands of River People...caused by loss of nourishment, economic independence, and purpose. Mental and emotional losses were more complicated...(73).

Nevertheless, in terms of flood control and hydropower generation, the Columbia River Treaty has benefited both Canada and the U.S. (Cosens 2012; Lesser 1990). Authors such as Sanderson (2012) will attest to the international cooperation and diplomacy it has afforded the two countries. However, as Worster (1985, 1993), an environmental historian tells us, the harnessing and control of water also involves the creation of bureaucracies that allow particular interests to consolidate and assert power over others. As Andrews (2006) states, in the U.S., in the late nineteenth and beginning in the twentieth century, natural resources were depleted and so reformers at that time created institutions to eradicate corruption and grow a public sector,

deciding that government bureaucracy was the best mechanism for managing environmental and public resources (Weber 1946).

This decision is vital as the great Columbia River flood of 1948 set in motion the justification needed for further dam building by the U.S. federal government in the Columbia River Basin (Harden 1996; Hirt and Sowards 2012; McKinney 2012, 2009; Shurts 2012; White 1995). Like the Sadd-el-Kafara, Worster (1985, 1993) argues that sometimes dam building is a necessary effort for survival. However, at other times, he states, dams are nothing more than the tangible outcome of ambitious individuals who possess an unequal share of power within society (1985, 1993).

The control of water appears innocuous at times, addressing the sporadic nature of flooding which in turn has usually had a negligent impact on the structure of society and power. On the other hand, though, Worster (1985, 1993) claims that it is the pervasive and insidious control of irrigation water that is more socially powerful and corrupt. Unlike flood protection, this type of control inevitably leads to societal reorganization, new patterns of socio-political interaction, and new and intrusive forms of discipline and authority all resulting in a concerted effort to “control and defeat a threat once and for all” (Worster 1985:20). Worster (1985) demonstrates how irrigation societies become dependent on not only water alone but on the manipulations of its flow. The links between water control and the social order are mirrored on the Kootenay River, where the Libby Dam controls its flows for hydropower, flood protection, and fish (Coleman 2013; Worster 1985, 1993).

White’s *Organic Machine* (1995) examines environmental changes along the Columbia River where he describes a history of the development of the Columbia River from a free-flowing river providing an abundance of fish for Native Americans until the complete

restructuring into a giant transportation system (37) and hydroelectric project (70) bringing millions of dollars, people, and infrastructure into the Basin (Weinkauff 1973). White (1995) uses the narrative of energy to articulate that human energy has been replaced by dam energy and dam energy replaced work energy, forever altering the culture, kinship patterns, sustenance, and procurement of food for Native Americans in the region.

The natural river flows once produced an abundance of salmon which captured solar energy from the sun while in the ocean, providing a diet rich in nourishment and thus sustainably supporting humans for millennia through the use of fish traps, gillnets, canneries, and hatcheries (Pearson 2012). The energy of the river, work of the anadromous salmon, and the labour of humans to capture and preserve the fish, organized humans socially, culturally, politically, and by gender (Armstrong 2005; Carney 2008; Pearson 2012; White 1995). However, when the Hudson Bay entered the picture in 1855, all of this was inextricably changed forever when over 50 percent of the Indigenous population was decimated, and by 1875 almost 66 percent of the Indigenous population in the region was decimated entirely (White 1995:27).

Fish canneries were built around 1864 on the Sacramento River and in 1866 along the Columbia River to pack spring salmon (Higginbottom 1988; White 1995). Richard White (1995) portrays this as “the application of heat to preserve fish” in canneries that replaced the “work of the sun and wood fires to dry the fish by the Indians” (32). By 1870, canneries were being built along the Fraser River to process prolific numbers of one of B.C.’s five main species of Pacific salmon, the sockeye (Higginbottom 1988). By 1878, canneries soon spread to Alaska by (Higginbottom 1988).

Second only to mining, canned salmon was the province’s fastest-growing export, shipped mainly to continental Europe, through to the 1900s. A cultural mix of Chinese, Japanese,

and Indigenous men and women worked laboriously at roughly 96 salmon canneries producing an average of 20,386 cases per packinghouse every three to eight week season (Higginbottom 1988) thus replacing what White (1995) calls the “cooperative labor of kin groups” (32).

Furthermore, this racialized the Indigenous people who chose to live close to their food sources instead of on reservations, as the white colonizers commandeered the best fishing sites from those Indigenous groups who had depended on them for millennia (Pearson 2012; White 1995). Separating the Indigenous communities from their food sources, the canneries carried the fish out of the Columbia River Basin halfway around the world (White 1995).

Moreover, by the end of the nineteenth century, over-capitalization, excess capacity, and over-production led to biologically depleted salmon runs and a decline of the cannery (Higginbottom 1988). Due to over-harvesting on both sides of the border with little prospect for recovery, the fisheries were forced to depend on chum, pink, and Coho salmon (Higginbottom 1988). The fisheries had a brief comeback during World War I when the production peaked slightly but soon declined due to overproduction and post-war inflation, decreasing demands and prices, which ultimately precipitated the canning industry downturn (Higginbottom 1988). Additionally, rockslides caused by the construction of the railroads constricted and blocked rivers preventing the few returning sockeye from spawning at Hells Canyon in B.C. (Higginbottom 1988). By 1925, the fate of fish was sealed with the predictable and eventual decline of fish populations. The early “Frankenstinian” hatcheries were developed to expedite the spawning process, inflicting as much, or more damage than the canneries, replacing what nature so beautifully had designed in harmony with Indigenous ways of life (Harris 2001; White 1995:44-47).

The Grand Coulee Dam was completed in 1941 (Pearson 2012; Shurts 2012; White 1995) and as White (1995) explains, hydro energy is the only constant amid the drastic changes that have taken place since this time. As technology changed, so changed the culture, and as the culture changed, so did the value of the river. As society harnessed the energy of the river, nature transformed. As mechanized, behemoth bureaucratic institutions grew – Bonneville Power, the Bureau of Reclamation, and the Army Corp of Engineers (2006) –, the water became capitalized, commodified, and politicized (White 1995). Finally, in the end, the river has become an extensive plumbing system, a leviathan irrigation system with veins and arteries of which the ramifications are a total reordering of geopolitical and economic alliances, foreign policy, and, international hydro energy eradicating a food supply that sustained humans since time immemorial (Worster 1985).

Blaine Harden (1996) personally narrates his travels of the entire length of the Columbia River and describes it as a “natural resource war zone” (21) and a “remote-controlled pool” (21). As he travels by tugboat, car, and foot, he visits Moses Lake, his birthplace. He now realizes that the harnessed river has wrought environmental damage causing decimation of once thriving fish populations that local tribes had relied on for thousands of years as a sustainable food source. The myth was that the Grand Coulee dam was to be the greatest dam on Earth, the salvation of society, an irrigation project that would make the desert bloom, and cheap power that would bring the country out of depression era destitution. Instead, it was an illusion propagated by greedy bureaucracies that sought millions of dollars for themselves without any concern for the local tribes or the fish. Harden (1996) argues that the development of the river was primarily subsidized. One of his central questions is who financed the development of the river and theorizes that it was financed mainly through federal handouts.

Harden (1996) writes satirically, that “God made the West so that American people could conquer its natural resources” (87) and explains how the dam became a showpiece for the New Deal. Roosevelt promoted the grandiose dam ideology while also exemplifying the political ideology of go big or go home. Four of the largest dams were built under his watch: Hoover, Shasta, Bonneville, and the Grand Coulee. Tribal nations were decimated along with the fish when Kettle Falls and Celilo Falls disappeared under the reservoirs of Grand Coulee and the Dalles Dam respectively. The Grand Coulee, Roosevelt’s crowning achievement, flooded more than 21,000 acres, the size of all of Creston’s agricultural land. Harden (1985) delves into the political economy of the agricultural sector of the Columbia Basin stating that half a billion dollars’ worth of apples, potatoes, wheat, spearmint, asparagus, and peas were grown per year with Columbia River water stored in Canada by CRT dams (117).

Harden (1985) takes a political ecology perspective when he analyzes the Hanford Nuclear Site on the Columbia, which speaks to his argument that the United States could justify just about every blatant disregard for human health and safety while pursuing its ultimate objectives of development for the supposed betterment of humankind. The consequences to local tribes, the environment, and fish were conveniently hidden from public view while anti-communist sentiment and the depression-era mentality of farmers as rugged and independent individualists defined by self-reliance and passive patriotism justified nuclear projects like Hanford as a bulwark against communism during the cold war (Harden 1985).

Settlement and Food

In this section, I draw upon two authors. First is Bennett’s *Northern Plainsman* (1969) who discusses the adaptation of settlers based on the distribution of moisture within a small

agricultural community in Saskatchewan. Secondly, I use Murton's *Creating a Modern Countryside: Liberalism and Land Resettlement in British Columbia* (Murton 2007) as an examination of B.C.'s role to manufacture a "modern countryside" after the Second World War.

Bennett in his ethnography *Northern Plainsmen* (1969) states, the town of Jasper (not its real name) has, since the nineteenth century, gone through profound changes which have altered the agricultural frontier in Canada and the many ecological niches. Bennett (1969) argues that commercial agriculture becomes dependent on moisture cycles, which alternatively determine humans' fortunes. Bennett (1969) substantiates that humans continually adapt and evolve within their ever-changing environment in order to survive. His theory that "adaptation to natural and social resources, strategy and manipulation, and the relating of cultural patterns to economic needs are processes visible everywhere in the agrarian societies..." applies to the Creston Valley as well, even though Bennett's (1969) research area is situated within a macrocosmic framework of politics, economy, and social structure on the Canadian Prairies (3) (Britnell and Fowke 1962; Fowke 1946).

In the Creston Valley area, farmers have had to adapt to the local river water supply and systems of control that belong to a broader Canadian socio-political scheme that sought to develop the modern countryside, especially after World War I, based on a series of Canadian settlement initiatives (Murton 2007). This settlement peak occurred at about the same time that Creston was experiencing increased numbers of immigrants (Bennett 1969:44). One such settlement camp in the Creston Valley was named after Colonel Robert Lister who was put in charge of the veteran's settlement scheme to "encourage agricultural settlement" which existed within a larger scheme to expand the "great west" (Murton 2007: xxi). Although it failed, as

Murton (2007) recounts, Camp Lister was a notable example of B.C.'s many exercises in social and environmental reconfiguring and control.

Just as happened in Jasper, many of the settlers in Creston abandoned their farms in the harsh droughts that followed in the late 1920s, prompting the government of Canada to recruit a whole new generation of “replacement settlers” from Germany (Bennett 1969:44; Hofer 1996; Murton 2007; Wallach 1988). Again, just as in Jasper, Creston society and economy were under the control of water (Bennett 1969) which resulted in the Goat River dam being built in the Valley in 1932 in order to harness hydropower (Sorboe 1967; Wallach 1988). In Creston, the Germans would not immigrate if the land lacked irrigation, so the government built a dam on one of the Purcell Range Creeks and piped water to each homestead. Unfortunately, there was only enough water for domestic and cattle use, not leaving enough for tree fruits, hay, hay-beef, and dairy (Sorboe 1967).

As Bennett (1969) argues, immigrants or humans manipulate their environment in order to create a “secure economy” (19) but at the expense of the degradation of natural resources, which in this case are the fish for the Ktunaxa and the natural freshets of the Kootenay River. The adaptations to the environment that Bennett (1969) discusses come with risks and uncertainty. Similarly, the precarious nature of climate change coupled with the drive for the expropriation of hydropower from the Kootenay River has severely elevated the risk factors at play in the Creston Valley and brought with it a mistrust of government by agriculturalists.

Canada and the U.S. are renegotiating the Columbia River Treaty with a continued focus on hydro dollars and flood control (Columbia River Treaty Negotiations Status 2019). And as a result of the complex interlocking relationships between First Nations, agriculturalists, government, environment, and socio-cultural factors, the implications for food security are

profuse and manifold, requiring a substantive, historical review of food production in this area to understand the multiple factors that have created the Creston Valley we know today.

The region's Indigenous Ktunaxa, and farmers, have all had to learn to adapt to the changing technologies, natural ecosystems, and finite resources of the region (Bennett 1969; Murton 2007). However, Euro-settler farming used a well-established system of farming landscapes based on a reworked ecosystem, controlled by symmetrical fences, and administered by farmers who were well aware of property rights. The theory of property rights follows on the critical environmental history theory of White (1995) and Worster (1985, 1993) whom both write about human's efforts to alter the landscape "for the betterment of humanity." The Euro-settler farming system does not tolerate the traditional subsistence patterns of the First Nations. British Columbia's attempts to colonize the mountainous, vertical, riverine topographies (which are not conducive to farming) echo its self-perceived inherent right of certain men to rule with their capitalist economics which was not always successful as we now see within the Creston Valley floodplain (Murton 2007).

Murton (2007) argues that post- World War II precipitated a "high modernism" that sought to improve the resource-rich landscape, for example, the Columbia River Basin in its idealized function as an agricultural setting. He argues that the economy is carefully controlled with much political involvement (Murton 2007) and the "interplay" between the rise of the extractive resource developments and its relationship with the growing city of Vancouver, B.C. at the turn of the twentieth century was carefully orchestrated (Murton 2002, 2007). With the countryside competing with urbanization to Vancouver, the city sought to be the mantle of progress (Murton 2007).

By the 1930s, the confluence of liberalism and environmental change intersected to create rural development as a key strategy for the government of British Columbia and its people (Murton 2007). For example, the “Settlement Area” in Camp Lister belonged to a larger objective to imagine and create a new modern countryside, one that would provide an agricultural engagement with the environment (Murton 2007). Murton’s (2002) thesis explains the social theory behind this development in terms of how the state has fully embraced the alliance between state and science. Nevertheless, when mining proved unsuccessful in British Columbia, new markets and agro-ecosystems were opened, including in the Kootenay Valley (23), which cemented a relationship between the European settlers, and their environments (Murton 2007).

The settling of British Columbia firstly as a national policy fomented by Canada is explained in Fowke’s (1946) history of the development of Canadian agriculture (Fowke 1957). Fowke’s (1946) investigation of the changing nature of food production in the Western Canadian prairie is analogous to Bennett’s (1969) description of agriculture in the town of Jasper, and also helps to explain much of the historical and agricultural change that has happened within the Creston Valley of B.C.

Using a political ecology theory to better understand the natural and the biophysical world by investigating the relationships between human beings and nature, social constructions, and political institutions Escobar (1996) allows us to understand the trajectory of agricultural food production as part of a historical and social process (Blaikie and Brookfield 1987; Robbins 2004; Watts 2003). Its lens illuminates, for example, how political and economic interests and objectives have shaped many agricultural developments. A political ecology analysis also shows that institutional changes in agricultural structures reward those who embody the influence of

daily agricultural practices, while those who do not, suffer through unequal access to socio-environmental nets such as governmental agricultural assistance aids (Escobar 1999).

Furthermore, most political ecology scholars agree that technical interventions are shaped by power imbalances that affect how benefits trickle down – or do not - to the most marginalized communities (Escobar 1995; Robbins 2004).

Water Treaty and Food Security

Extraordinary changes have occurred over the last 80 years to the Columbia River. Irrigation, hydro-power generation, flood control, and industrial farming has transformed the River into what White (1985) calls an “organic machine”. Beginning in the 1930s, development schemes such as the Bonneville Dam, the Grand Coulee Dam in the 1940s, the Columbia Basin Project in the 1950s, and The Columbia River Treaty between Canada and the United States in 1964 have inextricably altered the flow of the River (Clark 1995; Cosens 2012; Krutilla 1967; Swainson 1986; Waterfield 1970; Wilson 2016). One of four other treaty dams, the Libby dam as indicated in Figure 3.1, has inextricably changed the Kootenay River floodplain while the other three CRT Dams: the Duncan; Mica; and Hugh Keenleyside have also inflicted much socio-economic and environmental damage (Spritzer 1979).

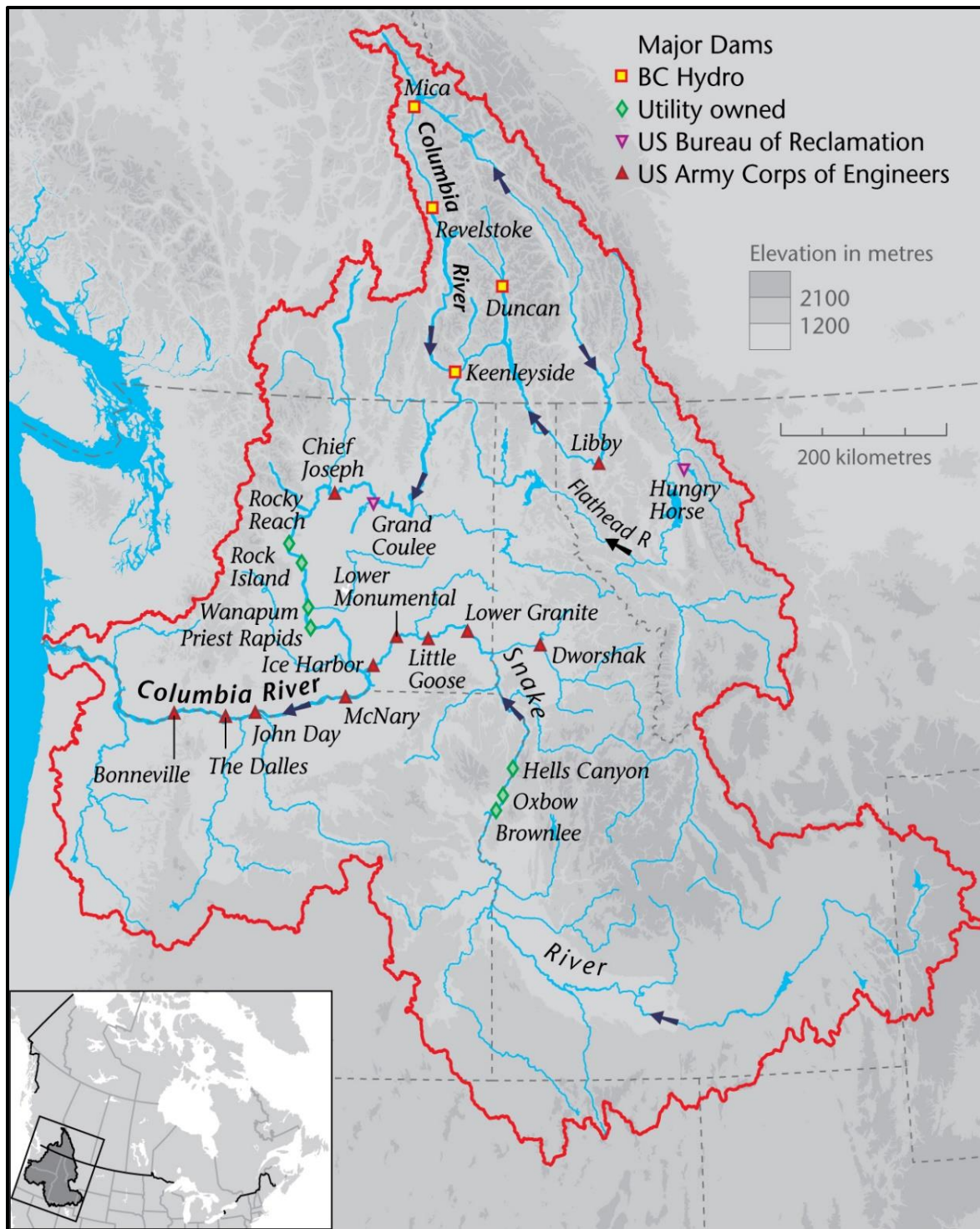


Figure 3.1 - Location of CRT Dams - Adapted from a Map Created by Eric Leinberger, Department of Geography, UBC (permission granted).

Columbia River Treaty

The Columbia River, in the Pacific Northwest was considered the Path of Life where Indigenous people depended on salmon for 60 percent of their diet (Alfred 2009; Cannon and Sunseri 2011; Coulthard 2014; Lindberg 2010; Pearson 2012:70). Built without fish passage, the Bonneville and Grand Coulee Dams were completed by 1943 and effectively blocked at least 50 percent of the prolific upriver salmon stocks in all rivers and tributaries that supported Indigenous ways of life for centuries (Pearson 2012). Furthermore, 21,000 thousand acres of prime bottomlands flooded due to the building of these two dams, affecting Indigenous peoples' food security (Kershner 2006). Adding to this devastation, ocean fish declined by 80 percent from 1988 – 1992 and Coho, the second most prolific fish run declined by 95 percent from 1976 – 1993, while wild salmon decreased by 80 percent (Columbia River Inter-Tribal Fish Commission 2019; Paragamian 2012).

B.C. was already firmly settled when talks began for what is now known as the Columbia River Treaty, but the great flood of 1948 seemed to justify and precipitate the signing of the treaty (Sanderson 2012). It was the ratification of the 1964 Columbia River Treaty that terminated all hopes that any fish would return in natural numbers to the upper reaches of the once mighty Columbia. Strictly predicated upon flood control and hydropower, the treaty did not provide for other uses such as water for salmon or steelhead migration in the lower Columbia nor sturgeon in the upper Columbia. Nor did it provide for irrigation or navigation.

Numbers of fish have increased since the 1940s due to the proliferation of fish hatcheries and fish stocking in most lakes, rivers, and streams (Harris 2001; Pearson 2012; White 1995:44-47). Nonetheless, during my research visits to Libby Dam, dam engineers explained that there is no natural spawning of fish along the main stem of the Columbia River. In a little more than a

hundred and fifty years, what used to be a natural area of deserts, plateaus, and rainforests, the Columbia River Basin has turned into a high tech region that ranks tenth in the world of gross national product by receiving some of the country's cheapest hydro in the U.S.A. (Holm 2018a; Pearson 2012; White 1995; Worster 1985).

Moreover, the devastating impacts of the loss of nourishment, economic independence, and purpose forever changed the sustenance and culture of the Indigenous People of the Columbia River Basin (Pearson 2012). The inexpensive hydro generated from all dams in the Columbia Basin has been marketed to California, leaving the River People to pay the price through loss of fish, food, culture, language, and life pathways (Columbia River Inter-Tribal Fish Commission 2019; Pearson 2012).

In 2011, the U.S. began a review process under the authority of the U.S. Entity; Bonneville Power and the U.S. Army Corp of Engineers (USACE 2006) whereas in B.C., the review process has been led by Kathy Eichenberger with the Ministry of Energy and Mines (Columbia River Treaty Review 2013 a, b, c, 2018; Wagner and Taylor 2019). The information available on the website of the U.S. Entity suggests that their review process involved extensive consultation to evaluate future decision-making which included the Sovereign Review Team comprised of representatives of the four Northwest states, 15 tribal governments, and 11 federal agencies (U.S. Entity 2018). From these consultations, the U.S. Entity issued its final set of recommendations on Dec. 13, 2013 and forwarded them to the U.S. Department of State to proceed with modernizing the Columbia River Treaty (Columbia River Treaty 2018).

Libby Dam

The most significant technological alteration to the Kootenay River occurred with the construction of the fourth of the Columbia River Treaty Dams, Libby Dam (Figure 3.2) in 1972

which enabled a flourishing and vibrant agricultural economy to prosper that is now bound to world markets as far-reaching as Southeast Asia and the Middle East (Spritzer 1979).



Figure 3.2 – Libby Dam, Libby Montana, U.S.A. looking southwest. Photo by author 2013

The Libby Dam was completed in 1974 as part of the Columbia River Treaty agreement providing flood control and hydro power for Idaho and Montana including the Creston Valley in Canada. Libby Dam's 144 km reservoir Lake Koocanusa, backs 66 km into Canada (Barton and Ketchum 2012). Of all four Columbia River Treaty dams, this is the only one that is situated in the US with 70 percent of its river basin resting within Canada (Barton and Ketchum 2012).

The Libby Dam along the Kootenay River, enabled the further growth of an agricultural industry based mainly on beef cattle, hay fields, and alfalfa on both the U.S. and Canadian sides

of the Kootenay River floodplain (Jamison 2004; Shurts 2012). Ostensibly, the Creston Valley has been protected from flooding by the Libby Dam since 1973 when it began its initial hydropower and flood control operations. However, changes to the Valley bottom of the Creston Valley were extraordinary after Libby Dam became operational in 1974. By protecting the Creston Valley floodplain from flooding, it allowed many agricultural areas to flourish. Ironically though, it negatively impacted the risk of flooding by deleteriously affecting the settler diking infrastructures as the current operation of the dam causes erosion of the dikes.

Effective flood control will require significant changes to the existing treaty or, at a minimum, significant investment in strengthening the diking infrastructures, something that the Province of B.C. has steered away from doing. A final alternative would be to move current farm operations out of the Valley bottom as the effects of climate change become more serious (Cohen et al. 2000; Desjardins et al. 2007; Ficklin et al. 2014; Nolin et al. 2012; Ostry 2010; Parry et al. 2005; Rajagopalan 2018; Shurts 2012; Taylor 2014; Weber and Matthews 2008). Not only has it caused ecological and infrastructural damage, but British Columbia lost 32,000 hectares of prime fertile agricultural land and 42,000 hectares of forests, riparian river habit, speciation, and diversity of flora and fauna at its reservoir, Lake Koocanusa, both in B.C. and Montana, U.S.A. (Jamison 2004; Shurts 2012).

At the same time, another one of the CRT dams, the Hugh Keenleyside, flooded the Arrow Lakes where dozens of small communities and at least 2,300 people lost their homes (Delehanty-Pearkes 2016; Loo 2004; McDonald 1993; Penfold 2012; Sandford et al. 2014; Shurts 2012). Orchards and dairy farms in British Columbia vanished beneath the water from the Columbia Treaty dams while, downstream in the U.S., in the Columbian Basin Project area, the economic productivity of farmland increased by over 200 percent (Holm 1994). As Scott (1998)

explains, alternative “knowledges” need to be included in designing governing systems that use science as a theoretical basis for decision making. Conflicted Basin residents do not feel they are currently being listened to. Spicer (2018) states that the negotiating teams appear to be “bickering over how much value to settle on for their general revenue” and not considering the negative impacts to the people of the five basin valleys whose Columbia River water is destined for irrigating U.S. desert farms that then compete with British Columbia farms (1). Spicer’s knowledge comes from living the nightmare of flooding family homes, lives, and memories.

Because the Kootenay River begins and ends its flow in Canada, the Libby Coordination Agreement (LCA) was ratified in 2000 between the Canadian and the US Entities (Barton and Ketchum 2012).

The Libby Coordination Agreement

The Ministry of Energy and Mines conducted consultations throughout the Canadian portion of the Columbia River Basin (Columbia River Treaty Review 2013a) in order to ostensibly provide an opportunity for the Province to engage with Columbia Basin residents. Several studies were also commissioned to investigate the economic, environmental, social, financial, legal and hydrological impacts of the treaty (Columbia River Treaty Review 2018; Hearn 2008; Penfold 2012; Wagner and Taylor 2019). Since the Kootenay River begins and ends its flow in Canada, with Libby Dam uniquely situated in the U.S. portion of the river, it was necessary to implement and ratify the Libby Coordination Agreement (LCA) in 2000 (Shurts 2012). This agreement was permanently adopted in 2008 between BC Hydro - the Canadian Entity, and Bonneville Power Administration and the U.S. Army Corps of Engineers - the U.S. Entity (Libby Coordination Agreement 2000). These entities are a testament to the burgeoning bureaucratic “water-

controlling societies” that Worster (1985, 1993) describes (21), and what Norman (2015) says are distinct institutions which have grown to address disagreements and facilitate change.

The LCA is an agreement that is separate from and yet attached to the CRT with the most significant difference being that the LCA can be terminated at any time by either side with 20-day advance notice before the expiration of the contract September 16th, 2024. After 2024, flood control returns to the jurisdiction of the International Joint Commission, who control transboundary rivers and lakes between Canada and the U.S. (Shurts 2012). The LCA authorizes Libby Dam to meet the U.S. fisheries requirement for the recruitment and revitalization of the Kootenai River White Sturgeon, bull trout, and salmon - a program first introduced in 1993 (Shurts 2012). Prior to the modified operation of the dam, the natural, annual freshet would deposit the river’s sediment, thus building up and reinforcing the dikes while assisting young fry down the river. However, the “Standard Flood Control” regime was challenged by the U.S. Endangered Species Act and in 2002 Libby enacted the “Variable Flow” (VAR-Q) regime which allowed the dam to discharge less water during the fall and winter (thereby filling up the reservoir in the winter months) and to increase spill water during the spring-summer freshet necessary to aid sturgeon release.

In June 2008, the U.S. Entity permanently adopted the regime (Hearns 2008; Shurts 2012). The VAR-Q flood control process and the fish flow regime significantly reduce flood control protection compared to the original terms of the treaty. This significance was evidenced in 2012 when heavy spring rains, massive snowmelt, and high VAR-Q water levels in the reservoir created heavy water saturation and seepage beneath the Creston and Bonners Ferry dikes not only causing erosion to the dikes upon dissipation of the water but the potential to breach all dikes (Shurts 2012). The operation of Libby Dam refers to the timing of the release of

water to mimic the naturally occurring spring freshets. These timed water releases are not necessarily timed with naturally occurring spring melt. Instead, water is released for the explicit aid of spawning salmon, an initiative ratified in the LCA of 2008 (Libby Coordination Agreement 2008). The water releases have inadvertently caused erosion of dikes due to the increased and decreased rise of water, taking soil each time river levels fluctuate.

Erosion is occurring at various points along the south end of the forty-year-old Creston Valley diking system that extends for 93 km along the entire Kootenay River system. Even though the Libby Dam brought flooding under control, pumps in various diking districts could not remove the 1997 flood-waters, and according to farmer's reports, Creston lost 75 percent of its crops that year. Again in 2012, another high-water event occurred and heavy spring run-off, heavy spring rainfall, and Libby Dam operating under VAR-Q regimes, barely held water below the optimal 1744-1746-foot mark (Columbia River Treaty Review 2018). This high-water event caused extreme saturation of the Valley bottom and damages to crops estimated in the millions (private discussions with Bonners Ferry farmers).

Even though the process of fluctuating river levels has been brought down considerably due to Libby Dam's operation, it is precisely because of Libby Dam that the dikes are eroding through processes of high-water tables and seepage from holding back water for the fisheries. Natural spring freshets previous to the damming of the river would have allowed for a more fluid and natural flow to the river which would have naturally brought sediment to the Valley and reinforcement of river banks. However, the banks are now eroding due to the timing of water releases during spring freshets. Coupled with earlier spring rains, and prolonged earlier snowmelt, the saturation of the water table simply put, erodes the dikes, he explains.

Several Creston Valley and Bonners Ferry floodplain farmers shared their recollection of flooding in 2013, and 2017 due to an early rainy season coupled with the VAR-Q regime. Together with the recurrent fluctuations in the water levels, erosion is visibly deteriorating the dikes. It is not a matter of not having enough water but having too much water. According to several farmers, the erosion of the dikes can be reduced if the dikes are repaired to strengthen the riparian slopes, but the possibility of unpredictable climate change-induced flooding coupled with the timing of water release for fish freshets may cause further erosion of the dikes, thus imperilling future Valley bottom agriculture.

From these agriculturalist's points of view, government institutions continue to encroach on natural water supplies that the farmers and First Nations have used successfully and cooperatively to irrigate the Valley bottom for decades. They explained that these food producing regions have existed within an ecosystem that has supplied abundant and naturally occurring waters for generations. Managed by local farmers, these irrigation systems were organized through local and small groups who worked collectively within their local environments to control the flows of water necessary for sustainable food production.

Creston Valley Irrigation

The map of the waters that food producers use to grow food in the Creston Valley reads like a road map as shown in Figure 3.3.

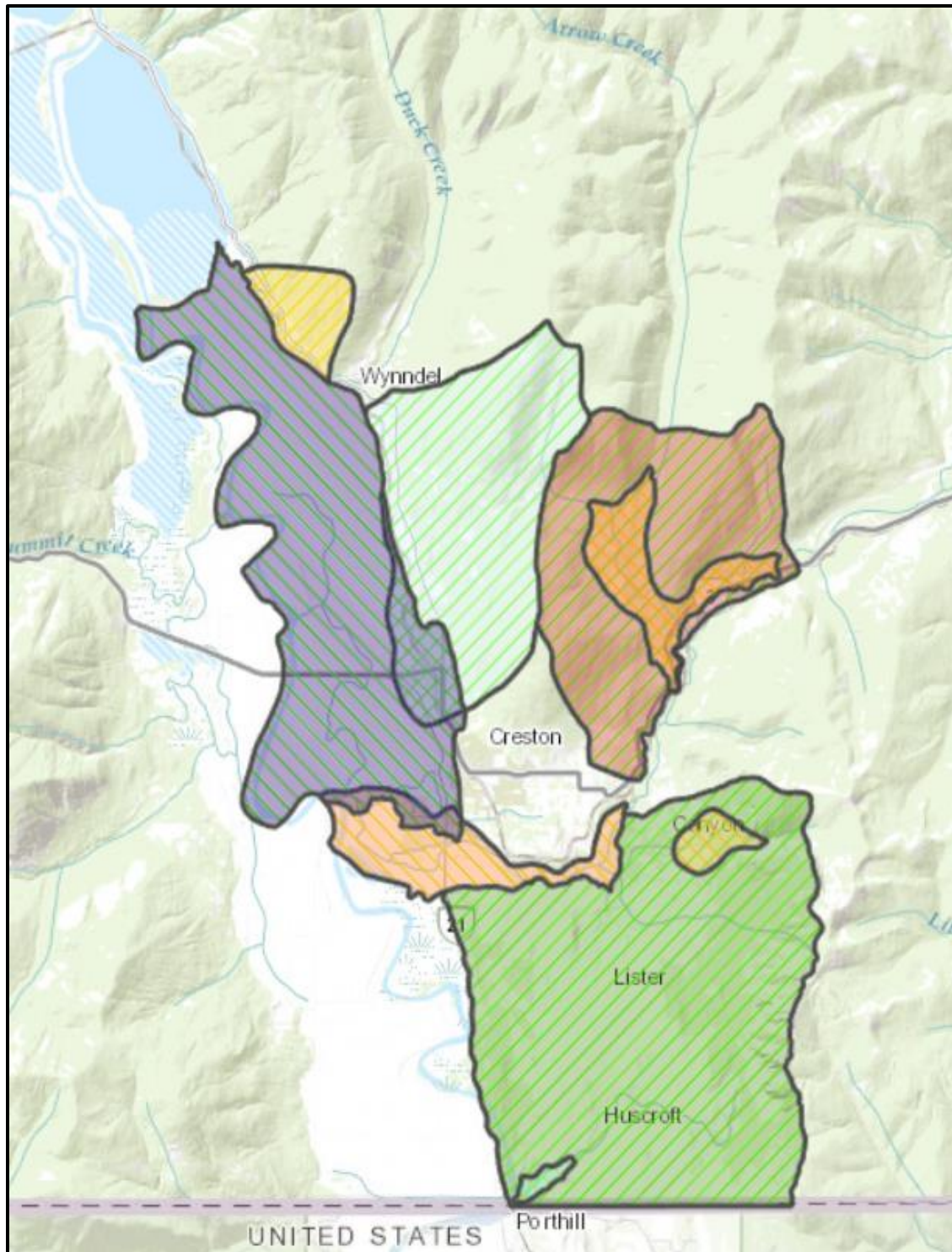


Figure 3.3 – Map of Aquifers in the Creston Valley of B.C.
British Columbia Data Catalogue Map iMapBC (permission granted).

The above map indicates the wells, aquifers, and surface water via lakes, rivers, streams, and ditches, managed by irrigation and improvement districts, the municipality, provincial government agencies, and U.S. and Canadian entities, responsible for the day-to-day operation of the international Columbia River Treaty and the Kootenay River. The Kootenay River is a dynamic ecosystem fed by many tributaries creating a labyrinth of elaborate water, weather, and soil patterns, influencing what crops farmers choose to grow in any one micro-ecosystem.

Most farmers pump water from surface areas such as ditches, lakes, streams, and reservoirs on the floodplain, off their land, and into ditches using centrifugal pumps. Farmers must subsequently pay electricity fees to their irrigation district to pump water off their lands. These annual fees are based on the number of acres they own. Improvement District fees also include the maintenance of electrical pump houses and riprap to shore up eroding dikes. Most farmers cite drought and flooding as essential concerns that affect their farming. Some farmers have water systems which limit the time the water can be used depending on whether a drought is occurring.

On the benchlands of the Creston Valley a number of water systems exist to carry water to city inhabitants as well as for agricultural purposes. The Arrow Creek water supply system serves the Town of Creston's municipal water needs (discussions with interviewees May 2013). The Lister and Rykert areas are comprised of large-lot agriculture and have two water systems, the RDCK Lister Water System and the Rykert Improvement District. The Lister Irrigation District has good water, but it is chlorinated. Rykerts Irrigation District has irrigation rights according to First in Time, First in Right laws (FITFI) which designate who has the right to govern bodies of water (BC 2019). The gently sloping southerly area of Erickson is managed by the Erickson Improvement District. Farmers also use an aquifer at the lower section of Erickson

district which is considered the floodplain for the nearby Goat River. Figure 3.4 shows the Goat River and its surrounding agricultural farms in red.

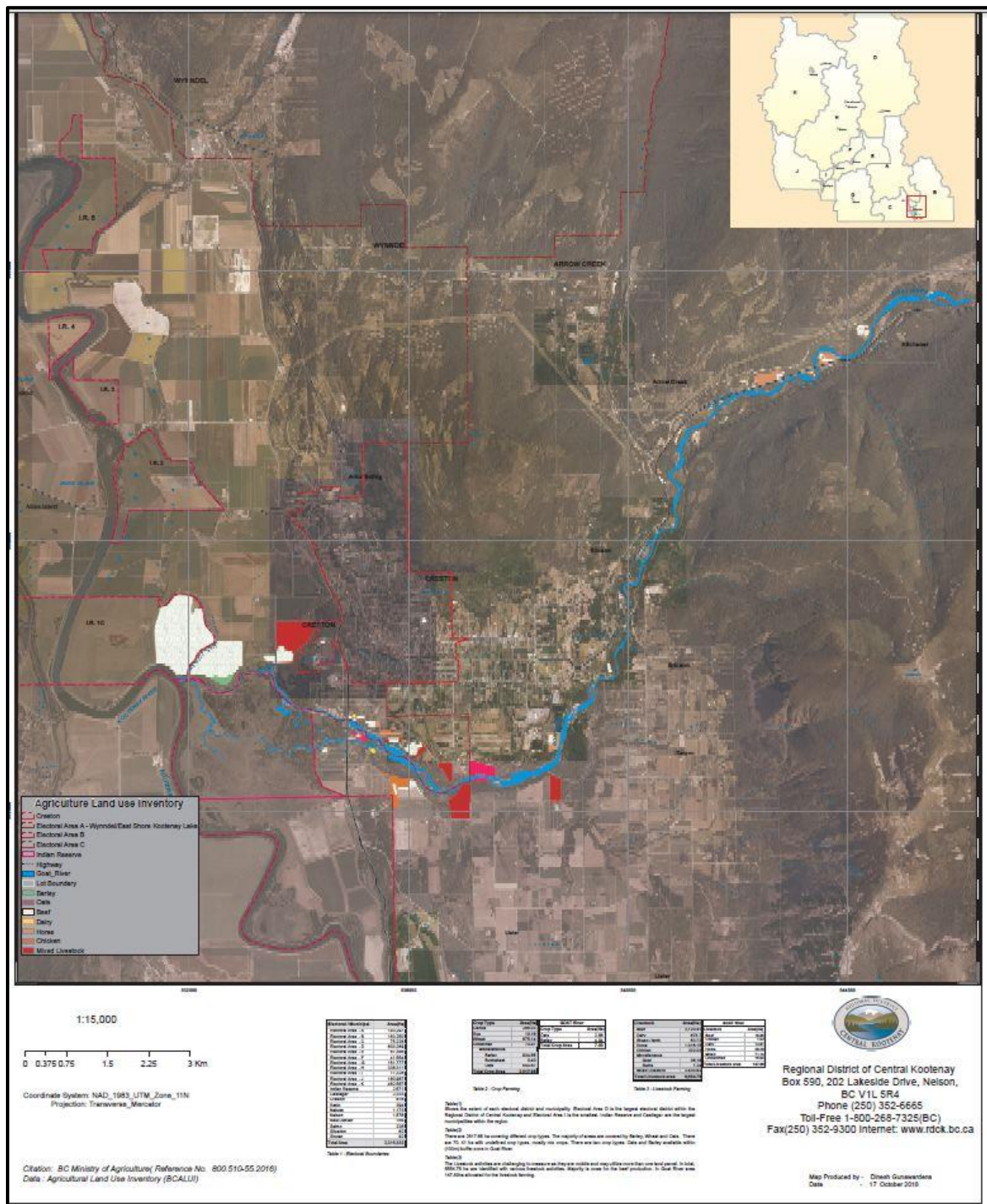


Figure 3.4 - Map of Goat River in the Creston Valley. Regional District of Central Okanagan (permission granted).

Farmers can pump water from the Goat River but must have a license to do so. This area also has an aquifer according to a landowner who lives on its floodplain. Goat River does not have an irrigation district to manage its water relying only on an original berm built before its diversion in the 1930s, to protect its floodplain dwellers from flooding. Subsequently, irrigation was not extended south of the Goat River, and consequently, fruit trees were confined to the Canyon area. Here, livestock, grain, and forage production are the prime agricultural activities.

For the area north of Lister, Rykert, and Erickson, the area of Canyon is managed by two improvement districts. North Canyon Improvement District uses water mostly from wells and has the most expensive water fees. South Canyon Improvement District also manages water on the benchlands.

On the Creston Valley floodplain, five water management districts control irrigation water which comes out of seepage areas. This water decreases the necessity for irrigation but increases the likelihood of too much water, requiring the usage of pumps to eliminate water from the fields. Within this area, extensive agricultural holdings are able to exist on reclaimed areas of the Kootenay River floodplain with smaller residential lots climbing along the Selkirk Mountain hillsides which are serviced by five community creek and diking district systems including Teetzel Creek, Urmston Creek, Schmuland, Nick's Island Diking District, and the Creston Diking District Water System (Creston and District Historical and Museum Society 2013). If irrigation is needed for some crops, water is pumped out from either the Kootenay River or its myriad of ditches and canals.

Each diking district on the floodplain is responsible for maintaining its own dikes according to governmental technical standards. The government owns all river waterways. The Creston Valley Diking District is a complex system of diking pumps and syphons. The Duck

Lake Diking District controls water which also comes from ditches along its 102 lots anywhere from five to 500 acres, and farmers pay a diking tax of one dollar per 1000 acres totalling an annual income of about \$40,000 per year which goes to electrical bills and ditch cleaning maintenance. Nicks Island Diking District is comprised of Indian reservation land on the 1 side of West Creston Road, and on the other side, the district manages its dike up to the side of the road. Timothy hay is mostly planted here. The Creston Reclamation Diking District is historically the oldest of all districts, and The Creston Valley Wildlife Management Area is run by Ducks Unlimited who manage 17,000 acres of wildlife area (Creston Valley Wildlife Management Area 2015).

On the northeast benchlands, The Wyndell Irrigation District remains outside the Agricultural Land Reserve and provides water for the Wynndel Box and Lumber, a general store, and several small businesses. The Ktunaxa controls their irrigation from their well providing irrigation and potable water for the yaqun nu?kiy Nation. It is daunting at times to completely understand the complexity of water supply systems in the Creston Valley as no one office or agency is responsible for a coherent set of mappings, jurisdictions, and responsibilities. Rather, the water system is made up of a maze of small institutions that can be run by a few farmers or can encompass the Regional District of Central Kootenay offices.

There is a chance now during the renegotiation of the CRT, to address the eroding dikes in the Creston Valley (Barton and Ketchum 2012). With the apparent will to revitalize the fisheries, there could also be the will to support future farming on the floodplain by decreasing the chances of future floods. So far, however, the issue of floodplain management continues to be ignored by both governments and the CRT entities, thereby making the future of farming for Crestonites precarious (Wagner and Taylor 2019).

Columbia Basin Trust

The Columbia Basin Trust (CBT) was formed in 1995 to help assist residents who were negatively impacted by the effects of treaty dam building in the Canadian portion of the Columbia River Basin (Bankes 1996, 2017; Columbia Basin Trust 2006; 2019; Cosens 2012; Hearn 2008; Vogel 2012). Directly, or indirectly socio-economic and environmental impacts to structures within the flooded areas, inundated lands, disrupted river systems, and displaced communities, were experienced by all basin residents (Delehanty-Pearkes 2014). Biophysical, social, and economic impacts include but are not limited to; loss of rivers, lakes, streams, and riparian areas in each of the reservoirs (Cosens 2012). Social impacts include lack of consultation and inclusion of basin residents, undelivered commitments regarding development by the Province or BC Hydro, 2,300 displaced people, and a dozen small communities economically impacted (Penfold 2012). Economic impacts include lack of tourism, recreation, loss of rail and road infrastructures, loss of productive forest, and related economic opportunities (Shurts 2012).

Devastating impacts to all the Basin's First Nations and Sovereign Tribes include the decimation of their fisheries, sources of religion, cultures, economies, loss of sacred tribal lands and archeological sites, not to mention exclusions from treaty negotiations (McLash 2018; Pearson 2012; Shurts 2012). In order to seek redress for harms caused by the treaty, CBT received a lump sum of \$276 million by the B.C. Government in 1996 for further dam improvements, a \$45 million endowment, and an annual \$2 million stipend until 2010 (about \$4 million in 2012) by BC Hydro and the Provincial government (Cosens 2012:66; Shurts 2012:215). None of these monies were ever allocated to the maintenance or repair of the Creston Valley dikes or its diking associations. Creston Valley farmers, the Ktunaxa, and the

environment have been negatively impacted along with the citizens of the Columbia River Basin who continue to bear the consequences of dam building in these regions without financial compensation.

Throughout this dissertation, I use a political ecology theoretical framework as an analytical tool to investigate the Creston Valley of B.C., where different food producers with divergent political powers experience various challenges to achieving food security. Furthermore, I provide food security and food sovereignty theoretical frameworks to understand whether Creston Valley farmers and food producers are food secure. With so much environmental damage wrought by the damming of the Kootenay River and ironically by the settler dikes, use of land by non-Indigenous settlers is inherently and profoundly damaging to the environment. As Fowke (1946) explains, the industrialization of food systems mirrors settlement of the Creston Valley where substantial industrial food and agricultural strategies were used in the industrialization of the prairies and of the Creston Valley. Paradoxically, the settling schemes made in the name of modernization and progress have been damaging to the environment. It is necessary however, to sustain human populations, making food production part of the destructiveness of the settling itself.

In the following Chapter, I discuss the concepts of food security and food sovereignty, noting their distinct histories which contribute to current definitions of food production practices as it relates to the Creston Valley, the Province of B.C., Canada, and the world at large.

Chapter 4: Food Security and Food Sovereignty

In the following sections of this Chapter, I outline some of the leading food production challenges faced globally and in Canada and British Columbia. I then discuss prominent definitions of food security, noting their origins within influential global agencies such as the World Bank and the United Nations Food and Agriculture Organization and demonstrate the relationship of these definitions to the Green Revolution and other industrial-scale approaches to the reduction of food insecurity and hunger. In the following section, I offer an analysis of how food sovereignty arose as a counter-narrative to this dominant industrial-scale approach, emphasizing the rights of communities, people, and the ability and autonomy of states to independently determine their food policies. Within the Chapter, I articulate how parts of food sovereignty and food security definitions collide at certain times and resonate at others. I argue that their frictions and tensions can coalesce to potentially provide solutions to food policy and food security challenges in Canada predicated upon applying notions of food sovereignty to achieve food security.

Food Production Challenges of the 21st Century

Despite the weaknesses inherent in UN statistics, as discussed more fully below, they do provide valuable insights into the nature of food security challenges on a global scale. Currently, according to the United Nations Food and Agriculture Organization (UNFAO 2018:1), almost 767 million people live in extreme poverty, mostly within rural areas of ‘fragile’ countries where the rural poor are dependent upon agriculture for their livelihoods. The Food and Agriculture Organization (UNFAO) also reports that, due to environmental vulnerabilities, persistent social

and environmental crises, and burgeoning population growth, 815 million people were hungry and food insecure in 2016, an increase of 38 million people over the previous year (UNFAO 2018; McGuire et al. 2015). Once regarded as a crisis of the South, the wealthy Organization for Economic Cooperation and Development (OECD) countries are also now reported as experiencing some form of food hunger; or inability to feed themselves under circumstances of deprivation (Dowler 2003; Sonnino and Hanmer 2016; O'Connor et al. 2016; OECD 2008; Riches 2012).

The levels of food insecurity reported by UN agencies is especially shocking given that over the last half-century, remarkable increased growth in globalized industrial per capita food production was experienced as well (Godfray et al. 2010). Even though industrialized food production started from a higher output base in the West, it has doubled in the U.S.A. over the last 40 years and increased by 68 percent in Western Europe (UNFAO 2005). At the same time, the world population has increased from three billion people to more than six billion (Pretty 2007). Statistically, per capita, agricultural production has outpaced population growth (Hazell and Wood 2008). For example, for every person alive today, there is a reported increase of 25 percent more food compared with available food in 1960. Notwithstanding, according to the UNFAO and the World Health Organization (WHO) (2014), these improvements in productivity have not reduced the incidence of poverty and hunger in absolute terms. At the 2000 Millennium Summit and at the 2002 World Food Summit, governments committed to halving hunger. However, every five seconds, a child under ten is reported to die from hunger and malnutrition diseases (UNFAO 2008b; UNHRC 2008).

The current food crisis is due to many factors ranging from a shift to growing biofuels, rising oil prices, financial market instability, and increasing control of the food supply by

industrial, agricultural corporations (Sonnino and Hanmer 2016). Furthermore, inequality in the distribution of land and increasingly fluctuating crop yields due to climate change have led to food riots in recent years in over 40 countries including Bangladesh, Burkina Faso, Mexico, Morocco, Uzbekistan, and Yemen (Sonnino and Hanmer 2016). Food price fluctuations and price increases have also been a significant contributor to the current world food crisis. Between 2006 and 2008 food prices globally increased by approximately 83 percent and peaked once again in 2010 and 2011 (Holt-Gimenez and Patel 2009; Lyons 2014). It is not a coincidence that rises in food prices occur alongside the aggressive expansion of global agrofuel production which decreases the amount of real food grown, creating a dilemma for those who are dependent upon a globalized food system (Lyons 2014; Qualman 2011; UNIPCC 2019).

While the industrialization of food systems in North America appears to have provided a doubling of food supply, it has also become firmly entrenched in unsustainable food production practices. Green Revolution sciences that result in a dependence on non-renewable fossil fuels and biocides destroy natural biofertility of agricultural land (Qualman 2019). Dependence on a small number of monoculture crop varieties leads to the depletion of irrigation water supplies. These conditions, including reliance on long-distance exports of the majority of conventional foods, make the future of food production systems dangerously precarious (Bomford 2000; Magdoff 2013; Pretty 2008). Rapid agricultural transformations in North America in the last century have resulted in a decrease in the number of farming families from 90 percent of the population in the late 1800s to less than two percent today, where specifically small and medium scale farmers represent between one and two percent of the population (Qualman 2011; Wittman 2009b).

In California, long-term drought is affecting B.C.'s primary source of fruit and vegetable supplies. According to Ostry (2010), British Columbia produces almost three billion dollars of food annually (4), about half of which is exported or about \$1.6 billion (7) (Government of Canada 2010). Although most of the exported products are fish and meat (predominantly cattle), most vegetables grown in B.C.'s expanding hot-house facilities are also exported (Ostry 2010). Because B.C. exports much of its produce, it is highly dependent on California for most of its \$2 billion of imported food, mainly fruit and vegetables (Ostry 2010).

Approximately half of B.C. food is imported from other provinces in Canada and other nations such as the U.S.A. (BC Ministry of Agriculture and Lands 2006; Ostry 2010). In 2007 for example, 70 percent of fats and vegetables, 60 percent of cereals, fruits, nuts, and fish, and 40 percent of meat came from the U.S. (Industry Canada 2009; Ostry 2010). B.C. is most dependent on its import of fruits and vegetables. In 2007 according to Industry Canada (2009), B.C. imported 70 percent of vegetables not only from the U.S. but 17 percent from Mexico and seven percent from China, whereas 55 percent of fruit – primarily from California – was imported from the U.S., eight percent from Mexico and Ecuador, seven percent from China and six percent from Chile. The remaining 13 percent came from 30 other nations.

Within the Creston Valley, 2012 and 2015 flooding caused local farmers irreparable loss of crops due to ill-timed, climate change-induced flooding. These extreme weather conditions affect not only local and global industrial food economies but also prove worrisome in general due to the continuing biological, physical, and socio-economic effects (Ostry et al. 2011). Clearly, with B.C. so highly dependent on the state of California for its fruit and vegetable supply - because it exports 95 percent of its produced food (Brynne 2011) - diversification of its food supply outside of drought-affected California is critical and urgent. Furthermore, a re-

envisioning from industrial food producing regimes and current government policies that support locally sourced and environmentally sustainable food production is imperative (Ostry et al. 2011; Qualman 2011). As climate change exerts its devastating effects on B.C. food production, the import and export systems must be addressed. In other words, we can no longer be so cavalier in our attitudes towards food security and food sovereignty when food production is being severely affected by calamitous, long term climate change.

Climate change aside, the growing and increasingly wealthy population is accelerating the demand for meat, dairy, and fat-rich foods (Ostry 2010). According to B.C. Stats (2010), B.C.'s population is estimated to increase from 4.5 to 5.9 million by 2036. This population increase will necessitate an increase of arable farmland base, requiring a further intensification of agricultural yields, ultimately resulting in the increased application of petrochemicals and fertilizers of which more substantial amounts of nitrous oxide (N₂O) will be generated (Desjardins et al. 2007; Qualman 2019). At the nexus of global demographics, dietary trends, future increases in greenhouse gasses (GHG), land degradation, and sustainable land management in terrestrial ecosystems, a transformation in our current food system must occur to halt what even the International Fund for Agricultural Development (IFAD) calls an “unprecedented challenge” for the one economic sector that covers the “largest surface area in the world; agriculture...” (IFAD 2013:9).

Food Security

Despite their normalized use in everyday discourse, the terms food security and food sovereignty are confusing at best, and at worst, their multiple definitions, and different priorities, widening over time, have not made defining these meanings an easy task. A more precise framing of food

security and food sovereignty definitions and their associated discourses is therefore necessary (Gibson 2012; McDonald 2010; Pottier 1999; Sage 2014).

The evolution and expansion of the nation-state, especially after the fall of colonial regimes in the post-World War II era, had a considerable impact on contemporary understandings of food security (Adams 2003; Fowke 1946; Knuttifa 2003; Koc 2013; McMichael 2014). Nation-states considered food supply a priority and not only encouraged but supported agricultural production for domestic consumption and security (Koc 2013). Due to several historical, political, and economic crises, including the Great Depression, interventionist policies in agriculture were adopted. They included subsidized grain as animal feed and the emergence of large if not enormous, food stocks (Koc 2013). Surplus food was used as “food aid” to lure new nation-states to subvert peasant-based food production systems in favour of commercialized, export-oriented systems (Koc 2013). For example, the 1954 U.S. Agricultural Trade, Development and Assistance Act allowed the U.S. to provide aid to war-torn Europe and other new nations such as Bangladesh in the global South, and the World Food Program used food aid for social and economic development (Koc 2013). The implementation of these and other food aid policies mainly profited large landowners who developed monocrop farming, which in turn forced increasing numbers of small farmers out of agriculture (Knuttifa 2011; Koc 2013). Food provisioning was not only a national objective but also an international goal.

Food security discourses began to first appear in international development literature in the late 1960s and 1970s sparked by the world oil crisis which precipitated the rising food prices of 1972–74 and the Sahelian food crisis of 1972–73, the Biafra famine in 1968, and the Bangladesh food crisis 1972–1974 (Edelman et al 2014; Escobar 1995; Jarosz 2014; Toronto

Public Health 2006). The discourse is dominated by neo-liberal, globalization policies enmeshed within developmentalism, and economic growth measured by the World Bank and UNFAO.

As Escobar (1996) explains, the role of language is instrumental in creating social reality. Following Escobar's (1996) lead, Jarosz (2014) provides a telling example of how global food production discourse obfuscates the reality of global food distribution systems. U.S. Secretary of State Henry Kissinger convened the first World Food Conference (WFC) in Rome in 1974 after the previous devastating two-year famine in Bangladesh. He stated the necessity of increasing world grain production, establishing food reserves, and engaging in transfers of food from surplus areas to food deficit places (Friedman 1993; Jarosz 2014). It was no small coincidence, however, that the areas of food surplus were located in the European Union and the United States, thus creating the persistent notion that these two influential contributors would feed the world (Jarosz 2014).

It was also at the 1974 United Nations General Assembly that the Universal Declaration on the Eradication of Hunger and Malnutrition stated that:

Every man, woman, and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties¹².

This declaration is significant because it stressed availability and incorporated concepts from earlier "rights" discourses (Koc 2013). Also, in 1975, during the WFC in Rome, Food and Agriculture Director-General Addeke Henrik Boerma revealed his plan for the "International Undertaking on World Food Security", which called for the "creation of regional and national food reserves, food aid from North to South, and the establishment of a global information and early warning system for impending disasters such as famine" (Boerma 1967; Jarosz 2014). This

¹² World Food Conference General Assembly. 1974. "Universal Declaration on the Eradication of Hunger and Malnutrition". United Nations.

call coincided with the introduction of the Green Revolution technology, which was in full swing by 1975, and agricultural discourse (Escobar 1996). As Michael Watts (1983) explains, this was ostensibly a call for national self-sufficiency in Africa, Asia, and Latin America which ultimately resulted in large-scale, mechanized, agricultural programs through the diffusion of the Green Revolution panacea (Jarosz 2014).

The Green Revolution, developed initially in Mexico, offers one of the most powerful examples of how the food commodification approach to food security was enacted during the 1960s and 1970s. One of the strategic initiatives was a program of agricultural research that ostensibly promised to alleviate hunger in Mexico and the world. This alleviation was accomplished by increasing agricultural production through the spread of high-yield hybrid seeds and intensive agriculture (Koc 2013; Perfecto et al. 2009). U.S. researchers, who had been extraordinarily successful in developing high-yielding wheat, applied their technology to maize, rice and other crops from less affluent countries. The rest of the world followed suit in what was sold as an answer to a productivity problem (Perfecto et al. 2009). The Green Revolution did result in increased food production in many regions but had limited impact globally on poverty and hunger because it did not address the underlying issue of unequal access to that same food. Its most critical long-term impacts appear to have been the creation of greater inequalities in farming communities, environmental degradation, and rapid expansion of fast food commodity chains (Koc 2013).

With the Sahelian Famine of 1984–85, food security research and literature grew (Toronto Public Health 2006). Over time, the concept of food security has evolved and expanded to include over 200 definitions and 450 indicators of food security that also incorporate and address a large number of food-related issues (Toronto Public Health 2006). One of the ways in

which the notion of food security began to change was to expand beyond the quantity of food only, to the quality of food as well. Sage (2014) reminds us that food security was once defined by the supply of high-calorie foods such as cereals and tubers as a way to combat protein deficiency and malnutrition (Sage 2014; Leathers and Foster 2009). It is also worth noting that in its earliest stages, food security was a means, through the Green Revolution (see also Magnan 2011; Gibson 2012; Perfecto et al. 2009; Wittman 2009b) to provide increased calories first and foremost (Sage 2014). As the main objective was one of quantity, not the quality of food, this logic has proven faulty as calories alone do nothing to address nutrition (De Schutter 2014).

Furthermore, deficiencies of iron, Vitamin A, and iodine contribute to stunted growth for over 165 million children and vitamin deficiencies for over two billion people globally. An estimated 250 million preschool children are deficient in Vitamin A causing up to 500,000 of them to become blind every year with over half of them dying within a year of becoming blind (Khoury et al. 2014; WHO 2014). This data indicates the urgency to address not only food insecurity, poverty, and hunger but also to address nutrition (Kirkpatrick and Tarasuk 2008).

In 1986, the World Bank's *Poverty and Hunger: Issues and Options for Food Security in Developing Countries* provided one of the most widely cited definitions: "food security has to do with access by all people at all times to enough food for an active and healthy life" (World Bank 1986: v). Not only does this report address nutritional security by stating the need for enough food for a healthy life, but it also states that food security is "...achieved only if all households have the ability to purchase food" creating a necessity to measure ones' food security in terms of material wealth only. This type of definition ultimately ignores the fact that many rural farmers can grow enough food to eat but may still be cash poor. The above definition is different from the 1974 Universal Declaration of the Eradication of Hunger and Malnutrition where its

definition states that: “Every man, women, and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties” (World Food Conference General Assembly 1974).

Neither of these two discourses, that of the UN emphasizing human rights and the World Bank emphasizing purchasing power, link food security to self-sufficiency (World Bank 1986:31). These discourses reveal a shift emblematic of a time when food security was reconceptualized alongside “mainstream developmental issues” (Jarosz 2014:171). These issues were conceived through, but not limited to structural adjustment programs, trade liberalization, and integration into global, international, and national capital markets as strategies for households becoming food secure (Jarosz 2014:171). In this sense, food security began to be defined through the ability of individuals to have adequate income and therefore the purchasing power to acquire food, and the expansion of globalized food systems rather than other areas of state-led programs of exchange or subsidies, not to mention the ability to feed oneself (Jarosz 2014). It departs explicitly from, as Jarosz (2014) states, the 1975 World Food Conference report - global in its scope and focused on the problems of food shortages due to the Sahelian famines and the rising global food prices from 1972 to 1974 (9) – which pointed at governments and global food suppliers with the explicit aim of stabilizing international food prices. (Jarosz 2014).

Coupled with former UNFAO Director-General Anneke Henrik Boerma’s call for a global undertaking on world food security, the 1986 discourses and indicators were glaringly different. The food security narrative became an individual responsibility even though an individual’s access to food was dependent on factors mostly out of their control such as land access and ownership, trade, wage-earning opportunities, and global and regional food and grain prices (Clapp and Cohen 2009; Mousseau 2009). These discourses point to the contradictions of

capitalist development, and its articulations of commodity production to household food security. The burden of food security at the global level has now become the burden of the individual using narratives such as the ‘poor African women’ for example or the ‘small farmers’ ability to produce food (Jarosz 2014:172). The discourses also became increasingly tied to influential publications from the World Bank and the United Nations which further anchored the concept of food security in neo-liberal development discourse emphasizing that the individual could have access to food security through marketized, globalized, commoditized, and commercialized food systems (Escobar 1996; Jarosz 2014).

In 1996, the Rome Declaration on World Food Security introduced the following definition of food security: “The right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger” (UNFAO 1996). Technology, financial resources, and food aid through “sustainable development initiatives” were defined as plausible responses to food aid. The sovereign rights of nations to devise and implement policies to promote and support food security are also recognized. However, what is not identified is how national sovereignty is compromised, eroded, and favoured through the WTO’s neoliberal structural adjustment programs and trade relations over the preservation of local farmer’s initiatives for regional and sustainable food sufficiency (Sage 2014). Also, as Jarosz (2014) points out, the neo-liberal trade policies endorsed by UNFAO, together with the intensification of economic globalization, economic restructuring, and population increases were destabilizing supply and demand systems with the result that increasing numbers of people could not purchase the food they needed (Jarosz 2014).

Escobar (1996) concisely characterizes these processes when he states that “the sustainable development discourse purports to reconcile two old enemies – economic growth and

the preservation of the environment – without any significant adjustments in the market system” (328). By using the discourse of capital, representations of nature, management, and science, the sustainable development narrative reinvents nature as the environment so that capital may be sustained (Escobar 1996). Jarosz (2014) also argues that, while international food security policy and discourses as heralded by the World Bank, the UN, the USAID, and organizations such as the Gates Foundation continue to declare and support “production, supply and demand, and accessibility to groups and individuals based on purchasing power or agricultural activity” (173), the evidence indicates that this approach leads to more poverty and malnutrition areas among vulnerable populations in Africa, Asia, and Latin America. Furthermore, these discourses do little, if anything, to address poverty and hunger in wealthy nations such as the U.S.A., Canada, and the EU, or more particularly in the Creston Valley in B.C., for example (Jarosz 2014), where Indigenous people are most vulnerable.

Social justice in relation to food is an emerging topic in the literature (Allen 2010; Beischer and Corbett 2017; Cadieux and Slocum 2016; Clendenning et al. 2016; Grey and Patel 2015; Hochedez and Le Gall 2016; Loo 2014; Sachs and Patel-Campillo 2014). A sister term to Food Sovereignty, food justice goals aim for transformative change within the food system to an equitable, ecologically sustainable, and viable alternative to the industrial food complex. Its key foundations of change are based upon the four pillars of trauma and inequity, exchange, land, and labour while dealing at the intersection of power relations where disproportionate impacts are most experienced and exerted by the corporate industrial food regimes in the global north (McMichael 2005). Various reasons contribute to the economic and social marginalization and exploitation of food deprived people. For Indigenous Peoples, some of the conditions include geographical isolation, inadequate land allotments, and unresolved treaties, small at-risk

populations, and a lack of political representation, outmigration, social conflict (Reed 2011) and racism.

Although it is difficult to put the ideals of food justice into practice, the process of change is best served by analyzing the structures of inequality, power, and identifying the material conditions that enable these ideals to either be enacted or inhibited by social justice scholars and non-academics who work alongside marginalized people who experience food insecurity.

Food Security in Canada

Although food insecurity has been endemic in many parts of the world where globally 870 million people are chronically undernourished, it is increasingly becoming an important socio-economic issue in Canada as in other industrially developed nations (CCA 2014). Ironically, in a country that often produces food surpluses, approximately 1.6 million people, slightly more than 12 percent of Canadian households were experiencing some level of food insecurity in 2011, an increase of 450,000 Canadians from 2008 (CCA 2014; PROOF 2019; Tarasuk 2016;). About one in eight households are affected, which includes 3.9 million individuals, of which 1.1 million are increasingly children, youth, and single-female families and Indigenous people (CCA 2014; Raphael 2009).

In Canada, lifelong malnutrition in children continues to plague Canadians, and as Reutter et al. (2006) explain, reducing the health inequities arising from situations of poverty is imperative. The National Council of Welfare (2004) states that 14 percent of Canadians are living in poverty, concentrated in single-female parent families, unattached female seniors, recent immigrants, and urban Indigenous people.

Responses to food price fluctuations at the household level, especially for those considered below the ‘poverty line,’ constrains individuals from obtaining sufficient amounts of food, thus, exacerbating the chances of becoming food insecure. It is at the intersection of poverty and food insecurity, dependent on financial ability and market price fluctuations that an insecure food situation is experienced at the personal and family level as defined by the UN. As Dowler (2003) points out, food security necessitates secure livelihoods or sources of income which provide enough money to purchase food to allow a healthy life. Income alone, however, does not provide a clear indicator of poverty or food security because UN agencies promote a world in which everyone is entirely reliant on cash, incomes, wage labour, and therefore includes the industrial food complex.

People lining up at the many food banks in most Canadian cities and towns provide a graphic example of the relationship between poverty and food insecurity in Canada. Canadians spend only 10 percent of their incomes on food supplies because cheap food policies have enabled low industrial wages and much of the Canadian food supply is imported (UNHRC 2012). For example, Canada imports about 45 percent of its domestic food supply. Paradoxically, however, food insecurity is on the rise. Usage of Canadian food banks has increased from 7.7 percent to 8.2 percent of the population between 2007 and 2011 where over 900,000 Canadians accessed their local food banks each month (Desmarais and Wittman 2014; UNHRC 2012).

Relative poverty measurements, used mostly for wealthy developed nations, are defined as the inability to secure the financial, economic, and social means necessary to obtain an education, maintain a healthy diet, or to secure safe and adequate housing (Raphael 2004; 2007; 2009). Together these measurements of poverty indicate that Canada performs poorly, ranking

19th out of 30 industrialized nations for adults; 21st out of 30 for families with children; and 20th for children (OECD 2008) based on pre-tax low-income cut-offs as shown in Table 4.1.

Table 4.1 - Measurement of Poverty in Canada According to OECD Standing.

Rankings	Adults	Families with children	Children
Ranking for Canada (ranked amongst OECD Nations)	19/30	21/30	20/30

Given this cause and effect relationship within the Canadian context, the inextricable link to food insecurity due to poverty is evident. New terms - “food poverty” in Europe (Sonnino and Hanmer 2016; Taylor and Loopstra 2016) and “food bank nation” in Canada (Riches 2018) have become prominent in mainstream discourse (Riches 2012:18). In a study conducted by Sonnino and Hanmer (2016), rising food prices dis-proportionate to household income spent on food have been identified within the lowest-income households in the United Kingdom, and food banks have arisen at an unprecedented rate. Also in the UK, during 2013, 14 charity organizations delivered over 20 million meals (The Trussell Trust 2015) while in Canada, Food Banks Canada (2013) reported in 2013 over 200 million pounds of food distributed annually indicating an increase of 30.6 percent since 2008 of the number of people using food banks (Food Banks Canada 2012, 2013; Tarasuk et al. 2014). These numbers provide evidence from Canada that although food banks were once thought of as a short-term solution to the food crisis, they have now become a firmly entrenched food mechanism to mitigate against hunger for food insecure families. Thus, the lines between the welfare state and charity food roles are further blurred and deflect from state roles and responsibilities, perpetuating a mechanism that ‘tackles’ food poverty, but does not address its structural problems (Reutter et al. 2006:7; Sonnino and Hanmer

2016:214). In other words, there is a definite shift in policy narratives which attribute the responsibility of food provisioning as having moved from the state to the philanthropic individual, thus absolving the government from having to address structural causes of the food crisis (Escobar 1995, 1996; Sonnino and Hanmer 2016). Furthermore, Tarasuk (2014) notes the similarity between public responses to poverty, which are being scaled back in the U.K. and a trend that is likely also happening in Canada. Granted, while using the economic model to determine relative poverty lines, and while recognizing that food poverty is multidimensional and multifaceted, food security also includes cultural dietary choices, and physical and financial resources, requiring a relational view of multiple socio-cultural, economic, and political deprivations (Sonnino and Hanmer 2016).

In 2007, household food insecurity in Canada had increased from 1.4 to 1.7 million households in 2012 (12.6 percent), representing four million people (Tarasuk et al. 2014). As Koc and Bas (2012) point out, the Canadian federal government has done little to implement policies that address the material deprivation in Canada, and to provide health initiatives and supports to the impoverished in Canada, apart from food banks which represent de facto policy on the food security needs of impoverished Canadians. In fact, charitable food banks are glaring markers of domestic food hunger (Raphael 2009; Riches 2018). Presently, Canada uses the Household Food Security Survey Module (HFSSM) on the Canadian Community Health Survey (CCHS) to measure household food insecurity (Government of Canada 2012; HFSSM 2012; Statistics Canada 2016c). This survey is conducted every year, but it was only mandatory to be included in the HFSSM in years 2007-2008 and in 2011-2012 with some provinces and territories opting not to conduct food insecurity surveys. These surveys have indicated that food insecurity has increased 11.3 percent in 2007-2008 and 12.4 percent in 2011-2012.

In May 2012, Mr. De Schutter visited Canada and met with political leaders and the senior administrators of several federal Ministries and Departments¹³ in order to collect and examine information about issues that are specific to the realization of the right to food. The Special Rapporteur travelled to Montreal, Québec; Ottawa and Toronto, Ontario; Winnipeg, Manitoba; and Edmonton, Alberta and convened with eight civil society groups including farmers' organizations, food security groups, human rights organizations, academics, researchers, and community members including Indigenous groups in four provinces.¹⁴

In his final report, De Schutter stated that a growing number of people in Canada are unable to meet basic food and nutrient needs even though the number of social protection schemes has skyrocketed. He expressed special concern over the growing gap between Canada's domestic human rights commitments and their on-the-ground realization. He also stated that Canada would benefit to a Right to Food strategy while also noting that Canada is continually moving to large-scale, industrial agriculture modes of production, leading to unsustainable farming practices and food procurement methods resulting, in turn, in higher GHG emissions, and loss of biodiversity. While noting the detrimental socio-environmental effects of industrial

¹³ These departments and ministries include: Aboriginal Affairs and Northern Development Canada; Agriculture and Agri-Foods Canada; Fisheries and Oceans Canada; Health Canada; Human Resources and Skills Development Canada; Justice Canada; and the Canadian International Development Agency. He also met with the Minister of Health, Leona Aglukkaq, Nunavut Department of Health and Social Services; the Ontario Ministries of Agriculture, Food and Rural Affairs, Children and Youth Services, and Health and Long-Term Care; the Ontario Human Rights... Commission and the Human Rights Legal Support Centre; the City of Toronto (Food Strategy Team and Food Policy Council); and the Manitoba Ministry of Aboriginal and Northern Affairs, Ministry of Agriculture, Food and Rural Initiatives, Ministry of Family Services and Labour, and Ministry of Healthy Living, Seniors and Consumer Affairs. The Special Rapporteur also met with political party officials, including Thomas Mulcair, leader of the New Democratic Party, and Bob Rae, interim leader of the Liberal Party.

¹⁴ Québec, Ontario, Manitoba and Alberta, the Inuit Tapiriit Kanatami, Inuit Circumpolar Council-Canada and the Congress of Aboriginal Peoples, the Assembly of Manitoba Chiefs, Manitoba Keewatinowi Okimakanak and Southern Chiefs, Sagkeeng First Nation, Chemawawin Cree Nation, Pukatawagan/Mathias Cree Nation, Lake Manitoba, Peguis, Swan Lake, Treaty 3 First Nations, God's River, Manto Sipi Cree and Wasagamack First Nations around the Island Lakes area, Confederacy of Treaty 6 First Nations, the Alexis Nakota Sioux First Nation and the International Indian Treaty Council, Treaties 6, 7, 8, in Alberta, the Enoch Cree First Nation and the Northwest Territories.

agriculture De Schutter emphasized that: “A thriving small-scale farming sector is essential to local food systems, which food policy councils and localities throughout Canada now seek to strengthen” (United Nations General Assembly 2012:9).

Although little else has been done at the federal level of the Canadian government, on August 21st, 2018 Minister Jean-Yves Duclos of the Ministry of Families, Children and Social Development released the document *Opportunity for All – Canada’s First Poverty Reduction Strategy* (Government of Canada 2018a). In this document, food security is mentioned as one of several indicators of poverty – a good start for Canada’s elected officials in realizing that food insecurity in Canada is rooted in income inadequacy. However, it is still a far cry from adopting food security legislation for all provinces and across various ministries. The Ministry of Agriculture, rather than playing a lead role in developing food security policy, focuses instead on supporting further agricultural industrialization and increased participation in global market systems which, as noted previously, disadvantages small producers, generates more inequality, and intensifies greater food insecurity for the most vulnerable (McIntyre et al. 2016).

On June 17, 2019, the government of Canada announced its much lauded Food Policy for Canada document (Government of Canada 2019d). Unfortunately, it falls drastically short of actually prescribing a food security policy. Although it is committed to a \$50 million Local Food Infrastructure Fund that purports to support community-led projects that help to access safe, healthy, and culturally diverse food, it does not address its main objective which is to fund one of the world’s largest industrial food system and export policies. Its four thematic chapters still encapsulate often competing and contradictory ideas that have yet to articulate how difficult choices in addressing food security will be made. Food Secure Canada (FSC) (2019) states that

this policy has the ability to be transformative while recognizing that its success depends on how the policy is enacted, how funds are allocated, implemented, and governed in the future.

Furthermore, FSC (2019) says the food policy does not address environmental degradation caused by industrial agriculture, four million people who continue to experience food insecurity nation-wide, Indigenous poverty and food insecurity, and racialized and minority groups who continue to go hungry. Small farmers are not directly addressed either. Food Secure Canada holds the Government of Canada accountable to their six priority outcomes (FSC 2019) which include a right to food and Indigenous sovereignty through reconciliation. Food sovereignty, decolonization, and guaranteed access to land are not recognized and until these glaring omissions are addressed this document highlights the urgent need for a coherent set of food security policies.

Community Food Security

Although the B.C. government temporarily opted out of measuring food insecurity in 2013 and 2014 (Tarasuk et al. 2015:8), statistics from other participating provinces indicate high rates of persistent food insecurity (Tarasuk et al. 2015, 2016). What is clear is that up-to-date, evidence-based statistics are imperative if efforts to mitigate against food insecurity are to be taken seriously by the provincial governments. At the community level, Wakefield et al. (2012:1411) conducted a full examination of community food assistance in the Toronto and Hamilton areas and found 31 community agencies that address community food security indicating the inadequate mandates or declarations at the federal level that addresses food security.

Agencies at regional and municipal levels have stepped forward to fill the policy vacuum, due to the lack of a single federal ministry's comprehensive food security policy, such as

Toronto Public Health (TPH). TPH states that food security is still the most common term used among those who work to meet the needs of individuals, households, and communities.

However, they also insist that the definition should go beyond food quantity and quality to include the four “A’s” as proposed by Mustafa Koc (2013). These “A’s” are: availability, which emphasizes having sufficient food for all people at all times; accessibility, which means having physical and economic access to food at all times; acceptability, which stresses access to culturally and symbolically acceptable foods, produced in ways that do not compromise dignity, cultural traditions, or self-respect of human rights; and adequacy, which is defined by having access to food that is nutritious and safe, including being produced in environmentally sustainable ways. A sustainable food system is defined as one that meets basic human needs, without compromising future generations’ ability to meet those needs (Toronto Public Health 2006). Another way to frame these four concepts, - plus universality - is looking at the five basic and essential questions provided by Toronto Public Health (2006) in Table 4.2.

Table 4.2 - Definitions of Food Security (Toronto Public Health, 2006).

QUESTION:	ANSWER:	
Who should get the food?	Everyone/all people	(UNIVERSALITY)
When?	At all times/sustained access (Availability)	(STABILITY)
How?	Through normal food channels/not from emergency food assistance programs (Accessibility)	(DIGNITY)
How much food?	Enough for a healthy active life (Adequacy)	(QUANTITY)
What kind of food?	Safe and nutritious Culturally appropriate Produced in environmentally sustainable ways that promote strong communities (Acceptability)	(QUALITY)

By addressing the above questions in Table 4.3, food security acts as a canopy term that advocates for equity in all aspects of food security. As the table indicates, all people should be able to access food in a dignified manner at all times for a healthy, active life. It also stresses that food should be safe and nutritious and produced in an environmentally sustainable way that promotes healthy communities.

Of course, the context in which these questions are answered can be quite complex and inextricably intertwined and may rely upon specific geographic factors and conceptual starting points. For example, a global food security framework would analyze the ability of national and international global food producers and systems to meet the Earth's seven billion inhabitants' dietary needs. This analysis needs to also take into consideration threats to the sustainability of food provisioning such as genetic modification, corporate dominance, and threats to bio-diversity, topics addressed in the next section (Toronto Public Health 2006).

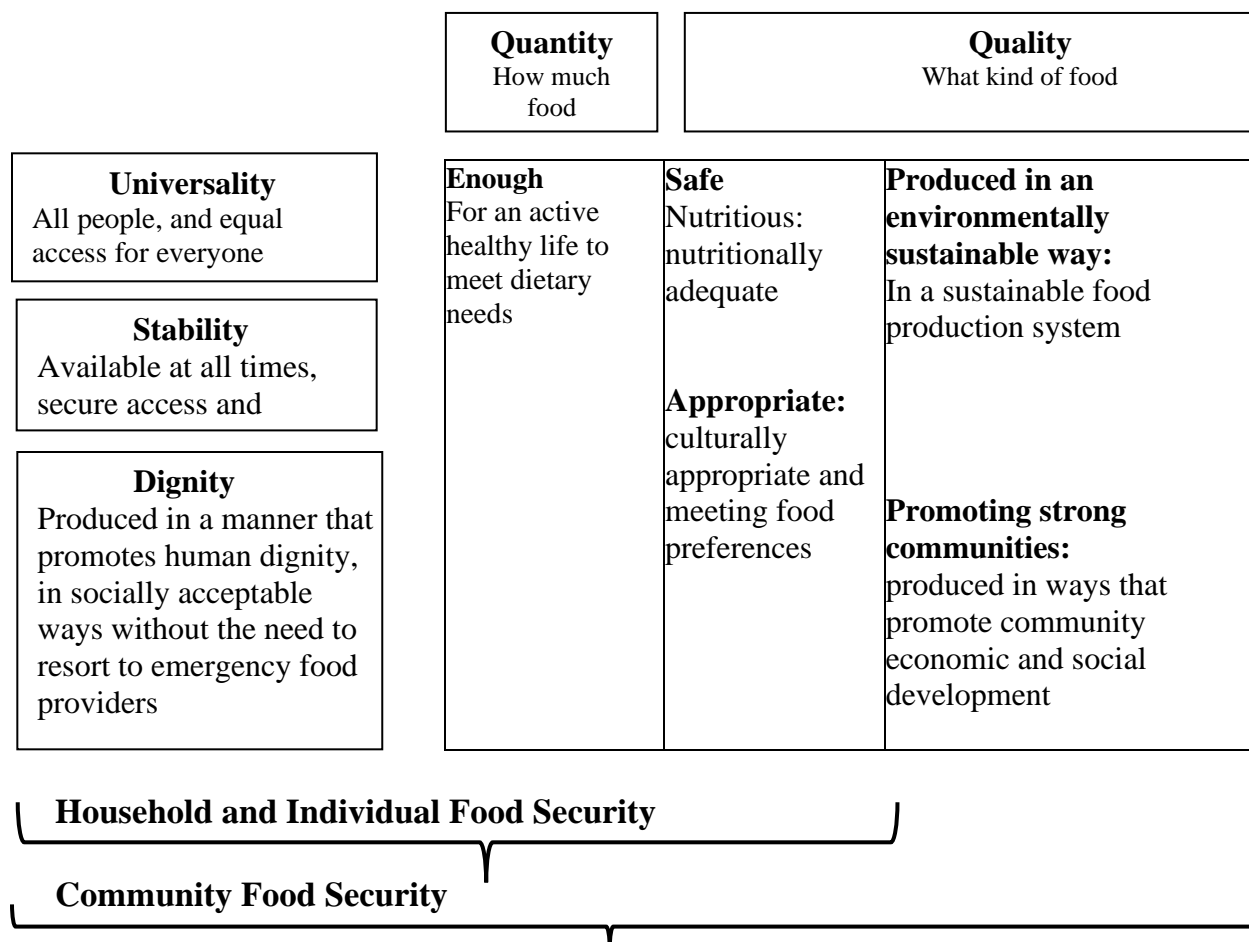


Figure 4.1 – Common Components of Food Security Definitions (Toronto Public Health, 2006).

Figure 4.1 shows how the concept of food security evolved to answer five specific questions. The above table explains that if all people have equal access at all times, through a dignified manner, in socially acceptable ways, and without the need to resort to emergency food provisioning centres, then the quantity and quality of nutritious food based on nutritionally adequate food - reached in a safe, nutritious, and culturally appropriate way - food security can be achieved for an active and healthy lifestyle. In this way, food security can contribute to economically secure and socially well-developed communities.

In the 1980s, analyses of food security began to include the concept of stability of “assured food” access as an essential component. Essentially, this concept mirrored the idea of food security as a fundamental ‘right’ stemming from the 1974 Rome FAO World Food Conference’s Declaration on the Eradication of Hunger and Malnutrition (Koc 2013). As a consequence, for the last two decades households and individuals were analyzed primarily within the context of experiences of hunger, and to a lesser degree, how experiences of the quantity and quality of diets were perceived to be compromised. This analysis has ultimately led to the identification of the numbers of food insecure individuals or vulnerability to food insecurity (Toronto Public Health 2006).

In the early 1990s, much research was conducted with low-income women in upstate New York by Radimer et al. (1992), who stated that experiences of household food insecurity might have four aspects:

- Quantitative (not enough food).
- Qualitative (reliance on inexpensive non-nutritious food).
- Psychological (anxiety about food supply or stress associated with trying to meet daily food needs).
- Social (having to acquire food through socially unacceptable means such as charitable assistance, buying food on credit, and in some cases, stealing).

These four dimensions of household food insecurity and the five conceptual components of food security are interconnected. However, the authors of the Toronto Public Health report have identified gaps in these definitions. First, the existence of food insecure households shows that universal food access is absent. Second, psychological aspects of food insecurity stem from unstable access and the inability of households to have sustained (stable) access to food due to resource (money) constraints, which means adults may experience anxiety. Third, accessing food in ways that respect human dignity is sometimes impossible for food insecure households who

must depend on socially unacceptable ways to meet their dietary needs. Figure 4.2 indicates the flow of experiences and decisions that may take place as resources decrease. Anxiety typically occurs first, which is then followed by compromises in the quality and quantity of food intakes, where quality typically comes at the expense of quantity.

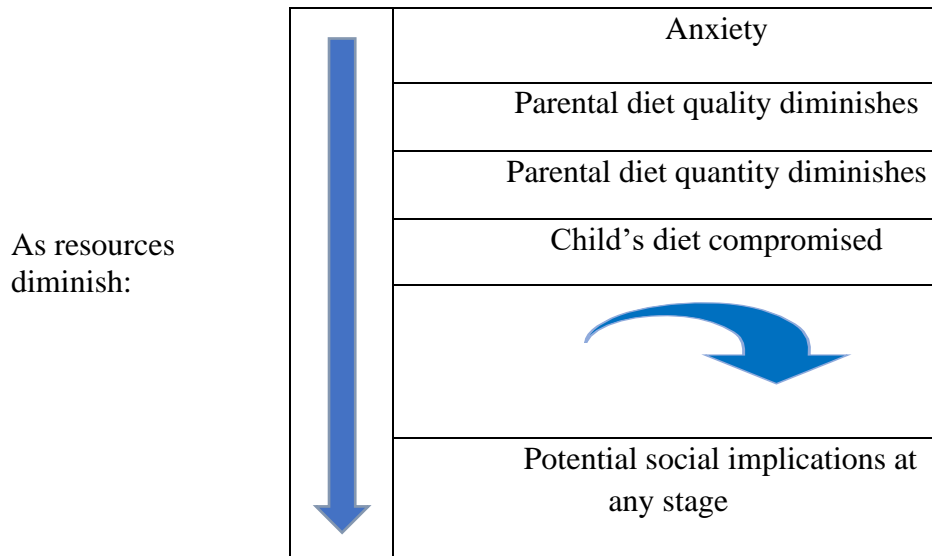


Figure 4.2 - Intrahousehold Food Dynamics Amidst Diminished Resources. Adapted from Hamelin et al. (1999).

It is noted in reports from Hamelin et al. (1999), Kendall et al. (1996), and Radimer et al. (1990) that not all households experience food insecurity in this manner. Instead, perception and response to food insecurity experiences are highly characteristic of experiencing food insecurity (Toronto Public Health 2006).

Although household and community food security remain intricately linked, most recently, there has been a shift in focus towards community-level food security concepts (Toronto Public Health 2006). While the emphasis of household food security primarily focuses on the physical and economic access to food, community food security also concentrates on the

importance of the environmental and social aspects of the food provisioning system (Power 2008; Toronto Public Health 2006). This concentration on environmental and social aspects not only addresses sustainability but can also include social justice, self-reliance, and community economic developmental issues, among all stakeholders in local or regional food systems (Toronto Public Health 2006).

In Canada, the Ontario Public Health Association (2002) has taken a keen interest in community food security. In its 2002 paper, “A Systemic Approach to Community Food Security: A Role for Public Health,” a broad definition of terms is based on the Ottawa Charter for Health Promotion which says that the importance and definition of ‘social determinants of health’ is:

Community food security is a strategy for ensuring secure access to adequate amounts of safe, nutritious, culturally appropriate food for everyone, produced in an environmentally sustainable way, and provided in a manner that promotes human dignity (2).

This last definition combines all aspects of Food Security in Table 4.3 which is expressed in the overlapping of the five Conceptual Components of Food Security proposed by Toronto Public Health (2006:20), four Dimensions of Household Food Insecurity proposed by Radimer et al. (1992), together with the original four A’s proposed by Mustafa Koc in Toronto Public Health (2006:25).

Table 4.3 – Historical Definitions of Food Security Combined (Taylor 2016).

Various Food Security Definitions Combined					
Toronto Public Health (2006)	Universality	Quantity	Quality (Nutrition)	Stability	Dignity
Mustafa Koc (2013)	Availability	Adequacy	Acceptability	Accessibility	
Radimer et al. (1992)		Quantitative	Qualitative		Social and Psychological

Table 4.3 intends to indicate the synchronicity of the various theories that are included in the Ottawa Charter for Health Promotion's definition of food security.

In 2013, the UNFAO Committee on World Food Security proposed the most current definition of food security to include the importance of nutrition. Food and nutrition security exists:

when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services, and care, allowing for a healthy and active life (UNFAO 2013:50).

In this case, the notion of health is included by the UNFAO in 2013 and resonates with the Ottawa Charter for Health at a time when the state of the western world's health is in sharp decline. This topic echoes with Khoury et al. (2014) and the WHO report (2014). These definitions combined create what I believe to be a concise definition for creating Canadian food security.

Although the concept of Community Food Security is included in the Toronto Public Health Report (2006), the concept interestingly shares more aspects with Food Sovereignty. It indicates a shift in focus by public health authorities to a community level. Within the

community level focus, the goals of physical and economic access to food remain but also includes and acknowledges the importance of economic, environmental, and social aspects of the system (Toronto Public Health 2006). These goals have partly arisen because a focus on food insecurity can no longer solely focus on the individual and household level. It must also include a more socio-holistic approach if food security goals are to be realized. Food system sustainability, issues of social justice, self-reliance, community economic development, and an inclusionary, collaborative, and cooperative model between all players in regional and local food systems are some of these social aspects (Toronto Public Health 2006). Based on the Ottawa Charter for Public Health principles, Toronto Public Health (2006) provides the most comprehensive definition of Community Food Security. This definition has identified the critical importance of the “social determinants” of health.

Ontario Public Health Association’s (2002) definition also includes and addresses several other points such as issues of adequate income for consumers and growers, local food production, environmental sustainability, fish and wildlife habitat protection, and access to nutritional, food-based community economic development, and social cohesion. Many health authorities nation-wide have adopted community food security as a response to the rise in food banks and obesity along with the increase in diabetes rates while environmental concerns were also being tabled for discussion; bio-diversity preservation, the health ramifications of chemical pollutants, and the impact of genetically modified foods on the environment (Toronto Public Health 2006).

This section has outlined the myriad of food security policies at various levels of government, including community initiatives. Even though, as McIntyre et al. (2016) have pointed out in their literature review, the B.C. government has recently shown a concerted effort

to implement agricultural programs that are more aligned with food sovereignty principles, it still lacks a comprehensive national food security policy. Moreover, a national food security policy must align with all levels of government, and until the governments expressly declare food security to be a priority in its mandates across all sectors of government, the abysmal conditions of poverty that contribute to food insecurity will unfortunately persist.

What passes as food security policy in Canada is a collection of many disjointed pieces of policy, regulations, programs at various levels of government. Even a cursory review of policy literature reveals that the technocratic, mechanistic, fragmentary, and contradictory view of food substantiates this hypothesis. Furthermore, Martin and Clapp (2015) explain that the financialization of the agricultural regime is firmly placed within the paradigm of neo-liberal and capitalist relations, which support industrialized agriculture. A food policy which prioritizes agriculture production systems that ensures and delivers the highest quality of nutritious food, in the most efficient and environmentally sustainable way and that addresses governance and reconciliation is yet to be developed. If the Canadian government legislated a food security policy according to the definitions of La Vía Campesina (1996b) and the IAAKSTD (2009) then indeed, the definitions of community food security would exist as precursors to attaining food security in Canada.

Food Security in British Columbia

Poverty continues to exist in the province of British Columbia at alarming levels. Data first began to be kept in 1989 by First Call (2019); a non-partisan youth advocacy coalition made up of over 101 provincial and regional organizations. The First Call mandate is to put children and youth first in B.C. through community mobilization and public policy advocacy (2019). The First Call Report refers to the LIM when it uses the term ‘below the poverty line’ interchangeably

with ‘poor child’ or ‘poverty’ (First Call 2017). In B.C., 20.4 percent of children in B.C. aged 0 – 17 years, live below the poverty line according to Statistic Canada’s LIM (First Call 2017). Having the highest provincial record in Canada, one in five children (over 167,810 in B.C. and the highest number in the 0-5 age group - 20.7 percent) grow up in poverty. This abysmal record by provincial government points to the need for systemic policy changes that would support families in their child-rearing years (First Call 2017). Children 0 – 5 are at the most vulnerable age for proper brain development, so it is critical that their daily food and nutrition needs are met (McCain and Mustard 1999).

Although notions of food security vary widely across Canada and in British Columbia, Hamm and Bellows (2003) define community food security as:

Community food security is a situation in which all community residents obtain a safe, culturally acceptable, nutritionally adequate diet through a sustainable food system that maximizes self-reliance and social justice (37).

While variations of this definition exist within some provincial associations, several projects and initiatives are found within the literature. For example, the BC Food Security Gateway (2019) is comprised of several food security networks which are coalitions of community members, organizations, agencies, and businesses that work collaboratively to address food security. Policy Councils consist of members representing various sectors of the food system which identify emerging food issues that will impact their municipality or region, and work to influence them through policy and programs. Typically, they collaborate with the municipal or regional government. Agencies include provincial government ministries, seven health authorities, provincially-funded initiatives, and other B.C.-wide organizations. Within the Food Security Networks, several authorities list small networks of local food initiatives. These

initiatives fill a void that the government of Canada's food security policy should be responsible for, instead of thrusting the responsibility towards various non-agricultural ministries, not-for-profit organizations, and charity groups (BC Provincial Health Services, Act Now BC 2006).

The link between poverty and food security in B.C. was established simultaneously with the shift of neoliberal narratives based on developmental paradigms and hegemonic practices, making food security intricately linked to the ability to purchase food (Escobar 1996; Jarosz 2014). Personal stories from some areas where poverty rates are as high as 50 percent (First Call 2015) further articulate the suffering, devastation, and injustice of the social conditions which lead to these situations. Several adverse impacts of the neo-liberal food system especially in the case of threats to the agricultural land base, including extreme climate change and water treaty making, not the least of which is a different food security policy.

Food Security in the Creston Valley

In the area of the Central Kootenays, where Creston is located, 26.1 percent of children 0 – 17 years of age live in low-income families (First Call 2015).

Furthermore, the number of children living in poverty in the Central Kootenays is 2,520, while the provincial total is 153,300 children living in poverty (First Call 2017). Given the link between poverty and food security, as discussed in the previous section, inarguably children are experiencing food insecurity in the Creston Valley. Under the Interior Health Authority, the Creston Valley Food Action Coalition (CVFAC) works to provide a network of local food producers and agricultural agencies. This network is comprised of concerned citizens working to create awareness of how they can better provide food using local resources in a sustainable, healthy, secure, and environmentally sound way.

One initiative in Creston is the Harvest Share program, which endeavours to supply extra produce to community groups who then dispense food to local churches and schools.

Regrettably, without an official food security policy firmly in place at the federal and provincial levels, community organizations will be left responsible for assisting in ameliorating the abysmal food insecurity situation in the Province of B.C. and the Creston area. The Creston Valley is ostensibly a food secure region within B.C.'s notable agriculturally diverse province, capable of producing an abundance of land-based foods, distributing it through its many small market networks, and providing a secure framework of food sovereignty practices. However, the dominant neo-liberal food regime and the continued deepening of its integration into globalized and industrialized food systems threaten small-scale food producers to continue providing a healthy, sufficient, local, and sustainable food supply for everyone (Pechlaner and Otero 2010; Wittman and Barbolet 2011). With 68 percent of the global population expected to live in urban areas by 2050 (UNDESA 2019) it is urgent that we integrate food security policy into urban planning to address food insecurity.

Indigenous Food Security

A lack of justice for Indigenous farming communities necessitates a better understanding of Indigenous people's food procurement systems, who globally account for 370 million inhabitants and a third of the world's impoverished population (UN 2009). Indigenous people's food systems are indicative of the shift away from traditional and nutritionally valuable native plant and wildlife foods, known as country or traditional (or ancestral) food, to a diet that is predominantly based on market food (CCA 2014; FNFNES 2011; Ostry and Morrison 2010; Paci et al. 2004; Wilson 2019). This transition has consequently resulted in higher rates of obesity, acute myocardial infarction mortality, diabetes, mental health problems such as depression, and

substance abuse indicating that people who are food insecure are more susceptible to these and other chronic health problems (CCA 2014; Paci et al. 2004).

However, it is widely acknowledged both in the literature and through lived experience, that food insecurity in Canada's northern and remote Indigenous communities is a severe problem (CCA 2014). In these regions, almost one million First Nation people in Canada are in a desperate situation, becoming the most marginalized of all groups and experiencing what is known as 'silent hunger' (Chan et al. 2011; McIntyre and Rondeau 2009; Tarasuk 2016; Tarasuk et al. 2014; UNFAO 2012a, 2012b). In the 2007 – 2008 International Polar Year Inuit Health Survey, Nunavut was identified as the highest rate of food insecurity for any Indigenous population in the global North due to several confounding factors (Rosol et al. 2011). The factors include the vast geography, remote communities, shifting climate change, changing economies, and social environments of its communities, among other socio-political factors (CCA 2014). While this data is indicative of on-reserve Indigenous populations, off-reserve households in Canada experience food insecurity that is more than double of all Canadian households from 27 percent to 33 percent - three times higher than the national average where households with children and more women than men are affected (CCA 2014). In some Indigenous communities, especially in the North, levels of food insecurity reach 75 percent (Fieldhouse and Thompson 2012; Thompson et al. 2011). Higher food prices due to the disruption of traditional food procuring practices, processes of colonialism, environmental dispossession and change, economic transitions, and material poverty are just some of the factors that are ubiquitous among all Indigenous groups in Canada (CCA 2014) where centuries of colonization have dislocated Indigenous communities' ability to govern their own food production systems (Mihesuah et al. 2019).

Willows et al.'s (2009) study of poverty rates of Indigenous people in Canada concludes that increased rates of poverty persist among economically vulnerable groups and are especially widespread within First Nations, Métis, and Inuit populations in the lowest household income category. Consequently, in Indigenous households who receive social assistance, monies meant for food are often prioritized towards essentials such as housing and utilities, clearly linking the interrelated concepts of poverty and food insecurity in Canada (Willows et al. 2009).

Furthermore, Barker et al. (2015:3) examine vulnerable populations of street children in Vancouver, Canada and conclude that Indigenous children suffer most from perpetual poverty, lack of housing, and food insecurity.

As indicated in Table 4.4, of 12 million non-Indigenous Canadian households and 196,000 off-reserve Indigenous people surveyed in 2004, 33 percent of Indigenous households were food insecure compared to nine percent of non-Indigenous households (Willows et al. 2009:1152). Of Indigenous households, 19 percent experienced moderate food insecurity and 14 percent experienced severe food insecurity compared to non-Indigenous household statistics of six percent and three percent, respectively (Willows 2009:1152).

Table 4.4 - Canadian Household Survey for Food Security (2004).

Canadian Households Surveyed in 2004 (Willows et al. 2009:1152)			
Non-Indigenous		Indigenous – (off-reserve)	
12,000,000 surveyed		196,000 surveyed	
9% food insecure		33% food insecure	
Moderate	Severe	Moderate	Severe
6%	3%	19%	14%

Dominant approaches to address British Columbia's poverty and food-related challenges resonate with food security discourse. In 2014, 30,000 B.C. children relied on food banks, an increase of 23 percent from 2008 (First Call 2015). It also bears mentioning that children of recent immigrants and refugees, Indigenous children, children of female lone-parent families, children of racialized families and children with a disability are at the highest risk of living in poverty. It is a much more dismal situation for Indigenous children which according to a study using 2006 census data, the poverty rate for status Indigenous children in B.C. was 48 percent, and the rate for other Indigenous children was 28 percent, compared to a poverty rate of 17 percent for non-Indigenous children (MacDonald and Wilson 2013).

Respecting, maintaining, strengthening, and nurturing traditional, locally-based Indigenous food systems alongside local agricultural food producing regions is one possibility of mitigating against further increases of food insecurity where agriculture and fisheries make up the primary food sector in Canada (De Schutter 2011, 2012, 2013, 2014; Feagan 2007; Ghanem and Cross 2008; UNFAO 2012a, 2012b).

Food Sovereignty

In 1996 at the World Food Summit in Rome the concept of food sovereignty emerged to counter food security discourses. It began as an alternative paradigm aimed at thwarting the neoliberal, industrialized economic model and took on an anti-globalization stance towards the corporatized, globalized, nationalized, and regionalized food systems, partly as a revolt against the dumping of subsidized US corn in Mexico (Beuchelt and Virchow 2012). Specifically however, in a meeting in Mexico in 1996, La Via Campesina first discussed food sovereignty. Based in Brazil, La Vía

Campesina (LVC), an international peasant¹⁵ movement formed in 1993, is comprised of 148 organizations from 69 countries throughout the Americas, Africa, Asia, and Europe (La Vía Campesina 2000c, 2008, 2009). The movement was premised upon a call for national sovereignty in agriculture, which aims to reframe and reconstitute an agrarian citizenship and ecologically sustainable local food production (Beuchelt and Virchow 2012; Desmarais and Wittman 2014; Desmarais et al 2011; Edelman et al 2014; Holt-Giménez 2009; Jarosz 2014; La Vía Campesina 2003; Sage 2014; Wittman 2011a). In 1996 LVC (1996a, 1996b) defined food sovereignty as:

The right of each nation to maintain and develop *its own* capacity to produce its basic foods respecting cultural and productive diversity. We have the right to produce *our own* food in *our own* territory. Food sovereignty is a precondition to genuine food security (1996:3)¹⁶.

This position paper was a direct response to the inequities created by the neo-liberalized trade and agricultural economic policies that virtually destroyed sustainable farms and peasant agriculture and created global poverty, hunger, and an unsustainable industrialized food complex (Burnett and Murphy 2014; Edelman et al. 2014; Jarosz 2014; Sage 2014; Wittman et al. 2009b; 2011a). Dominant neoliberal trade relations along with structural adjustment programs imposed by the World Bank, the International Monetary Fund as well as the International Agreement on Agriculture were seen as tantamount to the destruction of state sovereignty (Beuchelt and Virchow 2012). This initial position is necessary because it addresses peasant's lack of autonomy, supports local, sustainable farming, and is anti-global in its philosophy. Using

¹⁵ While the term “peasant” is seen colloquially as a pejorative term, national and international farmers’ movements embrace the term with pride, and it is therefore used within the framework of this paper as such.

¹⁶ See Jarosz 2014 – Vía Campesina’s Seven Principles of Food Sovereignty (173).

language that emphasises farmer's rights, it places the responsibility and autonomy at the local and national level (Beuchelt and Virchow 2012; Jarosz 2014; Sage 2014).

It is important to note that as the definitions of food security evolved from a national right of governments to negotiate free trade agreements, to the need to include the right of individuals, food sovereignty became the prerequisite to achieving genuine food security. This fundamental shift is based on the rebuilding of direct relationships between producers and consumers and became one of its most essential cornerstones in achieving equitable social, economic, and political relations in agriculture. Truly, food sovereignty demands a healthy, diverse, and sustainable rural economy that does not just address food but goes on to offer a vision of a sustainable future within the broader issues of how, what, where, and by whom and for food is produced.

In 2003, LVC released a second food sovereignty position document that continued to oppose the neo-liberal food system:

The right of people to define their own agriculture and food policies, to protect and regulate domestic agricultural production and trade in order to achieve sustainable development objectives, to determine the extent to which they want to be self-reliant, and to restrict the dumping of products in their markets. Food sovereignty does not negate trade, but rather it promotes the formulation of trade policies and practices that serve the rights of people to safe, healthy, and ecologically sustainable production (La Vía Campesina 2003:1).

This position document includes a shift to include the rights of people. The declaration asked the government to expressly adopt policies that: “promote sustainable, family-farm based production rather than industry-led, high input and export-oriented production” (Jarosz 2014:173-174). It also reflects an emerging and rightful concern with genetic modification of seeds, foods, feeds, and other GMO products. Furthermore, this declaration is critical of the World Trade

Organization (WTO) for its undemocratic practices and unaccountable position vis-à-vis food growers (Jarosz 2014) and includes the notion of trade policies between countries such as NAFTA, CETA, and TPP (Desmarais and Wittman 2014).

Both of these position papers make clear their resolute belief that hunger and poverty stem from the globalization and industrialization of food and agriculture reflected in the control and authority embedded in international institutions, including the World Bank and the WTO, and supported by agribusiness corporations in the EU and the US (Jarosz 2014). Wittman (2009b) argues that these policies have caused a food crisis that affects over one billion people globally. It has also caused ecological damage, loss of traditional ecological knowledge, and increased poverty (Wittman 2011b).

In 2007, the most comprehensive definition of food sovereignty was declared at Sélingué, Mali, where 500 representatives of peasants, family farmers, artisanal fisherfolk, Indigenous people, landless people, rural workers, migrants, pastoralists, forest communities, women, youth, consumers, and environmental and urban movements gathered from over 80 countries to sign the Declaration of Nyéléni (Nyéléni Forum for Food Sovereignty 2007). This declaration articulated a conceptualized framework and a collective vision for the burgeoning food sovereignty movement. It differed slightly from the La Vía Campesina's definition in order to reflect and include the notion of *consumption* (Beuchelt and Virchow 2012; Jarosz 2014) by including their vision and right to consume healthy and culturally appropriate food - a slight departure and evolution from the earlier statements that resulted from the opposition to neo-liberalized and industrial-capitalist food systems.

The Nyéléni document intersects with the UNFAO's 1996 declaration that food security encapsulates within its definition the human right to food. It differs, however, in that it envisions

a collective, transnational structure that breeds a ‘new social relation free of oppression and inequality between men and women, people, racial groups, social and economic classes and generations’ (Nyéléni Forum for Food Sovereignty 2007). In 2009, the Declaration of the People’s Food Sovereignty Forum declared that it is the government’s responsibility to protect and fulfill the human right to food. According to Olivier De Schutter (2014), the United Nations special rapporteur on the right to food, in order to realize food sovereignty, the current global food system must be transformed at transnational, national, and local levels.

Further to this document, disenfranchised are women and women farmers (Aerni 2011; La Vía Campesina 2000a; Desmarais 2004, 2005, 2011, 2012; Martz and Bruechner 2003; Nyéléni 2007; Patel 2012; Sachs 1983). The Nyéléni Declaration includes women food producers whom they distinguish as playing a central role in food production, the maintenance of genetic biodiversity on the farm, and household food and nutrition security (Nyéléni 2007). Often having unequal access to natural resources, lacking in decision making power, and are marginalized from male-dominated food production domains, they state that women must be included in policy-making decisions including creating research agendas in order to meet the needs of communities, the production and distribution of food, and the exchange and consumption of food networks. Because women are traditionally the seed keepers of the community and preserve local knowledge, they are essential components of the food sovereignty movement (Alston 1998; Desmarais et al. 2011; Quisumbing et al. 1996; Roppel et al. 2006; Shiva 1989).

Nonetheless, at the global level, the concepts of food security and food sovereignty continue to oppose each other. For example, the International Labour Organization and the United Nations Environmental Programme, The United Nations Conference on Trade and

Development and the World Bank have not advanced in their discussions on Food Sovereignty and do not have an official definition. There is some mention however of Food Sovereignty by the UNFAO who deal with the concept much more frequently, but there is still no official UNFAO document on the concept of Food Sovereignty. Accordingly, the above groups state that the terminology is vague and that the right to food for the landless and the urban impoverished is still not recognized. Predictably, these groups emphasize that the UNFAO should focus on “strengthening entitlements rather than promoting food production” maintaining their measurement of food security through cash economies rather than food sovereignty matrices (Beuchelt and Virchow 2012; Sen 1981).

On the other hand, the United Nations Human Rights Council is the only UN body which discusses the concept of Food Sovereignty in their meetings, forums, and discussions (see UNCHR 2004; UNHRC 2008, 2010). Contradictory and counter-intuitive, these UN agencies rely upon sets of global statistics to report their progress or lack of progress towards specific goals, such as the Millennium Goals for example (McMichael and Schneider 2011). Consequently, development to them means being tied into the globalized food economy furthering the assumption that these bodies would not jeopardize their positions within this powerful neoliberal framework. Food sovereignty relies on strikingly different metrics and recognizes the push towards cash economies as one that disenfranchises small-holder farmers (Desmarais 2008; LVC 1996). Fundamentally, governments of Canada who supply and produce food within the industrial food complex will not alter their discourse, narratives, values, or views to support food sovereigntists at the expense of their capitalist model of food security discourse (Jarosz 2014).

At a national level though, in many countries, many groups, organizations, and actors discuss the concept of food sovereignty and include it in their political arena, but few have delved any further than to provide a conceptual framework for discussion. Food policy research conducted by organizations such as Slow Food International (Slow Food 2019), FIAN International, Food First, the Oakland Institute, and the Community Alliance for Global Justice supports food sovereignty which stands in opposition to food security (Jarosz 2014). Beuchelt and Virchow (2012) provide a brief analysis of the actors who have not included goals and objectives of food sovereignty outside of the international NGO/CSO fora and World Food Summits. At the regional and non-governmental level, other than LVC, the European Platform for Food Sovereignty, founded in 2003, has boldly stated its goals and aspirations.

At a regional governmental level, the Economic Community of West African States (ECOWAS) has included the concept of food sovereignty in its policies. Also, twelve Latin American and Caribbean heads of state have discussed the *possibility* of including the concept of food sovereignty in their planning strategies at a summit in 2008 (Beuchelt and Virchow 2012). At the national level, seven countries globally have so far included and legislated the concept of food sovereignty into policy. Of significance, the right to adequate food was included in most of the legislation (Beuchelt and Virchow 2012). However, no industrialized country has adopted the concept of food sovereignty into legislation or policy or even fostered discussions on the concept at a high level (Beuchelt and Virchow 2012). In Europe, the European Commission has at least included a definition of food sovereignty in one of its papers (European Commission 2009).

Food Sovereignty in Canada

Desmarais and Wittman (2014) offer a comprehensive analysis of food sovereignty discourse at the global level while providing a critical analysis of food sovereignty's diverse range of strategies, narratives, actors, and agendas under what they term, the 'big tent' of Canadian food sovereignty (1153). In Canada, the concept of food sovereignty was first introduced by two founding members of LVC: the National Farmers Union (NFU) and the Union Paysanne (UP) (2019). Formed in the 1990s when LVC was taking shape, the NFU is the only direct farm membership group in Canada (except in Quebec) to have been created by an act of the Canadian federal government in 1970 (Desmarais; 2008; Desmarais and Wittman 2014). This community based, bottom-up belief is 'working for people's interests against the corporate control of the food system' (NFU 2018).

The Union Paysanne (2019) was formed in 2001 and includes a diverse group of farmers, researchers, academics, students, consumer groups, eco-tourism business whom all join in solidarity against industrial agriculture, emphasizing peasant agriculture (Desmarais and Wittman 2014). UP believes in human-scale agriculture and vibrant rural communities (Union Paysanne 2018). Several Canadian organizations such as the NFU, the UP and a handful of Food Secure Canada members attended the 2007 Nyéléni International Forum for Food Sovereignty and returned home to create Canada's People's Food Policy Project (PFPP) in 2009 which is committed to redefining food and agricultural policies to include a food sovereignty discourse (Desmarais and Wittman 2014; PFPP 2010). The Canadian Wheat Board (CWB) is also viewed as an institution that reinforces notions of food sovereignty insofar as its collective mindset works to share profits which stand in stark contrast to the neo-market ideas of free market efficiency and competitiveness. But Desmarais and Wittman (2014) also critique the claim that

the CWB exemplifies food sovereignty because it does not consider how the CWB's actions and marketing were affecting farmers in the countries where Canadian wheat was being sold.

The beliefs shared by the above three farmer organizations (among many others) are at times divergent but do come together to stand in opposition against policies in agriculture, health, and the environment. Wittman (2011) provides an example where Greenpeace Canada and the Sierra Club of Canada, the National Health Coalition, the Council of Canadians and the NFU, the Agricultural Producers Association of Saskatchewan and the Keystone Agricultural Producers (Peekhaus 2013) waged a successful, ten-year-long struggle against the inclusion of the recombinant bovine somatotropin genetic hormone in Canada's milk supply. Desmarais and Wittman (2014) explain that at its core, concepts of food sovereignty in Canada

include strengthening community, livelihoods, and social and environmental sustainability in the production, consumption and distribution of nutritious and culturally appropriate food that is deeply grounded in the lives of peasants, Indigenous people, and farmers in both the global North and South (155).

Their notion resonates with the 2009 final Declaration of the People's Food Sovereignty Forum: the government is responsible for protecting and fulfilling the human right to food (IPCFS 2015; Jarosz 2014).

Both food production and consumption were analyzed by several groups in 2004, with Food Secure Canada (FSC), a consortium of 50 provincial and 12 national organization, including individual members. This collaboration used a food sovereignty lens and discourse to develop the publication called 'Resetting the table: a people's food policy for Canada (PFFP 2010, 2011) as a living document that will evolve with new developments and research (Desmarais and Wittman 2014). Coinciding with this document, grassroots organizations such as the Young Agrarians, Slow Food Convivia, faith-based group Unitarian Service Committee of

Canada and the United Church of Canada and others primarily take concepts of food sovereignty and apply them to the notion of consumption while becoming involved with their local community food producers. These beliefs resonate with the Ottawa Charter for Health and Ontario Public Health Association, which includes community and the environment in its definitions of food security (Toronto Public Health 2006).

Furthermore, food-aware people are often concerned with taste, health, and the environment of their local communities (Desmarais and Wittman 2014). These groups demand that food be local and fresh, nutritious, and culturally sensitive resulting in a proliferation of community/citizen-driven food policy councils all across Canada, creating farmers' markets, community gardens, and the diversification of urban landscapes to include edible plants (MacRae and Donahue 2013). They choose to build their local food systems from the bottom up rather than the top-down, focussing on the community, history and tradition, ethnic connection, environment, and nutrition of food - themes that are congruent within the food sovereignty framework and embodied in the PFPP, FSC, NFU, and UP. These grassroots groups can then concentrate on policy change after addressing personal food epistemologies (Desmarais and Wittman 2014).

An example of how the two theoretical approaches merge, and could be applied in Canada, is Brazil's Zero Hunger program (Ansell 2014; Menezes 2001; Wittman and Blesh 2017), which links food security and sovereignty in Belo Horizonte. This is evident in its bylaw, passed in 1993, that sets a food security policy based upon food sovereignty principles. These foundational principles include the rights of people to define food and agricultural policies, protect their production and trade and to achieve food security through sustainable development. This theoretical framework could be important in helping small-scale farmers who meet the

definition and criteria of family farming, woman, and young farmers, and those who require finance in the area of agricultural research for new modes of small-scale farming (Wittman and Blesh 2017).

In Canada, where farm operators constitute only one percent of the entire Canadian population in 2011, food sovereignty will look entirely different than in Brazil and other settings (Wittman et al. 2011a, 2011b). However, similar issues are present in Canada, such as declining public farm services, collapsing rural communities due to ongoing farm debt and decreasing income resulting in an exodus of younger populations to larger city centres. Other examples include farmers' loss of power in defining policy at local, regional, and provincial levels of government, growing corporatization of agriculture, concerns about human and animal welfare from communities, alarming statistics about environmental effects of agricultural on the environment, and sustainability of industrial agriculture. Because of these issues, discourses of food sovereignty are reaching the broader public and indicate discontent locally and globally (Wittman et al. 2011 a, 2011b; Wittman and Barbolet 2011). Patel (2009) explains that the state can still be included in food sovereignty definitions, but differently from traditional narratives of sovereignty. In his analysis, the state is 'de-centered' which makes way for other participants across a variety of scales and jurisdictions to be included in food sovereignty conceptualizations and definitions.

Food Sovereignty in the Creston Valley

The link between food security and food sovereignty is a compelling concept that can be applied to the Creston Valley where smallholder agriculture competes with food imports from the U.S.A., Mexico, and China (BC Ministry of Agriculture and Lands 2006; Wittman 2009a). In

this setting, as in so many others around the world, industrial agribusiness food models are being challenged. There are now 38 market gardeners in the Creston Valley, for instance, an increase from 22 in 2013 when I initially conducted research there.

The Agricultural Land Reserve in B.C., together with increasing numbers of small market gardeners and growing numbers of local community food initiatives, provide the foundation on which food sovereignty principles can be further developed (Wittman and Barbolet 2011). Considering how food regimes are constructed politically and economically by the global economy, local small market initiatives tend to be subsumed by the dominant industrial agriculture regime (Buttel and McMichael 2005; McMichael 2009). It is for this reason that Koc and Bas (2012) argue for the creation of alternative paths to food sovereignty by civil society which can result in the pressure necessary for governments to consider the needs of citizens in local production and consumption of its food systems (Koc and MacRae 2011; Koc et al. 2008; MacRae 1999). If a change, therefore, is to be made, it should be done so from civil society up (Koc et al. 2008). In assuming Koc and Bas' (2012) theory to be a successful strategy to follow, grassroots food sovereignty initiatives in the Creston Valley are on the right path and some are even supported by local and regional governments. Several of these initiatives in the Creston Valley are described in more detail in Chapter 7.

Additionally, in 2006 the Ministry of Agriculture and Lands calculated that B.C. is 48 percent self-reliant in food production (BCMAL 2006), one of the highest in Canada as noted by Wittman and Barbolet (2011), showing the potential for future growth of food sovereignty in the small market food production systems. Farmland is essential for food production, and in B.C., about 1.23 acres of farmland is required to grow enough food to sustain one person for one year (Wittman and Barbolet 2011). In order to be 100 percent self-reliant, 6,869,529 acres will need

to be actively farmed by 2025 to sustain population estimates – an increase of 300 percent from 2001 levels (BCMAL 2006; Wittman and Barbolet 2011). The good news is that B.C. has a surplus of available farmland on which to support local and sustainable farms and some of that land is within the Creston Valley, supporting potential growth in the food sovereignty movement (Wittman et al. 2017).

Indigenous Food Sovereignty

Robin (2019), along many other authors, have convincingly illustrated the long history of colonization and its devastating negative effects on Canadian Indigenous ways of life, environment, self-determination, and food security. However, in recent times, as claimed by Robin (2019), Indigenous communities in Canada are responding to these challenges in various ways, including the resurgence of traditional relationships between peoples, land, food, education, and ceremony. All these elements are part of an interconnected whole that encompass the holistic Indigenous worldview.

In her paper "Tracing the Terrain of Indigenous Food Sovereignities", Michelle Daigle (2019) presents us with a brief exploration of how Indigenous food sovereignty has been theorized as multiple food sovereignties. Following this pluralistic approach, she builds on food sovereignty's emergent interdisciplinary dialogue with Indigenous studies by drawing on key themes from resurgence scholarship. Daigle particularly addresses how burgeoning debates on multiple and competing food sovereignties are increasingly complicating Euro-centric accounts of food sovereignty by connecting specific histories, identities and structures of power to contemporary food struggles across space and, crucially, to various forms of authority which incite resistance to the injustices documented by other authors (Patel 2009; Desmarais and

Wittman 2014; Figueroa 2015; Gupta 2015; Iles and Montenegro de Wit 2015; Kamal et al. 2015; Li 2015; Grey and Patel 2015; Shattuck, Schiavoni, and VanGelder 2015). Thus, I argue that, it is within the contexts of particular and specific conditions of food sovereignty, rather than multiple and sometimes antagonistic perspectives, that Indigenous experience should be placed and understood.

Coté (2016), claims that, everywhere, Indigenous peoples are actively shaping, nurturing and fostering healthy and sustainable communities through their self-determination efforts and decolonization strategies. According to Coté (2016), decolonizing also entails overcoming dependence on the globalized food system. The primary strategy to achieve this independence, according to Coté (2016), is to revitalize Indigenous food schemes and practices through the reaffirmation of spiritual, emotional, and material relationships to the land, water, plants, and all living things that have sustained Indigenous communities and cultures throughout their history. Seeking independence from the globalized food system clearly indicates that Indigenous people are actively pursuing food sovereignty.

As argued by Kepkiewicz and Dale (2019:983), current and pressing issues of Indigenous food sovereignty are intimately linked to concerns that go “from violations of Indigenous land rights to soil degradation resulting from industrial farming”. They also note that landownership often goes unchallenged, not only in settler food sovereignty discourse, but also in policy efforts made by the Canadian government. It is evident that Kepkiewicz’ and Dale’s claims allude to the fact that these issues are not new. The causes underlying the need for Indigenous food sovereignty existed long before the term ‘food sovereignty’ became a political concept, a human rights issue, and an urgent Indigenous issue.

The Canadian First Nations Food, Nutrition and Environment Study (FNFNES) (Chan et al. 2011), the BC Food Systems Network, the Food Secure Canada Indigenous Circle, Slow Food International (Slow Food 2019), and the Indigenous Food Systems Network (2019) are but five organizations in Canada seeking to decolonize colonial settler food, land, and water systems. This decolonization process stresses self-determination alongside the inclusion of traditional fishing, hunting, and gathering practices - key elements which they state must be achieved before genuine food sovereignty for all can be realized in Canada (Alfred 2005, 2009a, b, c, 2015; Desmarais and Wittman 2014; Wilson 2019).

Dawn Morrison (2011), coordinator of the British Columbia Working Group on Indigenous Food Sovereignty, explains:

Indigenous food sovereignty describes, rather than defines, the present day strategies that enable and support the ability of Indigenous communities to sustain traditional hunting, fishing, gathering, farming and distribution practices, the way we have done for thousands of years prior to contact with first European settlers... We have rejected a formal universal definition of sovereignty in favour of one that respects the sovereign rights and power of each distinct nation to identify the characteristics of our cultures and what it means to be Indigenous (97-98).

The Indigenous Circle within Food Secure Canada (2018) has now included the seventh pillar in the Nyéléni framework, during the People's Food Policy process. It emphasizes that food within the food sovereignty paradigm must be seen as a sacred part of the holistic web of life that defines community and culture, so food will not be commodified, manipulated, or used to feed animals and cars (People Food Policy Project 2011). This policy has resulted in mass mobilization around fish revitalization in the Columbia River Basin where Tribes and First Nations have organized to revitalize eco-system function, something that remains to be included in current Columbia River Treaty negotiations (Columbia River Treaty Negotiations 2019). An

example of successful legislation towards Indigenous food sovereignty is the Nuu-chah-nulth fisheries case that was finalized in 2009 which have affirmed their right to fish and harvest according to its own cultural, ecological, and economic systems (Morrison 2011). The NFU (2013), Food Secure Canada (FSC) (2013) and the Union Paysanne (Union Paysanne 2019) have collaborated to express their solidarity with FSC to create a resolution which states:

We stand with Idle No More and call upon the Government of Canada to remedy its historical and current policies of colonization, assimilation, and destruction, and work with each Nation to define and engage in an appropriate relationship based on respect and responsibility and full recognition of the right to self-determination. Healing and rebuilding contemporary relationships between Indigenous people and the Canadian government and honouring original nation-to-nation agreements are crucial steps towards achieving food sovereignty and food security for all (Food Secure Canada 2013:1).

Beuchelt and Virchow (2012) explain that including food sovereignty in our national food security policy could ensure food security for Indigenous people by advancing economic and political autonomy, which in turn could also potentially contribute to agricultural production (Pimbert 2008). In Chapter 8, I address these issues as they pertain specifically to the Ktunaxa Nation.

Reconciling Food Security and Food Sovereignty

In this concluding section, I discuss how food sovereignty and food security concepts might be reconciled, and I identify the particular approach in this study as applied to the Creston Valley case study and findings. Across the globe, a kaleidoscopic of biodiversity supports life and its human activities. This diversity is under threat due to environmental degradation caused by human actions from resource extraction to agriculture. Reports indicate though that Earth's decline is slower on Indigenous People's lands (IPBES 2019). Lessons can be learned from this

fact. The stewardship of the environment by Indigenous People offers instructions that can teach food producers how to stem the tide of environmental depredation. Several agricultural initiatives are investigating a new order that blends localized knowledge and modern agricultural science to maintain food security while applying food sovereignty principles (Altieri 1995; Altieri and Funes-Monzote 2012; Holt-Gimenez and Shattuck 2011; Holt-Gimenez and Altieri 2013; Holt-Gimenez and Patel 2009; Holt-Gimenez and Wang 2012; IPBES 2019).

Similarly, the International Assessment of Agricultural Knowledge, Science, and Technology for Development (IAAKSTD) Fifth Assessment report published in 2009 includes the input of 57 countries, the UNFAO, the World Bank, 400 scientists and policymakers, and recognizes both food security and food sovereignty as essential inter-relational elements in diminishing and decreasing malnutrition-poor and health-low cycles of hunger and poverty. This recognition is particularly important during the likelihood of falling yields due to climate warming and drying, culminating in extreme weather events and thus affecting the stability of future food supply (Ansell 2014; Jarosz 2014; Sage 2014).

The following Table 4.5 provides the criteria for assessing the data gathered in the Creston Valley in 2016. Based on these criteria, I will determine whether and to what degree Creston Valley farmers are food secure using a food security matrix specifically designed to operationalize the data in order to assess the relative level of food security in the Creston Valley. The sources within the following table base their definitions of food security on the broader concepts of food sovereignty principles. The definition of food security is predicated on food sovereignty tenets which address the rights of farmers, Indigenous peoples, and landless workers who are most impacted by global hunger and poverty. Food sovereignty asserts that food producers have the right to control their own futures and decisions in food and land policy

through ecologically sound, sustainable, and healthy methods of food production for both producers and consumers alike and is the basis for genuine food security as I define it in this dissertation.

Table 4.5 - Food Security Evaluative Criteria for the Creston Valley.

Criteria for Assessing Food Security	Sources for Food Security Assessment Criteria				
	UNFAO 2013	LVC 1996, 2003	IAAKSTD 2009	Nyéléni 2007	Toronto Public Health 2006
Economic access to food	•	•	•	•	•
Sufficient quantity of food for a healthy active life	•	•	•	•	•
Right to develop own food and trade policy		•	•	•	
Food sovereignty as a precondition to genuine food security		•	•	•	
Needs of consumer is priority of food sovereignty		•	•	•	
Must be protected against price fluctuations		•	•	•	
Environmental and ecologically sustainable methods of food production		•	•	•	•
Respect of women's roles and rights in agriculture		•		•	

As industrial agriculture intensifies, fueled by capital and market infiltration, environmental costs accumulate, and opportunities for small market farming are diminished (Altieri and Nicholls 2008). The social values and cultural practices of small-scale farming communities everywhere disintegrate, resulting in a breakdown in the intergenerational transfer of both agricultural and ecological knowledge. Given the social and environmental failures of the Green Revolution, it is imperative now to rethink the practice of agriculture on a global scale.

In the case of British Columbia, as Wittman and Barbolet (2011) explain, the agricultural land base is sufficient to allow for a transition to a sustainable food procurement system that could conserve ecological integrity while guaranteeing food security. The traditional knowledge of farmers combined with modern scientific applications, and support from NGOs, government, and educational agencies, can augment food security while conserving precious land and water resources, agrobiodiversity, and soil and water conservation.

Transforming conventional agriculture by transitioning to new sustainable food systems would decrease reliance on fossil fuels and petrochemical inputs, develop an agricultural production system that is capable of and resilient to future climatic flooding and drought while also adapting to climate change (Alemu et al. 2017; Gyander et al. 2017; Little et al. 2017), and encourage local forms of agricultural livelihood. This transition would not only revitalize rural communities but could also meet the region's food needs during unpredictable food price increases, growing populations, and climate change.

These transitions will require considerable structural changes, technological innovations, and cooperation amongst farmers in any given region such as with the policy transformations that took place in Brazil and the Zero Hunger Program. Without social, political, cultural and economic changes, genuine agrarian reform as espoused by La Vía Campesina (1996a) will

continue to be at risk, the environment will be left in crisis, and food security will continue to worsen as a global phenomenon.

In Chapter 5, I operationalize the food security definition provided in Table 4.5 and describe my methodological approach for assessing food security in the Creston Valley using the food security matrix. The assessment is applied to research data described in Chapters 6 to 8 and framed to allow me to conclude my study with recommendations for how Creston Valley agricultural practices could be reshaped to enhance food security. First, Chapter 5 will describe the research methodology that informed the fieldwork component of this research.

Chapter 5: Methods

Focussed Ethnography

Given the historical and geographical context of this study and the particular questions I seek to answer, it was necessary to develop an innovative methodological approach to gathering fieldwork data. Although eclectic in many regards, my methodological approach is best understood as a focused ethnography (FE) (Butcon and Chan 2017; Higginbottom et al. 2013; Knoblauch 2005; Stoller 1989). Typically, traditional ethnography researchers do not enter the field with a previously specified research question (Roper and Shapira 2000). Instead, they usually begin the project with no prior perceptions and notions of the field, instead, letting the setting “tell [them] what’s going on” (Erickson 1977:62). A focused ethnography, by contrast, does begin with specific questions informed by prior knowledge of the field. The goal is not to acquire as complete an understanding as possible of all key aspects of the ‘culture’ under study, but rather to employ cultural analysis in a more focused manner, applying it to a specific domain, in this case food production styles.

This study is also informed by experimental, values-based, and critical forms of ethnography which have adapted and adopted various methodological strategies and research processes. Working with and alongside the marginalized and oppressed voices of Indigenous people, women, and ethnic minorities reveals “hidden agendas and power centers for emancipatory purposes” where power structures form the central mode of inquiry (Mayan 2009; Muecke 1994:5). Environmental anthropologists often base their inquiries on a critical ethnography approach (Townsend 2009), which Watts (1983, 2003) describes as advocating for marginalized and oppressed groups in society. This approach empowers people by “challenging

the status-quo and addressing concerns about power, empowerment, inequality, inequity, dominance, repression, hegemony, and victimization” (Blaikie and Brookfield 1987), structures which I address through a ‘thick’ description of politics, culture, economy, and the environment in the Creston Valley (Geertz 1973). Critical ethnography emerged and resulted from the subjective, co-constructed nature of research among cultural groups and is founded on culture as relational, partial, unbounded, dynamic, and pluralistic. This is contrary to earlier conceptions of culture as closed, isolated, uniform, and enduring (Agar 1986, 2006). Most important to recognize is that new ethnographic forms are continually emerging in response to changing real-life circumstances (Atkinson et al. 2003, 2007).

FE relies on the collection of large amounts of data focused within relatively short periods of time where community activities are not visited continually but within certain intervals. This method requires prior knowledge, familiarity, and perhaps even prior ethnography, generating a subjective understanding or interactive knowledge (Higginbottom et al. 2013; Knoblauch 2005). I have been visiting and studying food security and food sovereignty issues within the Columbia River Basin for almost seven years. Drawing upon many conversations and observations conducted in Creston, B.C. and Bonners Ferry, Idaho from April until October 2016, when I lived on the western side of the Creston Valley, FE allowed me to periodically immerse myself in the community over a period of seven months. This period of FE immersion also included weekend trips to other parts of the Columbia Basin for conferences both in Canada and in the U.S.A.

My seven-month sojourn in Creston was comprised of many days spent on farms, the floodplain, the benchlands, the Kootenay River, and in the towns of Creston and Bonners Ferry. As well, it included driving the circumference of Kootenay Lake, speaking to agriculturalists,

water managers, and Indigenous People. However, I was also able to commute back to my home town of Kelowna, B.C., for short periods. Being able to circumnavigate both fields provided me with the intense, undivided, immersed, focused attention of being within the Creston Valley during the spring, summer, and fall months when agricultural activity was at its most active, while also being able to take short breaks at home with my family. The visits home helped to mitigate feelings of exhaustion, frustration, isolation, and loneliness, aspects that Jones (1973:30) refers to as “culture fatigue” or (Paul 1953:441) calls “participation fatigue.” For remedies to this phenomenon, Paul (1953) prescribes a change of social scenery and relief from intense participant observation in the field.

The geographical and latitudinal limitations of traveling three mountain ranges, one of which is the highest elevation highway in Canada, the Kootenay Pass, and the fact that significant amounts of snow are recorded each winter thus making highway travel prohibitive, limited my ability to be in the research field during all four seasons. The seasonality of farming also affected the schedule of activities, not just because farmers are not actively working the land during the winter but also because many ‘fly south’ for about five to six weeks from December to February when, as quoted by an interviewee, the ground is “frozen right up”.

Additionally, the FE researcher is interested in a distinct problem, within a specific context, seeking to answer a specific research question(s) (Morse and Richards 2002). The FE method is especially applicable when conducting applied social research in highly fragmented and specialized fields of study (Knoblauch 2005). While employing traditional ethnographic methods of inquiry such as interviews, long-term participant observation (Emerson et al. 2007), field notes, and document analysis, the FE researcher uses intensive methods to collect data using audiovisual technologies such as audio-taping and video-recorders as a practical and

efficient way to gain specific cultural perspectives (Higginbottom et al. 2013). Through the FE method, I was able to gather voluminous amounts of data in short periods so that I could link to and build upon my previous research findings in the Creston Valley in 2013.

FE also demands an exhaustive analysis of data through not only a thorough review of research notes and transcripts but through the analysis of actions, interactions, and social situations where the primary subject matter is verbal and visual (Knoblauch 2005). As mentioned above, I began with specific research questions about food security and food sovereignty in the Creston Valley during the renegotiation of the Columbia River Treaty, a topic which presents itself in emerging contexts, rather than an open-ended intent to live with and learn about a new culture. Thus, the research questions I specifically seek to answer are:

- 1) What is the relationship of industrial agriculture in the Creston Valley to food security at local, regional, and national levels?
- 2) What is the relationship of small market gardeners to food security at local, regional, and national levels?
- 3) How has the sovereignty of the Ktunaxa's traditional food pathways been affected by colonization, how food secure are they today, and what is the relationship of their food procurement strategies to food security in the Valley as a whole?
- 4) How does the management of the Libby Dam affect food security for farmers and local communities, both Indigenous and non-Indigenous?

I want to understand what conditions currently help or hinder the achievement of food security for all groups in the Creston Valley, what knowledge, skills, and experience they draw upon to procure their food and what economic and environmental challenges they face. I particularly seek to understand how the federal and provincial governments either support or continue to marginalize and oppress food producers as well as traditional Indigenous ways of

provisioning food. The FE methodology allows me to focus on these particular aspects of the Creston Valley food security question.

Due to the intensity of the FE research experience, this approach requires a reflexive understanding of ones' subjectivity and positionality (Deutsch 2004). Ortner (2006) explains in her book on "Culture, Power, and the Acting Subject" that when anthropologists are in their field of study, they engage in their thoughts and feelings about the environment around them. In framing my research findings, while being aware that all of culture is relevant (Boas 1922), my personal biases including my personality, cultural orientation, social location, class, political philosophy, gender and life experiences are undoubtedly etched into my interpretations of field data (Ortner 2006). Born in Vancouver, but spending my teenage years living in the small agricultural and Doukhobor community of Grand Forks located in the Regional District of the Kootenay Boundary area, provides me with an initial spatial and cultural orientation, knowledge, and familiarity of the Kootenays. Being raised a Doukhobor also gave me the intimate knowledge and understanding of some of the socio-historical, cultural food production methods of various smaller ethnic groups in the Kootenays while spending my early childhood living with and visiting relatives in the area. My positionality, as a white, educated, woman of privilege, also affects how I frame food security and food sovereignty in the Creston Valley where I work hard to educate myself in this area of research.

Hammersley and Atkinson (2007) emphasize, as the researcher grows intellectually and reflexively (Clifford 1990; Clifford and Marcus 1986), the validity of the research conducted must be intensely scrutinized. Through continuous and rigorous reflexivity, I realize that I must always be aware of the pre-conditioned notions of my reality and worldview, and continually attempt to identify the inherent problems of ethnographic bias which some have stated is an

impossibility to eliminate entirely and that all ethnography is inevitably subjective (Ortner 2006; King 2000; Lee 2015). My opinion on this conundrum is that, although absolute objectivity may not be attainable, it can be approximated. Gathering research data which is less dependent on subjective perspectives than field notes is one way, for instance, to limit research bias (Knoblauch 2005). Since FE relies heavily on the use of recording devices - tape recorders, videos, and cameras, in addition to what is observed by the researcher's eye and written in notes, data can be accessed by other researchers and interview subjects are able to review and comment on their own personal transcripts and recordings. In other words, the research data becomes more objective than relying on private field notes as everyone can share and present to any other researcher, especially to those being recorded and studied (Knoblauch 2005).

In addition to gathering data using the above techniques, I wrote daily in my personal journal which allowed me to reflect on my own thoughts, feelings, and at time biases. At times, these biases were revealed, and issues related to working in the field were fleshed out by daily writing. Sometimes, conflicts, anxieties, and internal cognitive dissonance revealed itself while de-constructing these reflections helped me to clarify research issues that may have arisen during time in the field.

My research continues to be influenced by some of the most heralded work in the writings on poverty, power, and discourse by Escobar (1996), Marx (1973), Patel (2006, 2009, 2010, 2012), Scott (1998, 1990), and Wallerstein (2011). As well as reading literature from these works, I also read widely, Agarwal (2014), Beuchelt and Virchow (2012), Desmarais et al. (2014), Edelman et al. (2014), Holt-Gimenez (2009, 2011), Jarosz (2014), McMichael (1992, 2004, 2005, 2009, 2012, 2014), Sage (2014), Wittman (2009a, b, 2011a, b), who discuss poverty, food security, and food sovereignty.

I use a political ecology perspective which asks epistemological and ontological questions while also addressing the issues that I identify as critical in my life and political struggles (Cancian 1992). My research is morally committed to reducing inequality, and therefore, it is critically linked to farmers' struggles and movements and must lead to action research that effects social change (Angeles 2017; Desmarais 2011, 2012). Although this study is not primarily focused on gender issues, I made sure to include female farmers as interviewees (Djouidi et al. 2016).

Critics of qualitative research methods claim that it is too subjective, difficult to replicate, and is lacking in a transparent research process (Bryman 2001; Lofland 1971; Roppel Desmarais Martz 2006:6). In order to ensure that replication was possible and that my study is epistemologically robust, ethnographically valid, and methodologically reliable, I triangulated my approach by relying on specific FE methods within a case study approach. In the area of case study research, I explore the evaluation perspective from Stake (1995, 2005), and also include the applied social science and cognitive science orientation of Yin (2003) and describe and explain my selection process and rationale for them.

In the paragraphs that follow, I describe the FE methods used to gather data using traditional semi-structured interviews, participant observations, and one focus group while also participating in conferences, listening sessions, community review meetings, webinars and other field-observer roles such as attending workshops, studios, and museum sessions and include the use of technological devices such as video recorders, cameras, and transcription software, activities characteristic of the FE method (Knoblauch 2005). These methods allow me to collect large amounts of data providing an empirical basis in which to answer my research questions while retaining a traditional approach to ethnography, something that is also useful for

interviewing the Ktunaxa People within whose lands all food producers are located within this research study (Knoblauch 2005).

Ktunaxa Research Protocols and Procedures

As outlined in Chapter 9 of the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*, Indigenous communities are subject to particular forms of risk and special procedures are required to ensure that risk is minimized. Researchers need, first of all, to follow the protocols put in place by the Indigenous community itself, as well as comply with Tri-Council standards and those of the Research Ethics Board of the host institution. It is also widely understood as McAreavey and Das (2013:113) note, that research with “minority and marginalised groups include issues of cultural sensitivity, inclusion, and positionality” (Deutsch 2004). Traditional ethnographic methods and focused ethnographic practices accommodate the sensitive and nuanced understanding of specific histories, cultures, values, epistemologies, and concerns required when researching with Indigenous communities (Archibald 2008; Battiste 2016).

Having previously conducted research in Ktunaxa territory as a graduate research assistant, I was already acquainted with Ktunaxa representatives and knowledge holders¹⁷ including Chief Jason Louie who I had first met in 2013. Given the centrality of oral tradition, and following Ktunaxa protocols as they were explained to me in 2013, I began my research in 2016 by visiting the yaqan nu?kiy Band Office where I was able to explain my project first to the yaqan nu?kiy Band Manager. In order to conduct interviews, Ktunaxa protocols require verbal

¹⁷ I use the term Knowledge Holder interchangeably with interviewees and contacts to denote Indigenous peoples who are knowledgeable and who are authorities in their community and Nation’s land/water-based philosophies and practices.

permission from senior representatives of both the Ktunaxa Nation in Cranbrook, and the local Ktunaxa Nation, the yaqan nuʔkiy, rather than written approval from Band Councils. However, after receiving verbal consent from the yaqan nuʔkiy Manager in late April 2013, I visited the yaqan nuʔkiy office again on June 3, 2016, to reintroduce myself and confirm approval to begin my research. I also obtained written approval from the yaqan nuʔkiy Chief and Manager at this time. Further to this approval, I also brought a consent form for each participant to sign and ensured that each interview would be conducted with full and informed consent.

Jo-ann Archibald (2008) explains “story as work that educates the heart, the body and the spirit which is truly Indigenous education” (xi) while Shawn Wilson (2008:60) shares that “Research is all about unanswered questions, but it also reveals our unquestioned answer.” In order to incorporate these insights into my interview process, I modified my focused interview process with Ktunaxa participants so they could use a story-telling and life history framework to inform me about traditional and contemporary fishing and food gathering practices. A few of the participants requested a copy of the final dissertation which I will deliver in the fall of 2020 once the dissertation is finalized. None requested to see the data before publication although this option was presented to them.

I developed a trust relationship through deep listening which was reflective of the deeply relational Indigenous way of knowing and acting (Forsey 2010; Wilson 2008). Each individual life history and story, or life story, was powerful and contributed to a collective story in which each participant shared their perspectives on food, water, place, and practice. I also asked about changes to the Ktunaxa territory caused by the Libby Dam, the CRT, and other dams on the Columbia River in the US and how this has affected Ktunaxa People in terms of food security and food sovereignty (Ferguson and Messier 1997; Lederman 2007).

Conceptualizations of land and ecosystem inequality based on the historical mappings of the yaqan nuʔkiy Land Reserves provide a broader historical and sociopolitical context through structural conditions in which the Ktunaxa have had to live (Galletta 2001). As Lederman states, oral histories contribute a unique archive of testimony to the historical record (2007) and as Tuhiwai-Smith (2012) and Daigle (2019) corroborates, such approaches to interviews fit well within Indigenous Methodology or Indigenous Oral Tradition to express the reality of day-to-day Indigenous struggles. The Ktunaxa interviewees were able to discuss their vast traditional territories shared with twenty-seven Indigenous Nations in the Province of B.C., which provided a tremendous amount of ecological and localized Indigenous foods (Morrison 2011:97). Although I could never, and will never be able to fully conceptualize, feel, and understand the devastating and lived effects of colonization, I was able to listen closely in my attempt at understanding and empathetically feeling the painful effects of continued marginalization and colonization of Indigenous People and resources in the Columbia River Basin through oral tradition.

Research Methods

Selection of Participants

I indicate in Table 5.1 how I have organized my research as a critical multi-case study project investigating several groups within the Creston Valley, B.C., Canada and Bonners Ferry, Idaho, U.S.A.

Table 5.1 – Interviews and Participant Observations Conducted in April – October 2016.

Case Study Group	Location and sector of interviews	Numbers of participants	Totals
Case Study 1. Canadian Farm Sector	Farmers – Industrial	10	
	Farmers - Market Gardeners	19	
	Participant Observation	9	
	Focus Group	3	
	Cultural Groups	8	49
Case Study 2. Canadian Water Sector	Diking and improvement districts	9	9
Case Study 3. Ktunaxa yaqan nuʔkiy	Ktunaxa Nation	8	8
Case Study 4. U.S.A. Farm Sector	Farmers - Industrial	4	
	Farmers – Market Gardeners	7	
	Participant Observation	6	17
Case Study 5. U.S.A. Water Managers	Diking and improvement districts and Libby Dam	4	4
Total Participants			87

Case Studies

The first Case Study interviewees consists of industrial and small market Canadian farmers within the Columbia River Basin that produce food for local, national, and global consumption, thus offering a broad perspective of food production styles. According to the criteria I present in the following Chapter, the industrial farmers produce for large international supply chains often for markets outside of the Creston Valley. The industrial farmers provided specific information that helped to answer whether producers and consumers were food secure based on gross and net

incomes, which also sometimes correlated to where their produce was exported, type of produce, and size of farm. Market gardeners who produced food for local consumption provided information about local markets, transportation, marketing, and crops grown offering a comparative analysis that contributed to determining which groups were food secure.

The second Case Study Group included local water managers from diking and improvement districts and city and regional managers. This group of people has managed the supply of water since early diking up until present day including the management of water that supplies the benchlands. This group was able to provide a historical and contextual component to my research that helped to understand food security and the threats and challenges that climate change is causing to food producers in the Creston Valley. Specifically affected are those who produce food on the floodplain and are affected by the Columbia River Treaty and therefore provided a historical perspective that is missing in terms of those who are excluded from food policy discussions and Columbia Treaty conversations (Crawley 2018).

The third Case Study Group is comprised of the local yaqan nu?kiy from the Ktunaxa Nation. Within this case study, all but two interviewees lived within the yaqan nu?kiy Nation Reserve and are mostly tied into industrial agricultural farming due to historical processes of colonization. The other two Ktunaxa persons lived off reserve in the Wyndell district flat lands, choosing to farm there while helping to develop and grow the yaqan nu?kiy organic garden initiative. The stories that were shared leant an Indigenous perspective to food procurement that has been profoundly affected by the Columbia River Treaty and the Indian Act.

The fourth Case Study group is made up of U.S. farmers who were also divided into industrial and small market gardeners offering a broad perspective of food procurement styles and systems which differed from that of Canadian agricultural methods. Sharing the Kootenay

River, and still based within the Columbia River Basin, political, geographical, and social histories differ somewhat from their counterparts in Canada, often growing different crops which are influenced by governmental subsidy programs and water treaties, linking these systems to global economies and industrial food systems.

Finally, Case Study Group 5 involved U.S. Water Managers that have the same responsibilities as their Canadian counterparts such as irrigation and improvement diking and water districts. These groups were mostly settled after the Creston Valley began diking indicating that the influence that Creston Valley agriculture had in relation to Bonners Ferry agriculture. Interestingly, this group is also inextricably tied to the protection of food production systems and is the most vulnerable to flooding caused by the management of Libby Dam.

Sample Selection

I used a purposive snowball technique (Lunenburg and Irby 2008) in which I first sought referrals from my initial 2013 contacts and then continued building my sample throughout my doctoral research period. This allowed me to come into contact with key industrial farmers, market gardeners, and Indigenous managers within the yaqun nu?kiy Nation. I was also introduced to many market gardeners at the local Farmers Market in both Creston and Bonners Ferry.

Sampling was conducted so as to obtain proportional representation among the three key interview groups, industrial farmers, market gardeners and yaqun nu?kiy knowledge holders. No comprehensive list of farming operations has ever been published for the Creston Valley region so, at the outset of my project, my knowledge regarding the relative number of farmers in each group was based on my own previous research in the area, data from Statistics Canada and local

regional districts regarding crops and farm size, and the information and advice provided to me by the farmers I spoke to throughout the snowball sampling process. The fewer number of industrial farmers in the valley, relative to the number of market gardeners, is largely a function of the physical size required for industrial farms. There are more small-scale farms on smaller plots of land simply because it is easier and more viable to own and operate small acreages and properties. The relatively small sample of yaqan nukiy interviewees was due, largely, to the protocols put in place by the community in respect to who was considered a “knowledge holder” and therefore a suitable and willing participant. However, given the small population size of the community, the number of yaqan nukiy participants was also roughly proportionate to the other samples. I did not apply a proportional sampling approach in the case of water managers on the Canadian side of the border, but simply included as many as possible, given the constraints of this project, and certainly enough to gain a thorough understanding of the irrigation and dike management issues throughout the region. I included a smaller number of US farmers and water managers in the study, in case a comparative study would shed additional light on food security issues. This did not turn out to be the case.

Sample selection within the two groups of farmers was not stratified on the basis of gender or ethnicity, and I did not collect demographic information pertaining to sex, gender, or ethnicity of interviewees. However, I did attempt to include as many female farmers as possible in the study, given the snowball sampling approach I employed.

All interviews were approximately one hour but several took longer. I continued the interviews as long as participants were willing to talk resulting in all interview questions being answered. The interviews took place at the participant’s farm, or a nearby coffee shop, or another location that they specified such as a restaurant, or their home. In one instance, I conducted a

telephone interview when a face to face interview could not be arranged. With the consent of those participating, the interviews were audio taped using two tape recorders (one as backup). If I sensed that the interviewee was reluctant to speak 'on record' I gave them the option to speak 'off record' by shutting off the recorder for that portion of the interview. During the interviews I took handwritten notes, and if they consented, also took photographs.

Interviews

Kvale (1996) states that the interview seeks to describe the meanings of central themes in the life world of the people we study and therefore its main task is to understand the meaning of what the interviewees say. I conducted 87 one-to-two hour, semi-structured interviews with both industrial and market farmers on both the floodplain and the benchlands, in both Canada and the U.S.A., and other people relevant to my study including water managers and one of the negotiators on the Canadian CRT negotiating team. In order to obtain reliable and comparable qualitative data, and with the most efficient use of the farmers' and water managers' time (Bernard 2011), I used an interview guide of approximately 58-75 questions that helped to cover the topics relevant to my study. I also used the unstructured interview method because I wanted to understand the lived experience of yaqan nu?kiy, and what it was like to gather food from unceded lands that had been colonized, causing a depletion and decimation of their food supply and procuring methods, such as traditional hunting, gathering, and fishing. The semi-structured approach allowed the interviewee to talk freely about anything that they deemed important to their food gathering abilities.

The interviews consisted of questions about their understanding of climate change, the CRT, dike maintenance, as well as their concerns about food security, food sovereignty, and

water and income security. Additionally, I collected some quantitative data such as age, years of farming, location of farms and acreages, and income from each participant. Included in Case Study 1 – Canadian Farm Sector, I conducted three to five interviews within each of the cultural groups I identified in Chapter 2: Mormons, Mennonites, and Doukhobors all of whom were small market gardeners but turned out not to be distinct in terms of their farming practices today. The remainder of interviews were conducted among the many farmers not affiliated with these particular groups as well as with water managers on the Creston Valley floodplain and the Kootenai Valley floodplain in Idaho. I used the same semi-structured interview guide for both farmer case study groups while, as noted above, I used a slightly modified interview guide with the yaqan nukiy participants and the water manager group (see appendices A, B).

Participant Observations

From mid April until late fall in October 2016, I conducted fifteen hours of participant observations while situating myself in conventional as well as within alternative small food grower farms within the Creston Valley and the US Kootenai Valley as it is known across the geopolitical boundary. This time period was particularly important to my research study because the growing season begins in May and lasts until the end of the harvest season into early November. During my interviews I had asked farmers if I could participate in on-farm activities which all were gladly willing to offer. I participated in ten observation sessions in the Creston Valley. These sessions included visiting the yaqun nu?kiy Nation's organic farm, touring the historical Creston Valley grain elevator, visiting a honey bee farm, participating on a tour of an industrial cherry orchard, as well as riding in a helicopter over two industrial orchards in order to spray rain water off the cherries in preparation for export to Asia.

I also volunteered for three Creston Valley Farmers Markets, walked along eroding dikes located on an industrial farmer's acreage, toured Creston's first medicinal cannabis facility, and walked along the Goat River estuary for a day. In Bonners Ferry, I conducted six participant observations. I was taken on a U.S.A. Army Corps of Engineers fish biology boat for a tour of the sturgeon recovery program mats and dike revitalization projects. I toured a goat milk farm, the world's largest hop farm, a lamb farm, an organic homestead farm, and a mushroom distribution centre (The Columbia Basin Fish and Wildlife News Bulletin 2017; 2018).

During the day I became part of the group and literally hung out (Kilbride 1992; Whyte 1989) in the field(s) and engaged in participant observation in both conventional and organic farming while combining unstructured and open-ended interviews during the observation. I had already met with the Creston Valley Organic food growers in 2013 and they allowed me to volunteer at the Saturday morning Farmers Market which enhanced my participant observation opportunities. I conducted the participant observations at various times throughout the growing season so as to understand the various fluctuations in crops, and market sales. I was also able to understand the water levels and diking erosion and determined first hand, the effects these had on farmers' abilities to grow food. Table 5.2 indicates the schedule and location of observations I conducted in 2016.

Table 5.2 - Schedule and Location of Observations in 2016.

Month	Canada	U.S.A.	Totals
May	Creston Farmers Market (3x) Organic Homestead Farm tour		2
June			0
July	Cherry Orchard tour Helicopter Tour Ktunaxa Organic Farm tour	Mushroom Farm Goat Farm tour	5
August	Dike tour Goat River tour Grain Elevator tour	Organic Homestead Farm tour Industrial Hop Farm	5
September	Organic Honey Farm tour	Kootenay River Boat tour Farm tour	3
June 2018	Medical Cannabis Facility tour		1
Total Sites	10	6	16

The sixteen observational studies were approximately one to two hours in length, and some all day, such as the Kootenai river tour, starting from early morning and ending late evening. During that time, I made extensive notes, written and recorded, and took photographs and videos with consent. From my observations in Bonners Ferry, I was able to learn about the differences and perceptions of food security and food sovereignty policy, and views on the ongoing CRT progress, including the diking revitalization projects along farmers dikes in the U.S.A. In these areas, sturgeon were able to successfully spawn while farmers' dikes were simultaneously protected from further erosion, a topic I discuss in Chapter 8.

Focus Groups

Lincoln and Denzin (2003) describe the focus group as a form of a single-person interview but conducted within a group. Initially developed by Paul Lazarsfeld and Robert Merton in 1941, the focus group is intended to record real-time people's reactions, while interviewing a group

(Merton 1987). In some cases, it is used at the outset of a research process for the development of other methods, such as interviews and surveys. In other cases, it is only conducted after considerable time in the field when it can be used to test and consolidate knowledge gained from other sources.

I followed the latter model, attempting to organize two focus-groups – one for alternative food growers and one for conventional agriculturalists - in the late fall of 2016. I asked farmers during the interview process if they would like to attend a focus group and most said yes, but that it was dependent on what was happening at the farm. This number of participants also included three small market gardeners who I talked with during a focus group held in the Creston Valley. Eventually, I was able to organize a focus group with small market gardeners that was one hour in length. Unfortunately, none of the industrial farmers were able to come to a focus group because of the intense schedules during this time of year. I was also not able to travel back to the Kootenays during the winter due to the dangerous amount of snowfall on the highest elevated highway pass in Canada. The discussion in the focus group was open and framed around the question of barriers to achieving food security in the Creston Valley. In this focus group, information was provided regarding the difficulty in finding affordable farm labour.

Secondary Sources

I also reviewed an extensive body of secondary research materials for my study including archival and museum records, government and NGO reports and academic literature. These materials illuminate how rapid changes to 21st century agricultural industrial food complexes have distorted the lines between food security, and sovereignty, natural preconditions for truly sustainable agriculture.

For a review of Columbia River Treaty materials, I consulted several online government sources from both Canada and the U.S.A. such as the websites of the US State Department and the Government of British Columbia. I have also investigated a number of Columbia River Treaty reports (Barton and Ketchum 2012; Columbia River Treaty 2019) and websites for a critical analysis of the large-scale technological transformations and transitions that this area has undergoing since the damming of the Kootenay River. I have extensively reviewed CRT reports, water policy documents, published and unpublished materials, by governmental and non-governmental agencies that explain and describe the activities and philosophies of decision-making institutions, advisory groups and lobby groups.

United Nation Food and Agricultural Organization websites provide global context for this food research project. I use climate change literature (Nolin et al. 2012) to assess future risks to agricultural production and archival materials from the Creston Valley Museum and its online resources to provide historical data about events that have occurred since European settlement of the area in the 1800s. Additionally, various governmental food systems websites such as the British Columbia Food Systems Network (2012) provide valuable information about the history of various crops and dairy farming in this area.

Although not reviewed in detail here (see Chapter 3), my study is also informed by an extensive review of food security literature based upon the writings of Jarosz (2014), Koc (2013), McMichael (2005), and Toronto Public Health (2006), among several others. I have also reviewed food sovereignty theorists Clapp (2016), Lyons (2014), Nonini (2013), and food justice literature Alkon et al. (2009), Allen (2009), Cadieux and Slocum (2016), Keske et al. (2016), Kremen et al. (2012), and Shiva (2005, 2002a, b). My literature review also includes approximately seven graduate theses (Akinabode 1996; Boehmer 2010; Bowden 1971; Frantz

1958; Gale 1973; Lee 1925; Schaeffer 1940), two of which provide some context for the alternative small farming organizations that have become part of the agricultural food production systems within the Creston Valley of British Columbia (Bowden 1971; Lee 1925).

While an abundance of literature exists in areas of farm financialization, corporatization, production, and economics within the Canadian Prairie Provinces and the United States (Statistics Canada 1987; 2007, 2008, 2016a, b) a paucity of anthropological literature on these same issues has led to difficulty in finding information about this region. Nonetheless, some of the literature I review includes Bennett (1969), which examines adaptation of settlers within a small agricultural community in Saskatchewan; Murton (2007), who examines British Columbia's role to manufacture a "modern countryside"; Worster (1985, 1993), an environmental historian whose examination of the growth of technology, science, and bureaucracy shows how humans harnessed and controlled water in the Columbia River Basin in his intriguing examination of the "Hydraulic Society"; as well as White (1995) who examines environmental changes along the Columbia River.

I incorporated multiple sources of information including original photos and videos from city and town archives, the Creston Museum Archives, industrial and market farm tours, farmers markets in the US and Canada, the Libby dam penstock, and other water controlling structures. I have also conducted a literature review of federal and provincial agricultural and food security policy and legislation and agriculture and water policy documents as it applies to agriculture and the CRT along with research and policy reports available from non-governmental agencies that explain and describe the activities and philosophies of food security and food sovereignty policy making in Canada. I was able to obtain a selection of Creston Valley flood plan maps, both ground and aerial to be included in my dissertation.

I used tables and graphs along with Regional District of Central Kootenay (RDCKALUI 2016) data to map the number of farmers on the floodplain and benchlands, and what types of crops they have historically grown as well as number of acres owned on each farm. Likewise, I mapped the number and type of water systems on the floodplain and benchlands to inform the types of crops being grown there along with interviews to determine where the water supply for such crops initiate from. The data was organized in graphs, maps, and tables. Finally, I organized and reported my analysis in such a way that it added clarity and conciseness to my analysis and findings.

Ethical Concerns

This project meets the criteria of the UBC Okanagan Behavioural Research Ethics Board (BREB) for low risk research, however, there are still risks that need to be addressed, especially those respecting privacy and confidentiality. Before interviews were conducted, participants were fully informed about the purpose of the research and the use of research materials and were asked to sign consent forms confirming their understanding and agreement to participate. In the event that some farmers did not want to disclose crop production/income details, or felt concerned about expressing certain political opinions, or complaints about neighbours, etc., I respected their opinions by not pressing for or recording information that they did not wish to share. Water managers were also under some pressure from their employers to not disclose information related to their responsibility, or incomes, and policies.

Special precautions were undertaken with Indigenous participants in the project as outlined previously. Ktunaxa protocols were followed in order to obtain community consent for the project, and those protocols were also followed when selecting participants. Interview

participants were asked to consider, as part of the consent process, whether their answers to any of the research questions might put them at risk in respect either to longstanding historical, colonial or decolonial processes, or in respect to knowledge that could be considered confidential within their family or community. Interviews were conducted only after a full discussion of these issues and with participants' assurances that they were comfortable with the minimal level of risk they felt was present.

To ensure and minimize privacy and any potential risk I used codes throughout my dissertation, and I made public only information that they themselves thought should be made public. Since I was not specifying nor basing my interviews on gender specific participants, I did not anticipate gender specific risk issues. However, should the physical and emotional safety and well-being of my participants at any time have been compromised due to gender concerns, I would have immediately concluded my interviews and addressed the issues of my participants. This concern never arose, however.

To conclude, I did not believe there would be any psychological, cultural, spiritual, privacy, or confidential risks. Furthermore, to protect all data collected for my study, I have made two complete copies of all photos, interviews, notes and audio recordings which are kept under lock in my supervisor's office, and in my own private, locked research office. Along with this, all data is stored electronically in three places; two hard drives and one computer hard drive which is also under lock and key.

Data Analysis and Interpretation

For years, qualitative social scientists were stigmatized in research circles for being less scientific than quantitative researchers (Creswell 2007; Grant and Tomal 2013; Lunenburg and

Irby 2008). This has resulted in qualitative researchers having that much more pressure to justify their interpretation and use of research data. Making sense of audiovisual data, interview transcripts, observation field notes, oral histories, and documents, is a daunting task without the added burden of having to navigate what Tesch (1990) calls the black box of reporting results, the mysterious task of creating a research narrative based on one's findings that are kept in secret until being opened up (Grant and Tomal 2013).

I coded my texts for themes by highlighting words and phrases with markers, and then analyzed the themes for patterns. While looking for themes, I used what Lincoln and Guba (1985:347-49) call key-word-in-context or the KWIC method to highlight real quotes from my interviews that represent what I thought were critical topics within my data and ultimately in my research. After completion of my fieldwork, I listened to each recorded interview at least three times and made voluminous amounts of typewritten notes and then coded the transcripts. I coded the individual interviews in categories that were pertinent to answering my interview and research questions and produced several major themes which asked: What is food security? What is food sovereignty? What is the financial security of farmers? What challenges are experienced by industrial and small market farmers in daily farm operations? What initiatives, if any help to mitigate the challenges farmers and consumers experience for production and consumption of food. How does the Columbia River Treaty and the Libby Dam affect food? procurement in the Creston Valley? How does climate change and flooding and drought affect food procurement for all farmers and Ktunaxa People in the Creston Valley?

After analyzing key themes, I linked them by what Miles and Huberman (1994:134-37) call *memoing*, continually writing down my thoughts about the data I was reading as they developed (Van Maanen 2011). Because I am using several qualitative research methods, I

employed a sequential data analysis process (Knoblauch 2005) that allowed me to triangulate and use the information I gathered from the first set of data in 2013 until this research study in 2016, to inform each phase of the project (Grant and Tomal 2013).

A Matrix for Analyzing Food Security in the Creston Valley

In the Chapters that follow I describe and analyse my findings on the basis of my research questions and the definition of food security I provide in Chapter 3. Since it was not possible, within the time constraints of this study, to gather data about all the factors that inform the definition, I have operationalized the definition on the basis of the factors that my fieldwork data does address and indicate the factors in Figure 5.1.

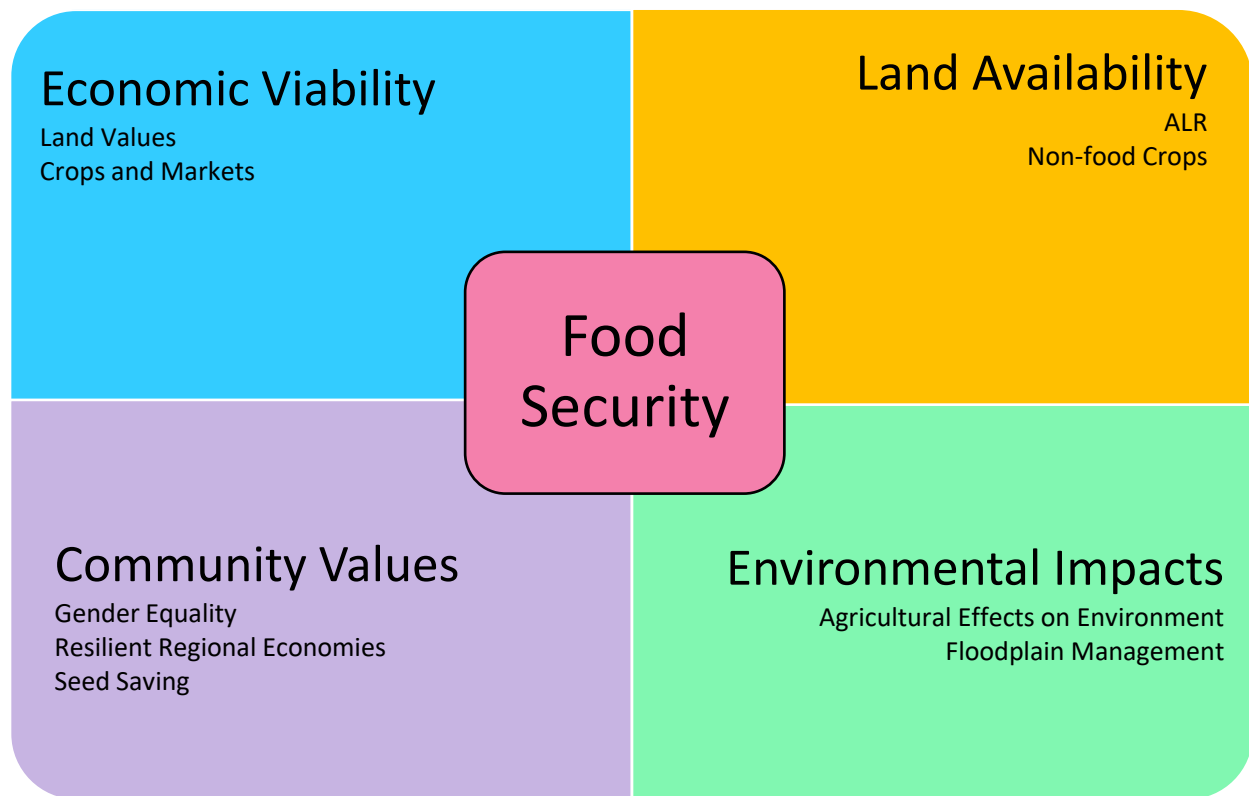


Figure 5.1 – Matrix for Analyzing Food Security.

I analyze four main factors that determine the food security of the Creston Valley which are: 1) the economic viability of food production both for farmers and consumers, 2) land availability which is a critical component in agriculture, 3) community values integral to achieving food security, and 4) the environmental impacts of local food production practices and the impact on food production of broader patterns of environmental change, such as global warming. These main factors are further analyzed and organized by sub-components, as identified in the following Chapters, to create a framework for assessing food security. I discuss land values, crops and markets, agricultural services, crop insurance, and technology and chemicals used in the production of food under the heading of Economic Viability whereas within the Land Availability heading I analyze Agricultural Land Reserve effects on land availability while also discussing alternative farms and crops. Under the heading of Community Values, I look at topics such as government and agricultural trade policies, local food markets, and gender equality. Finally, I investigate Agricultural Effects on the Environment and discuss climate change, draining and diking, damming and erosion, and farm chemicals.

While these main categories and their sub themes are specifically identified within this study, I did not examine such factors as sufficient quantity of food for a healthy active life, a topic that is critically important to achieving food security but is not within the scope of this project. The topic of nutrition and quality of caloric intake is therefore identified as a gap in this research and could be the foundation for further studies. I also do not include data which focuses upon the needs of the consumer, a principle that is identified within the food sovereigntists' definition of food security, but which is beyond the scope of this study. Price fluctuations are also closely examined by food security studies but are not a specific area of study here due to the

constraints of the study. I will, however, include some discussion of these topics in my concluding Chapter in the context of my food security assessments.

In the following chapter, I present my findings for industrial farmers in the Creston Valley, and then in Chapter 7, my findings for market gardeners and their food production methods. In Chapter 8, I examine the yaqan nu?kiy food production methods as they relate to food security and I then offer my assessment and conclusion, followed by some solutions for food security in Chapter 9.

Chapter 6: Industrial Farming and Food Security in the Creston Valley

In this Chapter I assess food security in the Creston Valley of B.C. in relation to industrial farming. In order to do this, I provide a representative description of industrial farmer responses to interview questions, mapped onto the food security assessment framework described below. Industrial farms are defined based on farm size, crops and markets, costs associated with industrial farming, and environmental impacts. My findings indicate that industrial farmers are facing several socio-economic challenges which have created a disturbing food (in)security scenario. In this chapter I also discuss the environmental effects of industrial farming in relation to climate change and present evidence that challenges the common assumptions that industrial food growers have benefited from Libby Dam flood control measures. In my conclusion to the chapter, I assess the relative contribution of industrial farming to food security locally, in the Creston Valley, and regionally, for BC and nationally for Canada as a whole.

Food Security Assessment Framework

The food security assessment framework in this chapter and the following two chapters is based on the food security matrix described at the end of Chapter 5. Not all factors in the food security matrix receive equal analysis in the findings of Chapters 6 – 8 since certain factors are more strongly associated with one type of food production system than another. For instance, since the Creston Valley economy is highly dependent on industrial agriculture, interview material includes a large body of evidence about economic viability. It includes less, however, about, community values, an issue that industrial farmers emphasize less than market gardeners. The

potential economic failure of industrial farming could lead to an overall loss of earnings affecting the ability of people throughout the Valley to purchase food. Food security in the Creston Valley, in other words, is predicated, at least in part, on farm income security. Areas of analysis relevant to the issue of farm income security include the size of farmland on which to produce food, the cost of land, the cost of growing exportable crops, and agricultural support services. In this Chapter I, in addition to interview information, I also analyze information from other sources about the costs and logistics of national and international food transportation systems, the constraints or support of various bilateral and international trade treaties, and governmental support systems.

Industrial Farmers

For this study, I distinguish industrial farm and market garden operations in the Creston Valley on the basis of the crops grown, acreage under production, level of technology used, volume and type of chemicals used, the markets targeted for sales, and gross and net income when provided. Industrial crops are monocrops occupying large swathes of land where management involves high levels of mechanization and chemical inputs. I modify these definitional categories in Chapter 8, due to the distinct socio-political, cultural, and historical circumstances that have affected food production for the yaqan nu?kiy.

The industrial crops that grow best in the Creston Valley under these systems are cherries, emerging vineyards for grapes, corn silage, and alfalfa for dairy and seed operations. A new industry in the Creston Valley is a medicinal cannabis production facility housed in an old indoor potato seed plant on Agricultural Land Reserve (ALR) land.

Creston Valley industrial farms do not nearly compare in size to those that exist in some locations. According to the NFU (2010:6), in Saskatchewan, for instance, farms are often 10,000 to 20,000 acres in size and in one well documented case, a farm as large as 100,000 acres exists, with aspirations to grow to one million acres (NFU 2010:6). Nonetheless, the farms in Creston that I identify as industrial are large in proportion to the size of the Creston Valley, encompassing immense tracks of land on the Valley bottom and benchlands as indicated by the map of the Creston Valley in Chapter 2. According to data from interviewees, farms on the floodplain vary in size from a 463-acre hay farm to a 5,700-acre alfalfa hay and seed farm. Because I did not have the opportunity to conduct interviews with all farms and farmers in the Creston Valley in 2016, the data does not include the 6,000-acres of Valley bottom land under the control of the Ktunaxa yaqan nuki. Of their lands, 3,500-acres are leased out to various floodplain farmers (see Chapter 8). However, according to interviewees, the largest farm is the alfalfa hay and seed farm operation where I did have an opportunity to speak with its owners. On the benchlands, of the farmers who I interviewed, the smallest acreage is a 17-acre winery, and the largest is a 145-acre cherry orchard.

Industrial farmers in the Creston Valley follow a widely distributed model based on maximum use of energy and purchased inputs while using gene edited seed products – corn, some canola, and soybeans primarily – that require high-tech seeding machinery, GPS systems for steering heavy machinery, and expensive sprayers and irrigation systems. Industrial scale dairy farmers use robotic milking machines, computerized feed ration mixers, and other capital-intensive food production apparatuses, all of which I witnessed during my tours on industrial food producing farms. Industrial farmers purchased new and used equipment, contributing to significant farm expenses that are necessary for this type of farm system.

The use of genetically modified seeds also requires high inputs of several derivatives of glyphosate, a highly toxic and dangerous chemical defoliant which, when applied, systemically kills all vegetation on contact except its partner seed which has been modified to withstand the glyphosate application (Acquavella et al. 2006; Baker et al. 2005; Centre for Food Safety 2018; Rissoli et al. 2016). Consequently, the crop is only successfully grown if the chemicals can eradicate all other foliage except for the one crop that is genetically engineered to withstand the onslaught of its herbicide. Although this issue is central to the future of sovereign food production in the Creston Valley, I do not provide an in-depth analysis of chemical impacts in this dissertation. All farmers use pesticides and chemicals that adjust soil Ph levels, indicating all industrial farmers are reliant on chemical inputs. Chemical treatments are also generally cheaper than manual control methods because fewer applications are needed to control weeds, thereby avoiding manual labour costs and use of alternative less dangerous chemicals (Gliessman 1998, 2007; Gliessman and Rosemeyer 2010; Shiva 1991, 2002b).

The target export market of any crop is the most significant indicator as to whether I classified the farm as industrial or market garden. Some industrial-scale farmers do sell a small portion of their product to local markets, but most exports are firmly ensconced within a globalized export market. Alternatively, I did not encounter any market gardeners producing food for international or globalized markets. I did classify as industrial, however, a large-scale asparagus farmer, who sells locally but markets mainly for the entire province of B.C. Likewise, a winery indicated that some of their wine is sold locally, but the majority flows out to other areas in B.C., Canada, and European markets. Also, Creston's largest industrial dairy farmer supplies his milk according to the B.C. dairy quota system which means that his milk products stay in B.C. and Alberta but are not sold directly to a local market indicating that ultimately,

dairy consumers do not know which city or town their milk originally comes from. Industrial cherries are exported for instance to China, Hong Kong, Taiwan, Japan, Korea, and Malaysia, and even Afghanistan. Some cherry farmers also indicated that they ship to India, Australia, and Europe including one cherry farmer who says that some of his cherries end up in Florida and possibly other U.S. states as well. The industrial alfalfa hay and seed exporter ships alfalfa to key Asian markets as well.

Additionally, net farm income is measured by gross farm output, production volumes, exports, minus farm expenses. Net incomes are not the only measures of the success of industrial farms. Industrial Canadian agriculture ranks as one of the most successful industrial food production models globally where it exemplifies some of the most prolific food production, most prodigious export achievements, most efficient, high-tech, and grandiose paradigms in the entire world (Qualman 2011). However, despite these so-called feats, Canadian farms in the mid-1980s were among the least profitable globally, a reality belied by the many distinguishable accolades that are bestowed upon the industrial farmers themselves (Qualman 2011). Some of the industrial farmers shared information regarding their gross incomes, which ranged from \$5 to \$6 million for an industrial dairy on the flats, to \$200,000 for a mixed vegetable farm operation. There are no market gardeners earning close to the higher gross incomes earned by the industrial farmers. Regardless of gross income, some industrial farmers earn the same net amount as some market gardeners, which is a topic touched upon by a few small-scale farmers (see Chapter 7).

As Qualman (2011) explains, despite enormous gross incomes, little net income is realized by many industrial farmers. Most industrial farmers were willing to share their net incomes, but many refrained to differentiate net farm income from net personal income, a statistic that would be helpful but is difficult to acquire due to the personal nature of family

finances. Qualman's (2011) argument that little net income is earned by industrial farmers is also echoed in the Creston Valley, making industrial agriculture a high stakes game dependent on many factors such as weather, global export markets, transportation costs, trade barriers, cost of inputs, and labour costs, and more often than not necessitating a partner who must also work to augment the family income. Since all farmers stated that the local economy was reliant on secure and sustainable farm income, any risk factors that threaten farm operations necessarily threaten the local economy. I discuss net farm incomes in relation to how the future of farmers and farm workers in the Creston Valley, and thus food security, are threatened.

Table 6.1 indicates the total number of farms in Regional Districts Areas A, B, and C provided to me by the Regional District of Central Kootenay. These statistics indicate the total number of farms and do not differentiate between market farm and industrial farm status. For the purposes of this research project, I have differentiated the two farm designations based on the criteria I provided above.

Table 6.1 – Total Number of Farms and Land Coverage in the Creston Valley.

Electoral Boundary	Total		Farms within the Floodplain		Farms outside Floodplain	
	Farms	Acres	Farms	Acres	Farms	Acres
Area A	48	21.45	-	-	48	21.45
Area B	551	399.05	8	4.24	543	394.81
Area C	223	315.01	124	263.25	99	51.76
Indian Reserve	6	10.06	6	10.06	-	-
Creston	7	3.16	1	0.68	6	2.48
Total	835	748.73	139	278.23	696	470.49

I also interviewed four farmers on the U.S. side of the Valley as shown in Figure 6.1, but because this data indicates there is no direct connection between industrial farming on the U.S. side of the border and the B.C. side, I will focus on just the B.C. side.

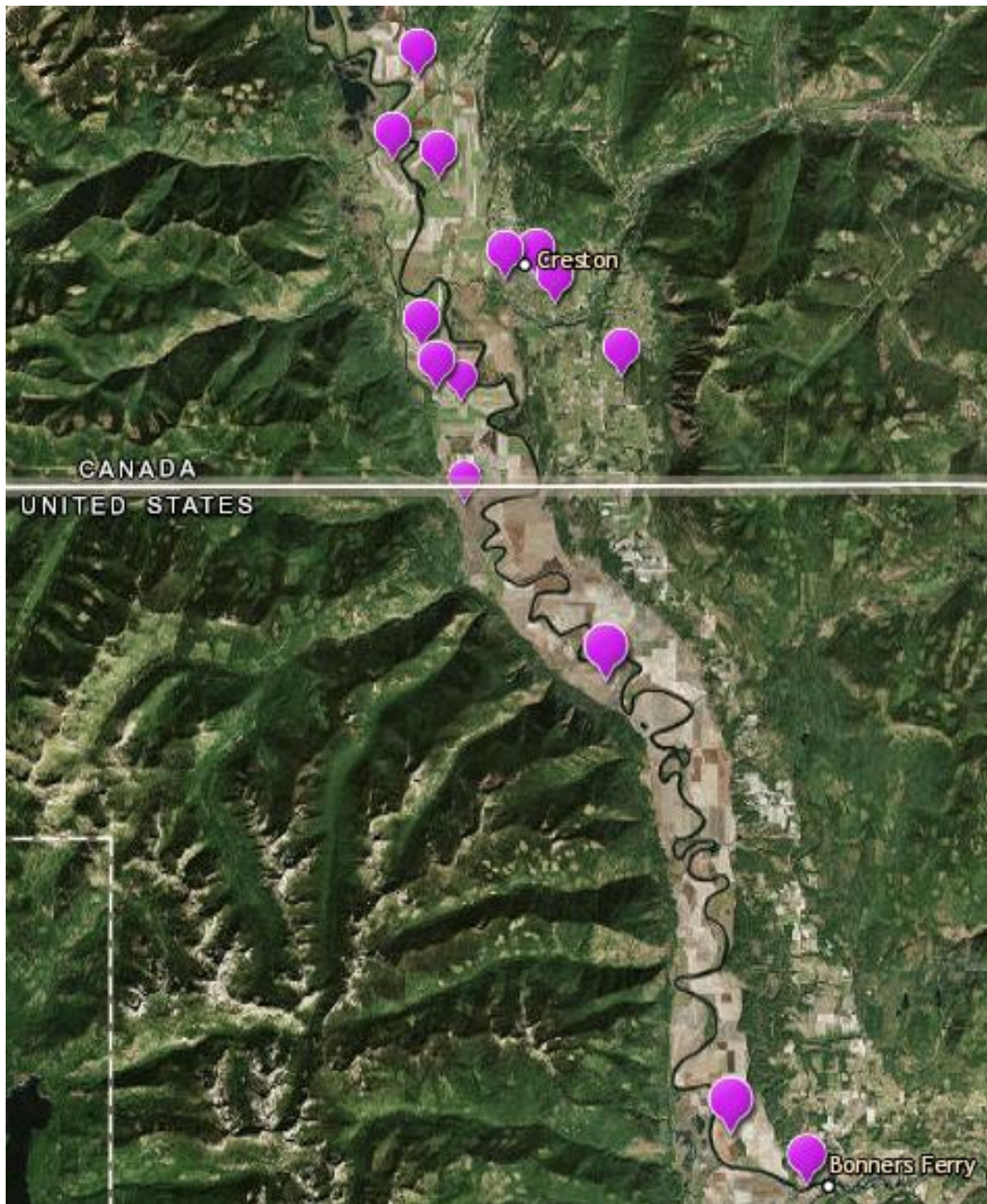


Figure 6.1 – Map of the Creston Valley Showing Floodplain and Benchlands’ Interviews
Produced by Joanne Taylor Using ArcGIS 2019 (permission granted).

While not a complete list of all industrial farm operations in the Creston Valley, Table 6.2 provides data for ten industrial farmers who I interviewed in 2016.

Table 6.2 - Industrial Farmers in the Creston Valley of B.C.

Inter-view #	M/F	Area	Crop	Acres	Level of Technology	Chemical Use	Target Market	Gross Income	Net Income
CI1 ¹⁸	M	Erickson	Cherries	87	Heavy tractors, sprayers,	Yes, Tarps	Global, Asia, Australia, India, Europe	\$3.5m	\$1.4m
CI2	M	Flats	Dairy	2,000	Heavy, large supply of tractors, bailers, seeders, milking parlour	Yes, on feed crops for cattle	National	\$5-6 Million	\$250K
CI3	M	Flats	Hay, Seed, Canola	5,700	Heavy, bailing plant, Large supply	Yes, 24D, Glyphosate	Global	\$3.2 million	
CI4	M	Flats	Hay	463	Heavy equipment	Yes	Local and International	\$400,00	\$20K
CI5	M	Flats	Cannabis Crops	2,400	Low tech - hydroponics concrete building	Yes	Local, National, Global	\$6 million	\$3 million
CI6	M	Flats	Cherries	50 In Erickson 400 on Reserve land	Helicopters, tractors, housing	Yes, Tarps	Global		
CI7	M	Erickson	Cherries	145	Heavy, has own shop for many tractors	Tarps	Global	\$1.3 million	\$50K
CI8	M	Flats	Asparagus Hay export	480	Many tractors, packaging plant	Yes	Local, Provincial	\$200K	\$30K
CI9	M	Flats	Mixed crops hay cereals	4,000	Heavy machinery: Air seeder, combine, semi, sprayer, all paid in cash	Yes	Local, Global	\$1.5 million	\$800K
CI10	F	Erickson	Wine Grapes	17	Yes	Yes	Local, National	\$98K grapes \$825K Winery	

¹⁸ In order to protect the confidentiality and anonymity of interviewees, I have coded all interviews according to location represented by the first letter, type of farmer indicated by second letter, and numerical order of participant.

Creston Valley farmers both produce and consume food, requiring them to earn enough cash income to be able to purchase food for personal consumption. While I did not collect data that specifically assesses whether farmers and consumers achieve a happy, healthy, and active lifestyle (UNFAO 1996), I do provide evidence on whether the long term viability of the local farming economy is secure or insecure. This evidence is especially relevant for industrial farmers who are financially dependent upon growing monocrops strictly for export such as alfalfa and cherries for their personal income.

While industrial farming provides a viable income for industrial farmers, Qualman (2011) reminds us that most of their gross earnings are eaten away by chemical and seed companies, fertilizer conglomerates, and other agricultural corporations, necessitating farm families to depend on off-farm incomes, and other taxpayer-funded support schemes (20). Food security is thus dependent on the gross farm and net income, but also a range of other factors which either hinder or support the achievement of genuine food security (Qualman 2011). This distinction is essential in Canada – an OECD (Organization for Economic Cooperation and Development) country - where society depends on a cash-based economy to measure their ability to purchase food and therefore be food secure, unlike countries where food security depends on their ability to grow their own food for consumption. Being dependent on the industrial economic model of affordability to purchase food is tenuous because of the financialization of food production (Magnan 2015). In the sections that follow, I assess food security in the Creston Valley based on the food security matrix presented in Chapter 5.

Economic Viability

Land Values

Market prices for Land

Challenges to industrial farming are numerous. Land values have sky-rocketed not only in the lower mainland areas of British Columbia but also in the Creston Valley where most farmers lament that land costs remain one of the most significant impediments to new farmers entering the farming industry (Condon et al. 2010). While industrial farmers can obtain subsidized loans, land prices generally remain prohibitively high for most farmers.

In response typical of industrial farmers, an industrial cherry farm on the benchlands CI1 says that land prices are the biggest challenge:

If you are coming from the coast, that is no problem but if you are not, the price of land has doubled in the last few years from \$4,000 per acre to \$8,000-\$10,000 per acre costing about \$1 million for 100 acres of farmland.

CI9 states that if you have no land you cannot get into farming unless of course, you inherit the farm. He emphasises that land is everything, and it is difficult to find. If some (land) does come up for sale, the cost is usually exorbitant. For example, he says:

100 acres of farmland will cost at least half a million dollars, and there is always the option to lease land, but then the bank will not lend you cash to purchase machinery without collateral. You can take out a loan to purchase land or machinery, but you had better have a good crop that is able to provide enough cash to cover the cost of the high-interest rates.

In summary, CI9 says that it is “economically impossible” to get into farming due to land constraints. Leasing land long term is also not a viable option because with fewer capital investments in machinery and outbuildings, farming is not viable (Masioli and Nicholson 2010).

Condon et al. (2010) corroborate in their study that due to the rise in cost of land within the Agricultural Land Reserve, farm prices overall have risen exorbitantly to sometimes \$100,000 or more per acre, costs that, as the above farmer states, do not allow for farmers to enter into farming (Mansfield 2014). Because of rising land prices, farmers move out of the larger urban centres like Vancouver, either because the land is not large enough for industrial agriculture there, or because it is being held on speculation, making Zone Two ALR land in places like the Creston Valley, seem more affordable by comparison.

ALR Impacts on Farmland Prices

When industrial farmers were asked “What is your attitude towards land being taken out of the ALR?” the majority of industrial farmers stated that they believe they should be able to take land out of the ALR. CI8, for instance, stated that:

Why are my hands tied? My buddy bought land and sub-divided it and became a millionaire. But my hands are tied in the ALR. ALR should be taken out so they can do more things with the land. Why should I be penalized for inheriting ALR farmland when I don't want to farm.

CI6 also believes that land should come out of the ALR. He says:

I don't like the ALR. My Dad was ALR representative in the Kootenays and he would come out and assess the land. Some land should come out. Some of it is rock and nothing can be grown on it. It is so difficult to take land out because of politics.

CI6 explains that people are applying to get land out of farm land because kids don't want to farm, and most importantly to them, they need the money. Selling the land in order for it to be developed then becomes a lucrative choice based on economic income and not food production or food security.

Areas that are located within the ALR are mostly located where land is more plentiful on the benchlands growing hay and dairy, hay and seed, and mixed crop farms. The Kootenay river provides an abundance of water on the Creston Valley floodplain and is also located within the ALR. However, several challenges exist for farms when the size of operation becomes big enough to be classified as industrial. One of the challenges is land price and availability for farmers - a barrier to either grow farm operations or start new farm operations. Prices for land within the ALR continue to rise as land prices are driven by speculation, and pressure to take land out of the ALR is growing (Katz 2009). Stricter restrictions on removal from the ALR and stronger policy at the municipal and regional levels could potentially cool overheated and overinflated land prices (Nixon and Newman 2016). The B.C. Liberal party, elected to government in 2013, implemented changes to ALR legislation in order to differentiate farmland protection regimes in different parts of the province, increase the powers of the oil and gas commission and local governments, and reduce the powers of the Agricultural Land Commission (ALC) (Holm 2018a). The ALC is an independent, administrative tribunal which makes land-use decisions for the ALR (Runka 2006) and came under review by the Clark government in 2014 to reduce the number of restrictions necessary to access land for extractive resource development.

Figure 6.2 indicates the Provincial Agricultural Zones. In 2014 the ALR was divided into two zones: Zone One covers prime farmland in the Lower Mainland, the Fraser Valley, Vancouver Island, and the Okanagan Valley where land is in higher demand (Holm 2018a). Zone Two covers farmland in the North, the Kootenays, and the rest of the Interior of B.C. where growing seasons are shorter and lower value crops are cultivated (Holm 2018a)



Figure 6.2 - Agricultural Land Reserve Zones One and Two. Minister of Agriculture's Advisory Committee (permission granted).

The policy and land rezoning change has made it easier to apply for and remove land in Zone Two from the ALR (Minister of Agriculture's Advisory Committee 2018). Thus, it opens up to non-farm uses such as oil and natural gas and other resource extractive development schemes including the Site C hydro-development project in Northern B.C. (Holm 2018a). People can now

easily remove land from Zone Two for housing as well, which has caused land for farming to increase in value so that farmers who *do* want to buy land, cannot. Farmers must now resort to leasing land for farming, which is difficult to find.

Land speculation is occurring not only in the Creston Valley but in other parts of B.C. with Class One zoned ALR land. In Richmond B.C., mega-mansions are being built on ALR land, making land prices well beyond the reach of young farmers who want to farm which in turn, imperils the food security of farmers in the Fraser Valley. One 22,000 square foot mansion that was granted a building permit by Richmond City Council is in a regulated area which states that the maximum size for houses on ALR land is 10,700 feet (Kotyk 2018). The oversight in enforcing housing restrictions perpetuates the speculative real estate market and denies the possibility of affordable properties for food production (Kotyk 2018). While the pressure to take land out of the ALR is growing, I found overwhelming consensus among farmers, both industrial and market gardeners' interviewees, that land within the ALR should *not* be taken out of the reserve.

In 2017, The Property Law Amendment Act was tabled by the BC Green Party leader Andrew Weaver (Wright 2017). This law introduced a 15 percent foreign buyers' tax on residential real estate in Vancouver. Since that time, investors have begun to target other areas of the province, including agricultural land where the effect has been significant on farmland prices. In August 2016, a suburban Vancouver 4.5-acre farm sold for \$2.58 million to an overseas buyer, representing 230 times the average price per acre for farmland elsewhere in Canada (Wright 2017:1). More recently, the New Democratic Party (NDP) of government of B.C. implemented changes to the ALR by cancelling the ability of individual farm owners to be able to apply to the Agricultural Land Commission (ALC) to exclude land for their purposes (Palmer

2019). Bill 15 states that the farmland owner must include a new step in the application process by contacting their local government first in order to apply, thus alleviating some of the burdens the ALC must bear when accepting applications (Palmer 2019:2). Former ALC Chair Richard Bullock agrees with this change and says that it will end the speculation of farm real estate by wealthy foreign investors who have propped up the cost of land in recent years. He stated that foreign investors' objectives are to convert viable agricultural land for other purposes (Palmer 2019:2). Wright states (2017), "the future of our food security requires that we act immediately to protect and preserve our limited land in the ALR" (1). Wittman and Barbelot (2011) further remind us that without a viable farmland base, it is untenable to produce enough food for local and distant markets.

Crops and Markets

Dairy Industry

When asked "what are the most significant challenges facing farmers in the Creston Valley today", Creston Valley's largest dairy farm owner, CI2 responded with comments that were representative of all eight industrial dairy farmers in the valley. He noted several issues and explained that hydro and fuel, and labour were some of the expenses that had most increased. However, he also expressed his fear that the supply side quota system was also under threat. He explained that he had approximately 1500 acres of land which supplied 1300 cattle with forage. The dairyman sold his farm's milk to the dairy board and delivered the milk wherever it was required, which could be to Glenwood, Alberta, or Red Deer, Alberta or Abbotsford, B.C. It goes to a Saputo (2019) plant, but all milk is sold through the board. He ships between 24,000 and 30,000 liters of milk every other day. His quota is based on butterfat, which is measured by

applying a 3.5 formula multiplied by the amount of milk fat which provides the amount necessary to maintain the quota. According to the dairy farmer, a quota can have a value of between one to two million dollars, depending how many cows are on each quota, and how much milk the government is releasing. But even though it may take a lifetime to acquire quotas, which can also be inherited, other challenges exist, which were stated by the dairy farmer:

Buying land is probably not as profitable as buying quota, but good land is always an asset, and our farming operation has a \$5 million-dollar gross income, somewhere between \$5 and \$6 million gross, but it is always a concern to run a profitable operation because you cannot stay in business if you don't...I must always maintain a good cash control. Expenses always go up and we had a lot of increases like in hydro and in fuel and in commodities as well as in labour. We have to maintain a good labour force that is paid adequately. These are the four or five areas that have gone up the most significantly.

The dairy farmer states that at the end of the day, his net personal income was about \$250,000 per year, which allows him to maintain a very comfortable life for him and his family. Three of his sons have also stayed in the agricultural industry and now own industrial quota poultry farms. However, without the protection of the quota, the constant supply of the product, and the land on which to operate a farm of this size, C12 and his family would not realize such a lucrative and secure income, and thus, lifestyle.

Since World War II, organizations such as the General Agreement on Tariffs and Trade, the World Trade Organization, the World Bank, the International Monetary Fund, and other regional trade agreements such as NAFTA have left no room for governments to negotiate on behalf of quota farmers. During the first agricultural phase in Canada after WWII (Britnell and Fowke 1962; Fowke 1946; Knuttifa 2003), the national plan included the growth of agriculture on the prairies and B.C. Along with this plan was ensuring the protection of wheat and dairy by

creating various boards such as the Board of Grain Commissioners of 1912 for wheat and other grains including oats, barley, flax, and corn, and later during the war years, rapeseed and sunflowers (Britnell and Fowke 1962; Fowke 1957; Magnan 2015; Swanson and Armstrong 1930).

Canada's contentious supply-management system is also threatened by foreign interest free-trade agreements like the Canada Korea Free Trade Agreement, the European Union, the Trans-Pacific Partnership – of which the U.S.A. no longer belongs - and the tenuous re-negotiation of the North American Free Trade Agreement (NAFTA). Now called the US-Mexico-Canada Agreement (USMCA), it “allows US dairy a slightly increased access of up to 3.59 percent of Canada's dairy market” (Blackwell 2018; Galbraith 2019:157; Holm 2018b). The American dairy allowance into Canada was followed by Trudeau's promise to compensate dairy farmers for this slight upward market adjustment. An ever-changing kaleidoscope of international trade agreements such as the Trade-Related Aspects of Intellectual Property Rights (TRIPS), the World Trade Organization (WTO), and the bilateral Comprehensive Economic and Trade Agreement with Europe (CETA) all pose threats to once protected farm sectors, such as the dairy industry. Added to the multi-faceted complexity of international trade agreements, are retaliatory sanctions imposed on agricultural products should diplomatic tensions arise. For example, in March (2019) China revoked a significant Canadian order of canola forbidding Richardson International its registration to export a portion of the \$5 billion Canadian canola export market, mostly because of the Huawei extradition case between the U.S.A. and Canada (Evans 2019).

The Canadian Dairy Farmers' Federation is another form of agriculture protection for farmers (BC Milk Marketing Board 2018; Canadian Dairy Information Centre 2018) Founded in

1934, it stabilized the dairy market and revenues for dairy farmers, and by the 1970s, a supply management policy governed Canada's seemingly non-risk quota system (Abbassi and Larue 2012). However, according to C18, dairy quota is "now on the line" in the Creston Valley, and explains that US milk cannot come into Canada. He says that "if milk were allowed to come across the line (into Canada), the entire system would fail". Predicated on a strictly controlled supply and demand model of agriculture, most B.C. quota farmers (generally located in the Fraser Valley) are indeed aware that the government is leaning towards removal of the quota system due to deregulation and trade liberalization, challenging notions of future farm and agricultural security (Cairns and Meikle 2012; Chernoff 2016; Hall Findlay 2012). In total, there are roughly 17,000 Canadian farms that operate under supply management; this represents about eight percent of all farms in Canada (Dairy Farmers of Canada 2018). The largest of the three supply-managed industries in Canada is dairy, which includes about 13,000 farmers. There are about 2,700 poultry farmers, and less than 1,000 egg farmers (Chernoff 2016; Dairy Farmers of Canada 2018).

Figure 6.3 shows a typical industrial milking machine in the milk parlour of a dairy operation in the Creston Valley.



Figure 6.3 – Industrial Milking Machine – Creston Valley. Photo by author 2016.

Quota owning farmers belong to a separate class of both industrial and small market farmers who have the security of guaranteed income as long as their operations adhere to the qualities and quantities of milk fat demanded by the government. Although the dairy quota system in Canada is fundamentally oriented to industrial farming, it is, nevertheless, possible to operate at a market garden level while holding milk quota, as I will discuss further in the next chapter. In the case of industrial dairy farmers, providing food as a staple or commodity connected to a globalized agricultural system dependent on fickle national trade policies and protectionist farm strategies may provide a secure economic income, but that security can be tenuous at times as leaders and their policies shift and change.

The once highly regarded Canadian dairy farm quota system is undoubtedly at risk, but the supply-side of dairy (milk and cheese), eggs, and poultry (chicken and turkey) based on government-regulated quotas that restrict the supply and imports with high tariffs (Hall Findlay 2012; Cairns and Meikle 2012; Chernoff 2016) does continue to provide farmers and consumers with jobs and food security. Holm (2018b) says that “Canada’s supply side management of dairy, poultry, and eggs matches its domestic demand and its products do not disrupt international trade flows” (1). Perhaps owing to their perishable nature, these products do not export well, unlike wheat and canola, and this helps to explain why Canadian farmers can be protected and ensured of a stable income. The protection afforded to the production and supply of this particular food group has the benefit of providing consumers and communities with an affordable, reliable, local supply of fresh, growth hormone-free dairy without taxpayer subsidies. Furthermore, the supply of dairy in local communities protects the environment against long-haul transportation emissions required for non-perishable food items, such as wheat and canola, and also ensures a stable food supply and pricing for future generations.

Vegetables

Not all industrial farmers export to global markets - some produce just for the province of B.C. Statistics are not provided for the numbers of industrial farmers on the Creston Valley floodplain, but after conducting research in the Valley since 2013, it appears that the only industrial vegetable farmer is an asparagus farmer (CI8). While ostensibly providing asparagus for a local market, the asparagus farmer grows in a highly efficient and mechanized manner, maximizing the use of chemicals, and states, “if you have eaten asparagus anywhere in B.C., then I have probably grown it!” Owning 480 acres of farmland on the Creston Valley floodplain which he inherited from his father and grandfather, he grows asparagus on 280 acres while

leasing out the rest for Timothy Hay export. He also has a small market garden for sales at the local farmers market. C18 does not believe in organic food and uses an array of commercial fertilizers and chemical herbicide sprays for the weedy and clay-bottomed soils of the Valley. His maxim is the “least amount of inputs for the highest yield”, and thus profits. His gross income is \$200,000 in a good year, but he admits that he has had a bad run of seven cold years and only the last two were profitable. Luckily, his wife earns a stable and substantial second income.

C18 also questions why just one sector of the food industry – the dairy industry - should be guaranteed by the quota system. He says that everything should be privatized. While challenges exist to the dairy quota system, Kneen (2011) reminds us that supply-management marketing boards and the quota system were initially developed to ensure that farmers receive a fair return on their product.

Alfalfa, Hay, Seed

Two industrial hay and grain producers that I interviewed on the Creston Valley floodplain are both affected by the unpredictable nature of global commodities prices and the costs related to the necessity of using petrochemicals, leaving little net income for the farmers. Alfalfa exports are an important crop for in the Creston Valley however, industrial timothy hay farmer CI3 says:

We grow (timothy hay) for export to Japan. We bail and compact with our business here and then we truck it to Seattle where it is shipped out to Japan for cow feed. The racehorse market is glamorous, but it is insignificant; the hay is mostly for their cows. We are the only timothy hay plant in B.C. The others are losing their acreages to grain because grain prices are so high now. The U.S. dollar drives everything. Now there is a big corn boom for ethanol. One percent for ethanol opens up, and the grain fills that gap, and the price goes up. Everything is going to feed beef cows and dairy cows. Food is predominantly big AG (agriculture). But B.C.’s quota is going down because people are buying U.S. dairy. The U.S. drives the entire world. If food prices go down, or oil, it is all because the U.S. dollar has weakened. In this Valley, we only have 20,000 acres, and at least 3,000 acres are greened up with alfalfa for export. Down there, they grow grain.

He explained that he exported 7,800 tones of hay and alfalfa in 2015 to Japan and other Asian countries. His ocean freight cost in 2015 was anywhere between \$40 - \$50 per tonne for shipment whereas his income was on average \$400 per ton, totalling in the low millions for gross income. Asked what his net income was, he sardonically stated that he would probably be better off to sell the farm after all costs were paid - a telling comment indicating that after expenses, net income was negligible. As part of his massive operation, he also leases 5,000 acres for hay and alfalfa from the yaqan nu?kiy Nation. Furthermore, in order to viably operate his farm, all hay and alfalfa crops must be GMO, becoming firmly embedded within the petrochemical, globalized food-chain model.

Grain

When I spoke with mixed grain farmer CI9, he explained several concerns he had for his industrial farm. When I asked him what are some of the most significant challenges facing farmers in the Creston Valley today, he expressed his constant concern for global market prices. Supplying the global food chain as far as Afghanistan, all prices are dictated by the world market in Chicago and New York's Commodity Commission. Owning 4,000 acres on the floodplain, this multi-generation family grows canola (roundup ready and grown for biodiesel), barley, wheat, timothy seed (the most profitable), and alfalfa, while peas, soya beans, and beans are grown for oilseeds, and corn for ethanol. Oats and hay he explains are the least profitable. The barley is sold to Columbia Brewing, and the wheat is shipped to Alberta. The Timothy seed is shipped to Japan via Bonners Ferry.

CI9 is a third generation farmer and fairly new to farming and he most likely does not remember a time when Canadian wheat and barley was protected by the Canadian Wheat Board (CWB). The Board of Grain Commissioners and later, Board of Grain Supervisors in 1917,

followed by grain pools in each of the prairie provinces, had a sole monopoly over the uniform sales and prices for Canadian wheat and barley until 2012 when that monopsony ended (CWB 2019). In 2015 the CWB was finally dismantled by the Harper government and farmers were able to market grain on the open market (CWB 2019). The Canadian Wheat Board offered the protection of wheat and barley for quality and price, but other crops such as canola and pulse crops led to a decline in wheat farm sizes and an increase in other crops (Magnan 2015). Up until 2015, the CWB provided farmers with stability and market power in a time of highly fluctuating global demand (CWB 2019; Magnan 2015).

C19 also explained that strong chemicals are used on the floodplain by all industrial farmers and that he does not agree with it but must use chemicals because the crops that he grows require it. He uses specialized machines such as air seeders which he pays \$400,000 cash for. Interestingly, his family also owns 35,000 acres in the Nelson, B.C. area and has logging rights which he will also manage in the future. The farmer shares that his farm grossed \$1.5 million and his net income was \$800,000, but the family shareholders must also receive their share of the farm receipts and implied that by the time all is said and done, the annual income is not that much. Producing product for international markets comes with its own inherent set of concerns such as global prices on the commodities market, the necessity of using petrochemicals, and securing enough net income for each of the family share holders to maintain the cost of living, indicating that industrial agriculture is a high risk model of food production.

Effects of The Columbia River Treaty on Canadian Agriculture

I had asked Creston Valley farmers if they were familiar with the general terms of the Columbia River Treaty (CRT) between Canada and the United States? Creston market cherry grower CM1 explained in economic terms:

Cherry growers are subsidized for water in Washington State. They get paid per pound. And we do not get any help from the government. They (the U.S.A.) would have too many cherries, and they ship them up here and flood our market. And we have to sell ours at a loss just to get rid of them. Because the big brokers are evil people. Extra Foods is selling Mexican asparagus when down the road (CI8) is growing asparagus.

He says that because of the CRT, they are *given* water to grow their agriculture in the Moses Lake area. In this way, he believes the government has subsidized Washington State agriculture.

In addition, hay and seed farmer CI3 echoes the cherry farmer's sentiments and says that not only is he experiencing land supply constraints, but also challenges to exporting hay and alfalfa to Asian markets. He states that they (the Americans) are all irrigated down south; without water from the Columbia River, they would be nothing". CI3 goes on to say:

The local potato industry could not compete with Moses Lake. And so, the Spetifore plant closed. Those local farms just took water from the channels. There has been a decline in potato demand, but Moses Lake supplies most of the big potato demands now. Everyone down there is subsidized in one way or another. We are not directly subsidized here, but we do have safety nets like Agri-invest. But it does not make any difference to us.

Creston Valley industrial farmers have repeatedly voiced their frustration and concerns about the subsidizing of agricultural products by the American government in Washington State. The Creston Valley is the largest agricultural area within the Canadian Columbia Basin that has

been directly affected by the Libby Dam on the Kootenai River, one of four CRT dams (Cosens 2012). In addition to the factors noted above that contribute to agricultural insecurity in the region, the additional water storage created by CRT dams has not only created an extra 9,400 kilowatts of hydroelectric power but has also increased the supply of irrigation water in the Columbia Basin Project area of Washington State. This additional irrigation has made it possible to bring half a million added acres of land into production in the U.S. Columbia, thereby benefitting industrial agriculture in Washington State at the expense of B.C. farmers food production (Harrison 2008; Hirt and Soward 2012; Holm 2018a, 1994; Wagner and Taylor 2019).

The additional irrigated land came into production in the U.S. after the construction of three Columbia River Treaty storage facilities in Canada; Mica Dam, Hugh Keenleyside Dam, and Duncan Dam. Initially, the massive Columbia Basin Project was created in 1952, and at that time, 1,029,000 acres were set aside by Congress for agricultural development (Freeman 1947; Funderburk 1954; Huffman 1980; Mitchell 1961). The hot, arid climate of the Moses Lake area, coupled with the constant supply of irrigation water from Banks Lake and the Moses Lake reservoir allows for a generous growth of barley, alfalfa, mint, beans, potatoes, corn and orchard fruits. U.S. farming in the Columbia Basin is being subsidized directly by the U.S. federal government which charges minimum rates for irrigation water to Columbia Basin farmers, and indirectly by Canada because of the contribution of CRT dams to the irrigation water supply. According to Holm (1994, 2018a, b), it was only after the Canadian storage water became available in the late 1960s that Central Washington farmers had a secure enough supply of water to begin planting high-value crops and orchards dependent on late summer irrigation. Given the

scale of production in Central Washington and the subsidized cost of water, Canadian farmers find it difficult to compete in both local and export markets.

Creston Valley farmers voiced their frustrations over the changes in fruit and vegetable production after the CRT was able to supply water to Washington State farmers. The Treaty does not include any provisions about agriculture or irrigation in either Canada or the U.S. The Treaty has nevertheless had several impacts on agriculture on both sides of the border which has prompted Creston Valley farmers to ask whether Canadian taxpayers and farmers are subsidizing the cost of water and agricultural expansion in the U.S.

Lack of Agricultural Services

When I asked industrial farmers about the most significant challenges facing them in the Creston Valley today, several cited the present lack of extension services as a challenge to growing food. CI1 explains one of his farming challenges is the lack of supplies in the Valley:

The biggest challenge is no supplies. There are no agricultural supplies in this Valley. Post fencing materials, chemicals, you have to go out of town to get it. There are no supplies of chemicals. As far as agricultural supplies, you have to go to Kelowna Growers Supplies. Even though they just opened a small store here in Creston, they do not supply the chemicals that I need in enough quantity. And if I do find a chemical I need, then I buy it all up. So we are independent. We have our own shop for parts and maintenance of machinery. We have 30 different pieces and about 14 tractors so that we do not have to suffer looking for parts.

Small and medium-sized farms like the ones in the Creston Valley are desperate for extension services such as soil scientists, water drainage specialists, fertilizer and soil enhancement advisors, and other experts who were traditionally available to farming communities during the last century. Extension farm services were first introduced in British Columbia in 1893 (Yesheawalul 1982) and currently serves a total of 113 municipalities and 33 regional districts.

Although the number of extension offices has been reduced recently, one office serving a cluster of communities as explained by a BC Ministry of Agriculture regional agrologist based out of Creston (personal communication 2018) still remains. The agrologist explains that the previous agrologist had moved to Alberta and horticultural advisors have now become private consultants working for Growers Supply, a chemical co-op based out of Kelowna but who also have a small office in Creston. Within the Creston Valley, the Agri-team consists of one Ministry of Agriculture agrologist and one private tree fruit horticulturalist. The agrologist also explained that through a collaboration between the regional districts of Central Kootenay, Kootenay Boundary, and East Kootenay along with the Columbia Basin Trust, a consultant from Cranbrook, but living in Rossland, B.C. (a non-farming community), also serves the area as an extension agent.

The labyrinth of small offices acts as what the provincial government states is an important part of the Strengthening Farming Program (BC Ministry of Agriculture, Fisheries and Food 2018) to ensure stable and positive working relationships between local governments, Indigenous people, and farming communities. However, on the ground, evidence is contrary. Given the complicated web of offices, advisors, and consultants, one would think that access to agricultural support as defined in the early years of the province's extension agencies, would help farmers with providing agricultural support in the Creston Valley. Decreasing the number of extension staff and replacing one-on-one contact with farmers contributes to the decline of farming support in general and consequently, the likelihood of agricultural security.

Alternatively, food producers' value face-to-face contact with extension field staff and are more likely to change behaviours and devise food producing innovations, conducive to growing food, as compared to long distance travel and one-way forms of fact-sheets via the

internet, and other forms of web-based communication. This explains the loss of farm families as low net incomes, high debts, corporate concentration, and the rising cost of production, making it extremely difficult for farmers. As farmers increasingly experience lack of person-to-person incentives and on the ground assistance, where it is needed, fewer people are farming.

Crop Insurance

Many farmers cited crop insurance as being too expensive to purchase and none of the industrial farmers I interviewed purchased it. When asked about Farm Income Insurance, an intergenerational farmer (C16) operating a large cherry orchard on the flats complained that:

I do not want the expense or the headache of dealing with crop insurance costs, and the endless paperwork that goes along with nightmare bureaucracy.

Instead, he buys wind machines and rents helicopters to blow rainwater off cherries and this, he explains, is extraordinarily successful. While on a helicopter tour of his existing family cherry farm on the Erickson benchlands he explains that at \$500 per hour, renting a helicopter is far less expensive and more reliable than waiting for nature to damage cherry crops and then applying for insurance. He budgets roughly \$50,000 a year for helicopter rental. After a heavy rain, helicopters fly throughout the Creston Valley in the early morning hours before the hot sun beats down on the fruit, resulting in cracked cherries which render them useless for international markets. Since the demand is so high for these helicopters, some farmers pitch in together and share the helicopter expense where one pilot will air-vac two side-by-side orchards in one fell swoop.

An industrial cherry farmer in Erickson (CI7) does have some crop insurance but states that it barely covers the expenses if there is crop failure. Instead, he has invested heavily in

expensive cherry tree netting, large fabrics that span the width of two and three rows of trees. The netting has been engineered to allow the sun to beat down on the fruit while keeping pest birds and rain off the fruit. The netting costs about \$35,000 per acre. A study needs to be conducted into which method is more economical in the end, and more intriguingly, which method would be more environmentally effective. For this lack of control, perhaps industrial cherry farmers do not need to purchase insurance but should alternatively choose to invest heavily in industrial equipment that protects against birds and hail, such as netting. As the industrial cherry farmer substantiates, it is still cheaper to hire helicopters to blow rain off crops than to purchase insurance for that size of farm.

Qualman (2011) argues that support systems like crop insurance are usually paid out more than paid into and because costs are divided between farmers, federal, and provincial governments, tax payer dollars end up supplementing the operation of the insurance scheme. Qualman (2011) believes Canadian taxpayer dollars go towards supporting the potential collapse of the farm sector because when farmers do make insurance claims it is usually substantial. As he describes, “taxpayers have been pressed to provide \$3 billion to \$4 billion per year through a range of farm support programs”, one of them being the farm insurance program (Qualman 2011:29). Thus, the government makes up the difference between money contributed to insurance premiums and claims made. The loss is a constant drain on taxpayers’ money, which ultimately subsidizes agriculture in Canada, prompting the question, who profits most within this system?

In the case of crop insurance then, perhaps industrial cherry farmers are not so much an economic drain on the Canadian government as the small market gardeners who pay into the insurance plan and then make claims on crop losses. In most situations, however, taxpayer costs

are greater for industrial agriculture. The industrial farmer, for instance, because of the scale of his operation, must purchase extensive technology which can then be partly written off as a tax deduction. Also, industrial farm products do not stay in Canada but end up in overseas markets, providing no local or regional food security, while negatively affecting climate change which also ends up as a significant cost to taxpayers.

The Federal government developed the Crop Insurance Act in 1959 and in the same year established the Farm Credit Corporation following the Farm Improvements Loan Act of 1944 (Knuttifa 2003). However, by the 1960s, due to the expansion of the industrial agricultural complex, costs rose for fertilizers, chemicals, machinery, the small number of industrial food producing oligarchies, most of them multi-nationals, were the only ones who could afford Farm Credit and crop insurance. Indeed, most of the industrial farmers I interviewed did not have any crop insurance. In essence, farmers continuously have to balance the escalating costs of producing food for the global food markets which dictate the price of grain and cereals on the open market along with global cherry prices, and the fierce competition with fluctuating prices due to climate change and a capricious market.

Technology and Chemicals

When I asked, “What are the most significant challenges facing farmers in the Creston Valley today”, several farmers stated that there is not enough support for growers and that the cost of inputs are financially prohibitive. They complained that the cost of chemicals is too high, not supplied within the Valley, or requires travel to where supplies are located. Cherry farmer (CI1) said that the John Deere agricultural supplier recently did open up, but that it has such a small selection of equipment and supplies that it is usually pointless to wait for shipping of orders such as fencing post materials, chemicals, and sprayers:

You have to go out of town to get it. It is not feasible to get it in town. So, we must go to Kelowna to the Growers Supply there, a six-hour drive one way. Even though a Growers Supply did open in Creston in 2016, the supply is small and insufficient. The support systems that were once in place are no longer available in the Creston Valley.

While extension agents could provide names of the latest chemical inputs used in industrial farming techniques, it was/is impossible to purchase them locally. CI1 grumbled that the time away from his orchard and thus time away from maintaining the quality of fruit which is dependent on the intensive monitoring of moisture cycles - one rainstorm and a cherry farmer's crop could be wiped out – is the equivalent to bankruptcy.

Having better access to chemical suppliers could help when weather dictated a surge in pests or weeds. By sacrificing time on his farm, CI1 was sacrificing economic opportunity and thus, economic resources to provide food for his family. The necessity to travel out of town was justified for economic survival and challenged notions of food security. If food security is defined by (or as) having the economic means to purchase food for one's family; then this particular cherry grower's financial security was challenged by having to leave his farm to travel a great distance to purchase inputs and tools. This process takes time away from the farm operation, especially when it occurs during the height of the growing season; thus, challenging food security and economic survival and contributing to food *insecurity*.

These changes have developed over the last few years and speak volumes to the industrialization of food procurement in the Creston Valley. Even though the shift in the 1960s to increase world food production using strategies such as new hybrid seeds, high-yield plant varieties, new irrigation techniques, machinery, monocropping, and fertilizers and pesticides, many of these technologies were unable to be used in the diverse social, and ecological terrains of the world.

The failure of the Green Revolution also applies to the Creston Valley floodplain where industrial farming looks to be successful, despite the ever-increasing demand for industrial chemical inputs. For example, at the end of the 19th century, to produce 100 bushels of corn, 35 – 40 hours of labour per week for planting and harvesting were required. Today, with the help of intensive use of petrochemicals, less than three hours of labour are required to grow and harvest the same amount of food, indicating the concentration in which industrial agriculture must use external inputs to realize profits. This increase in food production is aided by the use of industrial tractors for ploughing, weeding, and harvesting. Despite initial increases of production proportional to increased chemical inputs, a two percent annual increase of productivity has slowed to less than half of this initial rate (Perfecto 1992; Ponting 2007). One of the fallouts of the failed Green Revolution was a backlash by Western countries. For example, the European Union ban on genetically modified foods in the last decade (Gibson 2012) has left farmers and consumers alike questioning the success of the green revolution. Even with massive exports to less industrialized countries, hunger and food insecurity persist (Gibson 2012).

In the Creston Valley, this shift has manifested itself in industrial farmers' perceptions about growing with chemicals and whether they must use costly fertilizers. The mixed crop industrial farmer CI9 on the flats of the Creston Valley stated that if you want to feed the world, then you must use chemicals, but you must also have diversity. He explains that “you have to think outside the box using less chemicals like in Germany”. He does not agree with the amount of fertilizers being used in Creston and that Europe has many more regulations than in Canada. As Gibson (2012) explains, EU officials in 2003 ratified a UN biosafety protocol, which regulates international trade in genetically modified foods allowing countries to ban imports if they feel that there is not enough rigorous scientific research conducted on GMO crops. The

Creston Valley farmer says, “people are transitioning over to more natural growing methods because people are finding glyphosate in everything; in the waterways and it is going into the Kootenay River!”

Although not within the scope of this dissertation, it is important to note that all definitions of food security include some aspect of nutrition in their official statement on food security. The use of chemicals and especially glyphosate has shown to have negative health effects on most populations who use this chemical defoliant to control weeds (Battaglin 2014; Clapp 2016). CI9 practices crop diversification so that he does not have to use as many herbicides, which cuts down on the cost of chemicals. However, he does admit that he uses Roundup ready seeds and glyphosate. He also states that most farmers use whatever the cheapest method of weed control is, so if market prices of petro fuel are high, so are the petrochemicals and in that case, they will just till the weeds down. He also shares that: “Rogers out of Armstrong is asking for non-sprayed hay, so there is a demand for natural or organic farming methods which require no spray for 60 days in order for it to be classified as non-sprayed”. He believes that even though the UNFAO has stated that it needs chemicals to feed the world, there must be diversity between organic and conventional growing methods. Nonetheless, he says the world is transitioning over to certified organic because the demand is there, supporting smaller market gardens to produce food in ways that are less environmentally invasive and less financially burdensome. He also believes that places like Vancouver Island are growing markets for niche market items such as gluten-free oats.

Moreover, while some flats farmers are beginning to consider these economic and environmental shifts, but some, clearly are not. When discussing the types of chemicals used and whether he considered his farm to be organic or not, the asparagus farmer (CI8) emphatically

states that he does not believe in organics or a less chemically laden type of food regularly called “natural”. He believes “it is a rip-off!” Clearly, the mixed crop farmer understands there is a more ecologically sustainable model but is unwilling to transition to sustainable farming, while the latter farmer does not. Albeit these farmers compete against one another for profits, they still share the same agenda – to maximize production using the same expensive agrofuels at the expense of the environment and physical health. Agricultural shifts to a more ecologically safe, nutritionally aware, and environmentally conscious way of food production are taking place in the Creston Valley. Those shifts are primarily seen, however, with the small market gardeners and notwithstanding the farmers in transition, does not indicate a secure food future for industrial farmers on the floodplain.

Land Availability

ALR Effect on Land Availability

As noted above, provincial regulations allow for farmland to be removed from the ALR under certain conditions and, as a result, the cost of ALR lands has been escalating at close to the same rate as land prices generally in the region. However, ALR regulations also allow for effects that are not directly cost related such as allowing large housing development, the rezoning of land for tourism development, and land for non-food groups which invariably reduces the amount of available land for agriculture. In this section, I describe two of the ways in which agricultural land is becoming less available to farmers.

Wildlife Management Area

The application by the Creston Valley Wildlife Management Area (CVWMA) to take small acreages out of the ALR for expansion of its 7,000-hectare area of provincial crown land located along the Kootenay River System diminishes agricultural production opportunities. When I asked industrial farmers what their attitude is towards land being taken out of the ALR, one farmer had much to say. CI9 explained to me that the CVWMA Centre sponsored by Ducks Unlimited wants to expand and in order to do so, needs to have adjacent land rezoned out of the ALR. The wetlands are a protected wildlife habitat for nesting and migratory waterfowl and constitute one of the most extensive feeding grounds for waterfowl in B.C. But as CI9 states, “it is owned and run by the American outfit ‘Ducks Unlimited’ which shoots ducks for sport as they migrate as far down as Texas, U.S.A.”. Its largest annual Canadian sponsors are BC Hydro (BC Hydro 2018), the Government of B.C., and the Town of Creston. The protected wetlands form a vital habitat for ecosystem function, and Ducks Unlimited and its Canadian partners have admittedly invested in the construction and maintenance of its diking system. However, because of the strength held by Ducks Unlimited to shape the wetlands into a breeding ground for its duck hunting, the potential for productive farmland is once again lost to international commercial ventures that have nothing to do with food production.

Ducks Unlimited environs form an integral piece of the Creston Valley topological fabric which is inextricably tied to the complex diking system within the floodplain of the Valley. The diking system is a contentious topic within the food-producing community. Mainly under the control of the Libby Dam, some of the policy contradictions and constraints experienced by those who wish to strengthen the diking system for food production come into question. Clearly,

there are a myriad of stressors being placed on the mostly ALR land on the floodplain. These and other controversial issues in respect to dikes are discussed in Chapter 8.

Non-food Crops

Cannabis production alongside grape production for wine is a controversial agricultural crop in the Creston Valley when considering whether these crops contribute to food security. I interviewed two industrial farmers within these two sectors. One interviewee explained that the 100-acre cannabis farm he manages is situated within Area B of the floodplain on the west side of the Kootenay River, prime agricultural land providing the perfect growing environment for medicinal herbs. CI6 explains that the operation is expected to grow four to 40-fold and will include cannabis oil extraction facilities by the end of 2018 once a sales license is obtained.

I asked the director of quality control of this newly formed cannabis facility how much of the food he eats comes from his own person garden which prompted the discussion on whether he believes cannabis to be food. CI6 categorically stated “Yes” when asked if he believes Cannabis to be a food type. He explained that he considers this a type of medicinal food, good for the body. Cannabis is considered a negative social influence on the Indigenous people who have traditionally been subjected to the devastating effects of drugs and alcohol. Cannabis production facilities also take up valuable agricultural land and is considered problematic when taking into consideration the economic and environmental impacts of this form of agricultural production in the Creston Valley. Considering all these factors, Cannabis production does not contribute to food security even though it is being supported by the B.C. government.

The B.C. government considers medical marijuana a farm use. This consideration combined with rapid population growth creates the pressure to develop land for medical marijuana but results in fewer food crops being grown on available agricultural land. It is also

clear that marijuana will be grown as an industrial agricultural operation firmly entrenched in the neo-liberal paradigm of high-income earnings, and will be dependent on federal, provincial, and local laws.

In a White Paper produced by B.C.'s Institute for Sustainable Food Systems (ISFS) at Kwantlen Polytech University (Tatebe et al. 2018), the authors present several options for keeping land within the ALR rather than losing it to marijuana farms. The authors state that to keep land within the ALR, B.C. needs to address long-held, entrenched assumptions regarding property rights, land ownership, the free market ideal, and private interests. These issues require collaboration within several public and private sectors as well as jurisdictional bodies of government for effective, long-term, and systemic change for the betterment of future food producing systems (Murphy 1983; Tatebe et al. 2018), not only for Canada but for communities that depend on local food production systems.

In June 2013, the Government of Canada stated that “individuals who have demonstrated a medical need for cannabis must have reasonable access to a legal source of marijuana for medical purposes”. The same year, it also introduced the “Marijuana for Medical Purposes Regulations” (MMPR) . This new regulation defines how patients access medical marijuana and how medical marijuana is produced. The B.C. Province explicitly states that it considers medical marijuana a ‘farm use’ and therefore should not be prohibited by local governments to shape its growth within the ALR. Moreover, municipalities cannot ban medical marijuana production within the ALR, but they can regulate operations. According to the new Cannabis bylaws (Cannabis Distribution Act 2018), medical marijuana must be grown inside an enclosed structure among other such stringent rules and codes, making it quite difficult but not impossible to set up

legal grow operations. CI6 believes that land within the ALR should allow concrete buildings for agricultural uses for the growing public.

When asked to share provide details concerning the cannabis facility's agricultural income, CI6 shared that in 2017, the company began operations with sales reaching \$300,000 per month gross income. It is projected that gross income will be \$500,000 per month and net profits will begin to be realized at a 50 percent profit margin in the \$250,000 monthly range. These increased profits will fuel continuous expansion of operations with the addition of another 50,000 square feet, firmly placing this operation within the industrial agricultural mode of production. Moreover, CI6 shares his views on climate change. When asked how climate change will impact food procurement he states that with more and more extreme weather events, indoor growing will be the only reliable method of growing food or cannabis reducing the possibility of growing more food on ALR land. Agricultural production does not necessarily contribute to food security requiring a nuanced analysis of what is considered food.

Community Values

The industrial model of food production does not contribute to community resilience as I define the term in my definition of food security. As well, industrial agricultural does not contribute to food security according to the Ontario Public Health Association's (2012) definition which states that "food-based community economic development is an important cornerstone of food security". Using farmers attitudes on the basis of their responses to specific interview questions, several industrial farmers spoke only in terms of economic security.

When I asked local industrial farmers how important agriculture is to the economy and culture of the Creston Valley, several discussed the economy. CI4 said that "everything has gone big. I am getting out of farming. I can't make ends meet anymore, so I am selling my farm. It is

up for sale now”. CI4 said that agriculture is important to the local economy, emphasizing that agricultural success is assessed in terms of the economy and not the culture, or community as some small market farmers stated. CI8 and CI10 also commented that they contribute to the economy of the Creston Valley and thus to the community in economic terms, failing to provide insight into other factors that define food security such as community food production, community resilience, food security, and environmental considerations.

When industrial farmers were asked if they knew where their food eventually ended up, most industrial farmers listed the countries where their product had been exported, none of which remained local. Based on this question, CI9 industrial mixed crop farmer explained that industrial agriculture is the dominant food paradigm, so food grown locally is consistently exported while food for local consumption is imported. When asked the same question, CI3 stated “my industrial farm is market driven and I plan to keep growing it. I ship timothy hay for cattle to Japan and alfalfa to China for animal feed and we also ship timothy roughage to Florida”. Clearly, this form of industrial agriculture does not contribute to community resilience as its product is exported to global markets. Industrial agriculture is consistently fragmented and stands outside of community networks and relationships. It does not withstand environmental disruptions and economic impacts while smaller modes of production are better positioned to endure stressors to community and its small-scale economies of production, making it more resilient to recover from economic impacts or environmental challenges, proving that a small-scale food sector may be much more resilient, and food secure in the long run.

One of the biggest contributors to the demise of community resilience is that large scale farm operations must bear associated costs to maintaining the environment. When I spoke with industrial farmers on the floodplain, most talked about the impacts that Libby Dam has on

farming operations while also recognizing the flood protection it affords as stated by the early proponents of the Columbia River Treaty. For farmers on the floodplain, they shared that they are in a constant battle with the erosion of dikes. CI8 says that:

the erosion of dikes has the biggest impacts on farmers' land. Years ago farmers could afford to repair their dikes but now it is unaffordable. They don't have extra money to repair dikes in a way that is good for fish with willow trees.

When asked who should fix the dikes, CI8 said that the government simply "ripraps the dikes" where it is needed but this does more harm than good for the safety and food security of the floodplain farmers, and for the fish as "it is not good for the fish" and that no one is willing to take responsibility to repair the diking system in a bio sustainable manner on the floodplain.

Sustainable community food security acknowledges the environmental importance of a food system that is based on a socio-holistic approach if food security goals are to be achieved. The erosion of dikes and the lack of responsibility to repair them becomes a social justice issue where fish and wildlife habitat protection and social cohesion are tenants of OPHA (2002) contributing to its model of sustainable food systems and community food security for all food producers in the Valley, including Indigenous peoples who had protected the floodplain for fish supply for millenia, contributing to food security.

While social cohesiveness is an important cornerstone to food security, the bio-diversity and health ramifications of chemical pollutants through the production of genetically modified foods on the environment is critically important. When discussing the types of chemicals used on their farms, all industrial farmers stated that they use petrochemicals in the production of their crops. CI9 says "the valley is very weedy, so we need to use herbicides to combat the weeds. If zero-tilling is practiced, then more chemicals are needed". The farmer goes on to say that "here

in Canada there is an excessive use of petrochemicals” and that everything is ‘Round Up’ grown. Although he does not agree with it, he states that he must use the chemicals otherwise it will affect the output of the crops and thus the farm operation’s gross profits indicating an unwillingness to contribute to the biodiversity and environmental health of the community. When speaking about chemicals and organic farm methods of production, CI8 states that he does not believe in organic food production because it will not feed the world. He believes there is nothing unhealthy or wrong with using chemicals. The industrial food system does not contribute to environmental, economic, and social sustainability. Building sustainable food systems involves many interactions between community members and its environmental components and the multitude of factors that determine the way in which food is grown in a healthy way in the Creston Valley.

While discussing the types of crops grown in the Valley, several industrial farmers shared information on their emerging industries. CI5 shared that the concrete building which grows cannabis is 24,000 square feet taking up a large area of productive soil. The building happens to be situated on 20 acres of industrial zoned land amidst the sprawling 100 acres of ALR land. While wine grape, cannabis production are growing industries, issues of water use become important and problematic as CI5 explains that they use one million gallons of water per day in the spring months questioning whether farmers should be using water for industrial agriculture during global climate change induced pressures on water supplies. When taking into consideration the social, economic, and environmental impacts of this form of agricultural production in the Creston Valley, it does not contribute to food security in the Valley.

Cannabis is a contentious agricultural crop in the Creston Valley taking up valuable agricultural land, while also being a negative social influence on the Indigenous people who have

traditionally been subjected to the devastating effects of drugs and alcohol. Wine production uses heavy chemicals on its crops while marijuana requires concrete grow buildings. This new geography puts the Creston Valley also at risk of being swept up in industrial production to serve local and elite markets non-food alcohol and cannabis thereby losing land that could be used for essential local food production which would contribute to healthy and resilient communities as well as robust regional economies. The impact of alcohol production on the environment is negative due to its energy intensive inputs and the social ramifications can also become dire for First Nations whose communities have historically been ridden with alcoholism and drug use. As CG10 states, “the yaqan nu?kiy will not be investing in cannabis production because of the negative effects on its community, historically and currently”.

While seed sovereignty is one of the main tenants of community food sovereignty as it is outlined in LVC (1996) all industrial farmers indicated that they rely on chemicals such as Roundup to grow food. These comments were unanimous amongst all industrial farmers when asked why they have chosen the methods they use in their farm production. When discussing what types of chemicals are used on the farm’s crops, CI9 stated that he believes wholeheartedly in the UNFAO when they say that farmers must feed the world and in order to do so, GMOs were needed, which are necessarily dependent on its engineered chemicals to grow that particular crop. CI10 also states that their operation is market driven and that they rely on the use of GMO seeds and plants to grow their products. CI2 stated that in order to feed his cattle, chemicals were used heavily in the production of hay which is grown in conjunction with GMO seeds. As habitat and wild species are destroyed by the heavy use of petrochemicals and its genetic manipulation of plants, the food system becomes degraded contributed nothing to the environment, its community networks, and the nutritional content of foods.

According to the OPHA (2012), community nutrition is an essential component of the improvement of the health of people within a community, which industrial food paradigms do not address. One of my findings indicate that industrial farmers have less community attachment, less engagement, are less mindful of community, and their values. When asked why they chose the industrial method of food production, none of the industrial farmers stated that health and nutrition was important. Contrasted with market gardeners, almost all small-scale farmers valued the health of community members and the environment, bringing them closer to the community to which they live and produce food. Small market farmers espoused the use of non GMO seeds so that they did not have to use Roundup ready seeds. They stated that they wanted the sovereignty over the choice of how they grew food which is in stark contrast to industrial farmers who are bound by growing their crops for global and international markets. This does not contribute to community nor food security and is discussed in depth in Chapter 7.

Industrial agriculture does not contribute to the socio-economic and environmental resiliency that robust communities require in order for all residents to obtain a safe, nutritionally sound diet that maximizes and empowers self-reliance and social justice. In the Creston Valley, the majority of industrial farmers do not engage its community members with building stronger ties between local consumers nor does it contribute to the social networks of the community. It also ignores the preservation of valuable farm land for food cultivation and disassociates its from building community relationships which contribute to food security.

Industrial Agricultural Effects on the Environment

Since the arrival of the first Europeans, the Creston Valley has endured several changes to its environment. In 1935, 8,000 acres of the Creston Valley bottom was dredged and diked thus

affecting riparian zones and displacing unique fisheries habitat. By 1948, the Valley bottom was completely diked and by 1974 flooding was under the control of Libby dam thus halting the natural flooding of the flatlands and robbing it of its vital nutrients. A farmer on the flats CI9 describes how his grandfather had helped to build the dikes. He shares how VARQ causes so much erosion. Due to the aging of the diking system together with the unnatural cyclical increase and decrease of water fluctuation, levy erosion is rapidly occurring, ultimately affecting farms and food production. CI9 goes on to explain that “the powers that be still do not have a proper plan to restore the dikes”.

The control of water by Libby Dam is also contingent upon U.S. government legislated fish freshet releases that are ill-timed based on well-intentioned predictions, but policies do not address the on-going experiences of Creston Valley farmers who are tied into global food production markets. The high risk flooding situation makes farmers more susceptible to the consequences of flood disasters and thus at risk of their food production operations. Floodplain farmers stated that they are satisfied with Libby Dam holding back floodwaters, but at the same time complain over the erosion of the dikes, blaming not the dam itself but the operation of it for fish revitalization. CI4 took me out on the dikes for me to see first hand how the dikes were eroding. He says:

Basically you have to have a major problem before anyone will do anything. This dike could blow out. This is really bad here; in the spring we will have water boil over right here where it is seeping under the dike. Everybody is trying to get money to do stuff, but we are not too successful. Our dikes in the Valley are in terrible condition.

This issue raises disputes between floodplain farmers and Ktunaxa people; a point that stands in the middle of agreements to collaborate on the rebuilding of the diking system for both

farmers and First Nations. High water events and the release of water from Libby Dam complicates revitalization initiatives for Kootenai Tribe of Idaho fish, which further complicates the unpredictable nature of water saturation on the floodplain. Warmer, wetter patterns necessarily impact the timing of precipitation which tends to affect not only the *volume* of runoff but also the *timing* of runoff thus creating potential scenarios for flooding of rivers during high water mark years. Compounding this crisis is the increased rise and drop of river water levels which cause erosion of diking structures on the Kootenay River floodplain (Barnett et al. 2005) placing pressure on the sustainability of food production, making industrial farming its own culprit and victim in its assemblage of industrial agriculture practices.

Industrial agricultural systems have evolved since the damming of the Kootenay river to involve the consumption of fossil fuels and water at unsustainable rates while intensive forestry depletes soils and causes erosion, adding to global warming emissions. These types of degradations are evident in the Creston Valley where I witnessed several chemicals being applied to grain crops throughout the Valley in summer months of 2016. All industrial farmers that I interviewed explained that the use of chemicals was necessary in order to reduce the potential risk to grains if rain were to fall at ill-timed periods throughout the growing season thus justifying the use of chemicals. One farmer CI9 says:

Chemical use is extreme here. The chemical use is not sustainable here compared to other countries in Europe where it is much more regulated. It is excessive but people are going more into being healthier. People ask me when I used chemicals. I spray with Round Up and glyphosate. It is found everywhere, in beer. They spray their whole yard here with glyphosate. Down in the Valley here, there is water drainage ditches everywhere, and I cannot keep away from drainage ditches and it is going into the Kootenay River.

The rampant use of petrochemicals contributes to water, soil, and air pollution. Naylor (2014) explains that application rates of fertilizer have increased since the 1950s by over a third until the 1990s, while wheat yields have only increased slightly between 1980 and 2000 (277). Through the over-simplification of industrial food production, dangerous chemical inputs pollute local air and water systems, leaving soils over-exploited. It is no different on the Creston Valley floodplain where soils have been worked and depleted through high-intensity monoculture cropping. The nutrient depletion of the soil undermines the original richness of the floodplain, where it ultimately affects the economic stability of farmers.

Dairy and livestock producers continue to move into the flats, taking over more croplands and government studies indicate that even though drainage from the Valley basin is sufficient, reported levels of fecal, enterococci and *E. coli* bacteria levels are above the B.C. Approved Water Quality Guidelines (2001) for agricultural irrigation where livestock and crops interface (Ministry of Environment Kootenay Region Environmental Protection Effectiveness Evaluation Plan of Creston Valley, B.C. 2008:4). Moreover, industrial beef and dairy cattle also produce GHG emissions from lime and urea and other fertilizer applications which have a pronounced effect on local ecosystems and thus global warming (Pellegrino Cerri 2018:4; UNFAO 2019).

Unprecedented changes in landscapes have also affected climate change and food security. Two farmers who live on the hillside commented on deforestation. CG12 talked about the forest fires in 2012. They stated that: “The forest fires really messed everything up. It was so smoky here. There was not enough light coming through for the crops.” They also stated that they can hear the logging trucks right above the hill behind their small farm night and day which in turn causes more deforestation, runoff, erosion, and wind. Although not well established, the link between deforestation and food insecurity can be made”. Logging is increasingly understood

as a significant contribution to the food crisis as it degrades land that could otherwise be made food productive. The logging industry is also highly dependent on income from exported timber, lacks enforcement, and is known for weak regulation. The lack of trees also contributes to wind erosion, which decreases valuable soils for food production (Oldeman et al. 1991).

Additionally, on the Creston Valley foodplains alfalfa, wheat, and cherry farmers use machinery that burns petrol fuels contributing CO² emissions to the environment. CII states that he must use helicopters which can cost up to \$70,000 per year at \$3,100 per hour in fuel costs. He must also use wind blowers each year to spray moisture off the trees. Livestock, feedlots, industrial fuel, and food mile costs coupled with inefficient irrigation systems indicate that the intensiveness of energy use goes well beyond the sustainability of food production. These and other Green Revolution praxis in the Creston Valley continue to negatively impact the environment, climate change, and ultimately food production.

Land degradation, deforestation, soil erosion, climate change due to global warming, pollution, and loss of biodiversity pose immediate threats to food security in the Creston Valley. Vague assumptions regarding the effects of catastrophic global climate change do not address the on-ground realities of flooding for Creston Valley food producers who in 2017 are experiencing floods worse than those in 2012. The symbiotic relationship between earth, the environment, and food security remains fractured and unsustainable under current food producing conditions.

Summary Assessment: Industrial Agriculture and Food Security

In this Chapter I have critically analyzed the contribution of industrial farmers to food security in the Creston Valley. Industrial farmers have voiced their concerns about increasing land values, lack of agricultural support, decreasing ALR land base, threats to the quota system, and arbitrary

international trade policies. Coupled with risks to total household income, despite the scale of their operations and size of their gross incomes, farmers are not earning enough income to support a family and require second income earners in the household who work off the farm. These conditions have impacted the ability of industrial farmers and consumers to produce and access affordable daily choices for food. The pressure to produce food within this industrial paradigm has also contributed to the destruction of valuable land production ecosystems that ultimately contribute to climate change-induced drought and flooding in the Creston Valley.

Industrial farmers discussed skyrocketing farmland prices that have contributed inaccessibility to land for food production. Agricultural services that once supported and assisted farmers are no longer provided by local government extension services which have transitioned over to the private sector, requiring farmers to travel out of the Valley for support. Now that mono crops are grown for global export, an increase in expensive chemicals has made it difficult for local stores to carry supplies for local farmers thus necessitating farmers to also travel to major city centres such as the Okanagan for supplies. Burdensome costs to insure against crop failure are unattainable for most farmers due to the cost and endless amounts of paperwork. Crop insurance has thus become a luxury for many industrial farmers who can no longer afford to purchase insurance, opting instead to hire helicopters to blow moisture off of fruit trees ultimately contributing enormously to greenhouse gasses.

Land values have also increasingly become more cost prohibitive obligating farmers to lease land rather than to purchase, thus inhibiting their farms from growing in size. Some farmers are fearful that farmland will not stay protected within the Creston Valley Agricultural Land Reserve (ALR) where further pressures are placed on ALR land by changing policies towards food production at the provincial and local levels creating uncertainty for farming. The dairy

quota system is also at risk, and some farmers say that it may not stay in place. American agricultural subsidies are also cited by farmers who are angered by the changes in crop prices. Industrial farmers are caught in global export trade systems that expose them to fickle international trade policies which challenge the security of quota producing dairy farmers, and international markets for cherries and alfalfa.

Climate change is cited as a challenge to the future of agriculture in the Creston Valley. Crops such as grasses and grains are left to the mercy of erratic climate change while flood protection by Libby Dam on the floodplain has necessitated new types of crops to be considered. Industrial farmers are optimistic about the future regardless of drought and flooding, leaving those whose lands encompass eroding dikes, to wonder how they will afford to repair aging diking infrastructures if further floods occur. Farmers on the benchlands share their concerns for water scarcity during recent years of imposed water restrictions (BC 2019). All industrial farmers discussed their farming practices based on advanced biotechnology, coupled with intensive, oil-based inputs and dependant on capitalist and global market interests, as ultimately unsustainable. However, only one farmer contemplated transitioning to small-scale farming, citing difficulties in adjusting to the socio-economic well-being for his family. The environmentally degrading approaches that are presently being used within the Creston Valley require transformative change for truly sustainable conditions before food security can be achieved.

Chapter 7: Market Gardeners and Food Security in the Creston Valley

This chapter investigates the contributions to food security made by small-scale farmers on the basis of the same food security assessment framework used in Chapter 6. As outlined in Chapter 4, that framework is based on a definition of food security that incorporates food sovereignty principles. Harmonious relationships between human communities and their traditional food production methods are often disrupted by government policies and extractivism. Market forces and exchange, new capital intensive technologies, global systems of production, and most recently, erratic climate change also cause disruption. LVC (2003), IAAKSTD (2009), and Nyéléni (2007) believe that food sovereignty should be considered the prerequisite for food security because it considers important aspects of small-scale farmers': 1) autonomy and resiliency, 2) long term viability, 3) sustainability, and 4) the affordability of agroecological systems of production. These considerations are central principles for food producers to embrace in order to resist the pressures of industrial food production arrangements that tend to exacerbate food insecurity rather than ameliorate it.

In the Creston Valley, small market gardeners emphasize food sovereignty principles, choosing to shape their food production systems on small-scale supply chains. Often, this is done on much smaller land bases, and with the use of fewer petrochemical inputs than the industrial food production paradigms dictate. This Chapter summarizes my findings in response to my second research question, identified in Chapter 5: *What is the relationship of small market gardeners to food security at local, regional, and national levels?*

Over half the farmers I interviewed in Creston in 2016 speculated why this area *imports* most of its food when it can produce so much for local consumption (Brynne 2011). Many farmers also questioned where the locally produced food goes. This question is especially relevant when climate change induced pressures on agricultural production and modern water treaties continue to ignore the rights of farmers and Indigenous people. These pressures especially challenge the future of food security in British Columbia, and indeed globally. In this chapter, I describe the reflections of several of the market gardeners who I interviewed on these issues and more generally on the importance of food sovereignty for achieving economic, social, and ecological security not only for themselves but for consumers and all Canadians.

The sections that follow present my findings in the same order as the previous chapter based on the criteria identified in Table 6.2. First, I define who qualifies as a small-scale gardener for this study and further define other terms under this heading used throughout this dissertation. I then outline some of the challenges that small-scale farmers experience. Second, we examine the economic viability of market gardening, issues related to land availability, impacts on food sovereignty, and the environmental impacts of market gardening. This Chapter concludes with a discussion of the net effect of market gardening on food security for Creston Valley farmers and consumers.

Market Gardeners

I define market gardeners following the same criteria used to define industrial gardeners: crops grown, amount of acreage under production, level and types of technology, volume and types of chemicals used, markets and gross and net income. Additionally, market gardeners can be distinguished from industrial farmers based on the alternative farming ideology they follow.

Their approach stands in direct opposition to industrial agriculture and is less capital-intensive. For instance, there is more focus on environmental issues such as land degradation, water pollution, soil erosion, biodiversity loss, and climate change (Rossett and Martinez-Torres 2012; Rossett et al. 2006; Sage 2014). As a result, market gardeners often adopt agroecological practices such as low-input, diversified, and organic methods aimed at conserving biodiversity and ecosystem function (De Schutter 2011; Sonnino et al. 2014).

This research study was able to identify 38 small-scale farms within the Creston Valley in 2019. While this is only an estimate based upon local farm websites and confirmed by local agriculture associations in 2019, I assume that this number continues to grow from the initial 21 small market gardeners assessed in 2013. Figure 7.1 indicates the location of the 16 Canadian market gardeners interviewed in 2016 , which is almost half of all market gardeners in the Creston Valley. The research also includes seven U.S. market gardeners, also indicated in Figure 7.1, and also located in non-floodplain areas.

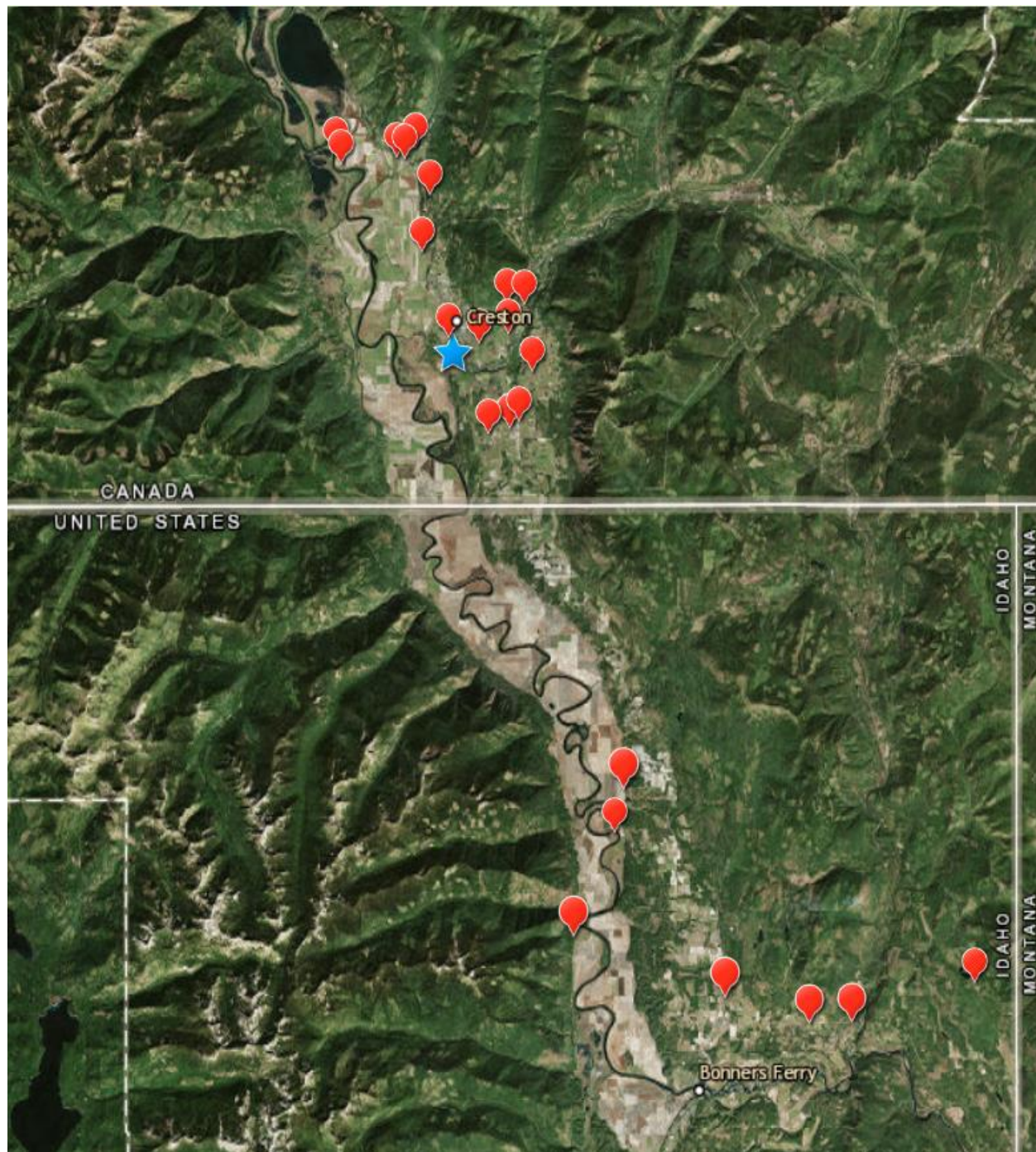


Figure 7.1 – Map of Creston Valley and Bonners Ferry, Indicating Small Market farm interviews. Produced by Joanne Taylor using ArcGIS 2019 (permission granted).

This chapter focusses predominantly on the Canadian market gardeners since U.S. market gardeners do not belong to the same associations as Canadian growers and there is very little

cross-border movement of produce. Table 7.1 outlines the characteristics of sixteen farms for which I gathered interview data from in 2016.

Table 7.1 - Market Gardeners Interviewed for this Study.

#	M/F	Area	Crop	Acres	Type of Machinery	Chemical Use	Target Market	Gross Income	Net Income
CG1	f/m	Lister	Flax	80	tractors	No	Local, regional		
CG2	f	Canyon	Veggies, fruit, chickens	7	None	No	Local		
CG3	f/m	Lister	Heritage wheat	700	tractors	No	Local, regional, coastal		
CG4	f	Canyon	Lamb	40	None	No	Local		
CG5	f	Erickson	Veggies, fruit, eggs, baked goods	1.5	None	No	Local, regional		
CG6	f/m	Wyndell	Bees, honey	600 colonies	None	No	Local, regional		
CG7	f/m	Erickson	Veggies, CGS	1.5	None	No	Local	\$50k	
CG8	m	Wyndell	Strawberries		None	Yes	Local		
CG9	m	Wyndell	Beef cattle	480	tractors	No	Local		
CG10	m	Canyon	Wine, apple cider, vinegar, juice	8	None	Yes	Local, regional	\$72k	\$40k
CG11	m/f	Erickson	Mixed farming social society	26	None	Yes	Local, regional		
CG12	f/m	Wyndell	Garlic	12.5	None	No	Local	\$50k	
CG13	m	Erickson	Tomatoes	16	None	No	Local, regional		
CG14	m/f	Wyndell	Cherries	4.19	None	Yes	Local, regional, provincial	\$65k	
CG15	f/m	Canyon	Dairy, milk and cheese	500	tractors	No	Local	\$1.6 million	\$120k
CG16	f	Wyndell	Meat		tractors	No	Local		

The average market garden is much smaller than the average industrial farm. This average depends on the type of crop grown, and on the lower quantity of food required for local markets. For example, the smallest market gardener uses 1.5 acres to grow a variety of fruit,

vegetables, and herbs for a local Community Supported Agriculture initiative, whereas the smallest industrial vegetable farmer grows a monocrop of asparagus on 280 acres for provincial markets. A small market heritage wheat farmer grows on 700 acres on the benchlands, whereas an industrial wheat farmer grows on 5,700 acres on the Valley floodplain. A small market dairy farm occupies 500 acres, whereas an industrial dairy farm on the floodplain operates on 1500 acres.

Industrial cherry orchards typically require large amounts of land, in Erickson and the floodplain, where they occupy acreages ranging from 87 to 400 acres of land, while a small market cherry orchardist farms only 4.2 acres. Whether farms are designated industrial or market garden, therefore, determines how much land is required and thus how far the crops are transported. Cherries that are exported overseas require large amounts of chemicals to keep the cherries fresh during transport and more technology to sort and to grow such as hail netting, helicopters, fans, and heaters during unpredictable climate situations. Since industrial farming requires more technology and inputs and initial financial investment for farm set up, larger amounts of produce are grown to justify the initial farm costs in order to realize returns and therefore profits. Market orchardists also choose to stay small for health and environmental reasons and subsequently do not have the cost of chemical inputs since produce is staying within the region. When products stay regionally, smaller acreages are sufficient to meet market demands. Although several challenges to growing for local markets are eliminated, challenges persist. The following section discusses the challenges that small market gardeners experience in the Creston Valley.

The umbrella heading of small-scale farmers or producers is defined contextually reflecting historical, institutional, and environmental contexts. Whether small-scale agriculture is

conducted in rural economies is also important. Precise definitions elude a clear-cut terminology and must acknowledge that there is no right or wrong way of labeling farms but must consider harmonized definitions and the relativity of the following classifications. For the purposes of this dissertation, some terms must be defined under the umbrella heading of small-scale farmers. For example, I use the terms smallholder and small-scale interchangeably as the former refers to tenure, while the latter refers to production levels. Despite this nuance, I believe they are one and the same. The term smallholder also overlaps with the term family farm and family run farm, and market gardener, small farm, and small market fall under the same definitions used to denote small-scale farming in the Creston Valley¹⁹.

Economic Viability

Land Values

Challenges to market gardening are myriad. Rezoning land within the ALR for residential and development purposes alongside increasing cost of farm land affects the Agricultural Land Reserve (ALR) for farmers who wish to farm on land which is already in production. In 2016, several market gardeners voiced their concerns about land coming out of the ALR as a “huge issue”. When asked what their attitude is to land being taken out of the ALR, a heritage wheat farmer (CG3) in Canyon and Lister disclosed that the Area B Director, in fact, voted to take land out of the ALR, especially in Canyon. He says, “they really get no support here for keeping land within the ALR”. Yet another market farmer (CG1) shares that “we should be very thankful that we have the ALR. Land is really scarce, and we should protect what land we do have”. Previous

¹⁹ For more nuanced definitions, see the UNFAO report on defining small-scale food producers (2019:9b).

to this, in 2013 I had the opportunity to attend a Regional District of Central Kootenay (RDCK) (2013) community meeting which addressed issues of land relocation out of the ALR in the RDCK Area B - Canyon and Lister districts. The meeting was dynamic with several local farmers voicing their opinions and concerns regarding ALR rezoning for development to the RDCK. I witnessed the Area B director (who was pro-development) denounce the ALR and try to persuade residents to rezone. In B.C., land that remains within the ALR is lost to residential and resource development and this has contributed to a 9.1 percent drop in the number of B.C. farms between 1996 and 2006 (BC Ministry of Agriculture and Lands 2006). Viable farm land is essential for small scale farm and as all small-scale farmers had stated, land must be preserved for food security.

As discussed in the last Chapter, a primary barrier to achieving food security through sufficient production is the increasing cost of land. When asked what the most significant challenges facing farmers in the Creston Valley is today, several small-scale farmers noted the cost of land. CG2 says “it is very difficult if you want to get into farming with all the inputs and land is very difficult to buy as a small scale farmer”. Financial barriers force farmers to secure land through leasing, which also has challenges to efficient farm growth. For example, viable and productive soils are harder to build when the history of the land is not known, and it takes years to build up the soil when farming agroecologically. Farm infrastructures and supportive social relationships are more difficult to engender if farmers do not own or otherwise have long term control over their land. Lease arrangements typically leave farmers unable to securely invest in the future - environmentally, socially, or economically. Market gardeners require less land than industrial farmers but given their relatively lower incomes and reduced assets, land prices are an equally severe impediment to establishing an economically viable farm operation.

Crops, Markets, and Incomes

Dairy

The milk quota system in Canada, as discussed in Chapter 6, is a protectionist system organized mainly for the benefit of industrial scale producers such as C12, however, protectionist policies and quota systems can be consistent with market gardener agriculture as well. An organic small-scale dairy farmer, CG15, noted her frustration with the quota system when asked what the most significant challenges are facing farmers today. CG15 explained that she and her spouse are first generation dairy farmers whose 220 dairy cattle provide milk and cheese on their 500 acres of certified organic land in the Lister area of the Creston Valley. CG15 speaks to the ability to autonomously make farm decisions that affect their milk production, but when asked if they had sovereignty over her farm she said “yes, we do, but we are still governed by the quota system by the government”. They have sufficient autonomy to follow agroecological principles, providing certified organic milk through the quota system to local customers. But this process includes a surprising twist, however, in that CG15 must first sell her milk to the dairy board, but then buy it back. Because their dairy is a certified organic dairy (the only one in the Central Kootenays), CG15 and her spouse are allowed to sell their own milk locally, but only under the authority of the dairy board. But the dairy board increases the price when they sell it back to the farmers, making a profit on what is really just a paper transaction. CG15 explains that this is unnecessary and cuts into their profit margin.

CG15 also believes that the overcapitalization of Canadian dairy quota and the increasingly high price to buy quota are highly problematic. She also notes that within the quota system, emerging changes in customer demands have created friction between the dairy board and organic dairy farmers. Nevertheless, CG15 admits that the quota system is a globally

acclaimed example of supply management and thus a secure food production system in Canada (see also Export Action Global 2018).

Yet another flaw in the system is that the organic dairy farmers must do all of their own marketing because the dairy board does not market certified organic milk. Although this is not a problem since CG15's dairy is only sold regionally, it is an added expense. CG15 states that the paper profit of resale by the dairy board ultimately goes to Saputo, the B.C. dairy processor. CG15 suggests this is a form of punishment for standing outside of the industrialized dairy production system for producing and selling milk organically and goes on to say that they have taken this up with the dairy board several times, but always to no avail. CG15 says:

We actually tried to fight the milk board on it. We actually went to the Farm Industry Review Board (FIRB 2019). It's a tribunal that looks at complaints to the milk board or the egg board. There is quite a process, and we did it. We filed a complaint about the pricing. We just wanted our licensing changed from a plant that ships to a processor, to a plant that sells and buys back. But they said that since we are processing on our own and not through Saputo, that we are marketing our own farm product...product that changes with the seasons, and marketing during the changing seasons which allows us to change the milk fat, and therefore cheese products. We believed there should not be a huge cost difference. It is a bit of a mess. No one really knows about this.

The dairy farmer continues:

Supply management works very well as long as it is done according to their standards...then it is ok. But as soon as you try to supply the consumers with what they want, which is very often local and organic, then they are no help to you. It is really not the dairy board it is really Saputo. He has a monopoly on everything.

Saputo is an industrial milk processor and supplier who supplies, markets, and distributes a wide variety of milk products (2019). They are one of the top ten dairy producers globally and the largest in Canada. Saputo is the top dairy producer in Australia and the second largest in Argentina. In the U.S.A., Saputo is ranked among the top three cheese producers. The products are sold under several brand names such as Armstrong Cheese, Cracker Barrel, and Dairyland, to

name a few (2019). CG15 believes that Saputo has so much power in the industry that they control the dairy board and states this creates a very complicated situation to be an organic milk producer in B.C.

In The Special Rapporteur's final report from his 2012 visit to Canada, he summarized that the various supply management schemes in dairy, poultry and eggs, present equal advantages for food producers and taxpayers. These legislated marketing tools have been designed to control sellers at a specific level and to replace a competitiveness within the market with a fair and concerted effort by farmers to sell collectively through the quota system for mutual advantage. This system has helped ensure that an equitable amount of market power remains in the hands of all farmers, ensuring the viability of various food sectors. It has also enabled rural areas to keep farm production and processing facilities, mitigating against the distribution costs to consumers living in these areas such as the Creston Valley. At the same time, he states that supply management schemes allow quotas to be traded *without* controls along the lines of the highest bidders among licensed producers such as the case with Saputo (see chapter six). Values for quotas may therefore increase dramatically and capitalization costs for farmers rise accordingly, limiting new farmers entry in the supply-side management system. Therefore, the system should be strengthened for its advantages but reformed for greater equity for small scale farmers and to encourage new farmers into its various sectors (General Assembly of the United Nations 2012).

Vegetables

A mixed (CG7) vegetable farmer says he makes a good living farming on one and a half acres of bio-intensive market garden. He and his wife practice community supported agriculture (CSA), which means that most of what they grow feeds their local community. Last year (2018) they

delivered a weekly harvest to 100 families while also selling their multiple varieties of vegetables, herbs, and fruit at the local farmers market. They do not wish to expand further, but seek to grow more intensively, using better methods of production. When asked to share some of their finances with me they indicated the success of their CSA is shown by their gross earnings, which have grown steadily since earning \$25,000 in 2014. By 2015, gross earnings increased to \$35,000, and they predict \$50,000 for the year 2016. CG& stated that his profit margin is about 50 percent. They were not willing to share net earnings, perhaps because all net earnings were being funnelled back into the CSA. By running their business on an economic model, predicated on community food security the strength and success of this model provides food security based on food sovereignty principles. CG7 explains that he uses this method because: “It produces better quality for the environmental implications than conventional agriculture, for my health, health of my family”. He explains that that this is not the conventional method of growing food especially in Creston but that he and his family have made a choice to grow food this way. He believes that the culture of the town is changing and that

When asked what the most significant challenge facing CG7 as a market gardener is, he replied that climate change is a big threat, he says:

The issue as I see it is that we have had this awesome water storage system where all the snow falls on the mountain and then melts slowly through the year but we have seen especially this year last year especially less snow then it gets really hot in the spring so we don't have a shortage but we only have a storage problem.

CG7 states specifically after experiencing two years of drought and ill-timed weather patterns such as late-season frost that it certainly seems that there is a climate change problem. Although he uses the city water, he also states that “there is quite a bit of water underneath the ground and I am pretty sure that there are aquifers that we could tap into.” In this sense, he

believes that although drought is a concern, in the short term, there are ways to handle water shortages. Of course this does not address long term water storage in aquifers but CG7 seems confident that Creston is changing.

CG7 also states that the security of their lifestyle could not survive on their farm income alone without some significant lifestyle changes and sacrifices. CG7 further explains that the expenses of farming are going up, while the cost of food is staying the same. He feels that keeping food within the local economy is the best way to mitigate against the economic constraints of market gardening. Therefore, he and his family have created a lifestyle to grow “affordable and nutritious” foods for themselves and the community. This lifestyle encourages food security, which CG7 believes more food producers can do to become entirely food secure.

Fruit

Fruit can also be grown on smaller scales in the Creston Valley. I spoke with one small market cherry farmer CG15, who planted 90 lapin cherry trees on 2.2 acres of his eight acres of farmland in Wyndell in 1998. He now has 650 trees. The life expectancy of a lapin cherry tree is quite long if pruned properly, he says. He uses a semi-organic fertilizer to amend the soil but admits that the cherries are sprayed for fruit flies among other bacteria and viruses that cherry trees are prone to. CG15 says that a bad crop could also be a “pollination thing” so if the bees are not prolific one year, it could be a terrible crop due to lack of pollination. He discloses that 2015 was a good year at about 30,000 pounds of cherries, and the best year he has ever had is 55,000 pounds. CG15 explains he strives and prunes for an optimal 50 pounds of cherries per tree because then, even though perhaps less in numbers, the cherries are nicely full-bodied.

When asked about his financial security CG15 shared that after harvest, it gets costly to produce and ship cherries. CG15 says he stopped shipping because the brokers got crooked. He explains:

I used to ship my cherries to Holland, Belgium, Germany, England. But the packing shed handles the deal. The broker does the deals. Everyone makes money but you. I quit doing after and now I handle my own cherries.

He now markets his own cherries and gets to keep and maintain control over his own produce. He travels all over the East and West Kootenays, and into Alberta to independent grocery stores. CG15 and his wife are very creative with their farm, which has a 100-year-old guest house which is rented out as Airbnb. When asked about his finances, the farmer explains that the couple also makes cherry juice and chocolate covered cherries which contributes to the \$65,000 total gross annual income from the orchard. Although he explains that when he tried to obtain financial support from the Columbia Basin Trust (CBT) to grow his wife's chocolate covered cherry business, the CBT grant application was declined. Aside from this setback, he paid out \$12,000 in wages, sprays, and other expenses, leaving a net profit of roughly 50 percent or less. Despite this seemingly lower net profit, CG15 says he loves being his own boss, allowing him to, for example, go fishing when he wants, and he loves pruning in the winter for two and a half months for four hours a day. This method of independent production is an example of food security which provides a secure income at the same time.

However, this autonomous lifestyle is not without challenges. When asked what the most significant challenges facing farmers are in the Creston Valley is today, CG15 believes that climate change is causing drought for many farmers in the Creston Valley. For now, he has access to plenty of water through the Wyndell Irrigation District owned by the farmers. Though the regional government is moving to take control of the water system and farmers are fighting

against this move. In general, CG15 does not want to be controlled by anyone indicating that he chooses to practice small-scale local farming in order to have sovereignty over his farm. He also argues it is a shame that there are no market vegetables growing on the flats. Instead, industrial farmers are growing alfalfa and shipping it to overseas markets. This in turn invites government interest as he states: “So, soon as a farmer wants to get a bit bigger, the government will be visiting you and pouncing on you because everything is controlled by the government”.

Alternatively, if you stay small, it is tough to make a living. Personally, he admits that they can make a living because he has no debt, owns his own land, home, and orchard, and his wife works for the school district. Predicated on a secure financial foundation and choosing to grow local fruit for local markets this farming family exemplifies a small-scale food production systems that contributes food to the local economy and mitigates against climate induced GHG emissions.

Meat

I interviewed three meat producers in the Creston Valley. One of them is a lamb farmer. When asked to describe her farm production CG4 explains that she raises 18 sheep on 40 acres which provides enough meat to sell locally. Figure 7.2. shows some of the lambs on her acreage.



Figure 7.2. - Lamb farm in Lister B.C. Photo by author 2016.

She explains that all meat produced in the Creston Valley is butchered locally and therefore must stay within the province of B.C. She also states she does not want her farm to expand, as her husband works full-time off the farm and she is the only one managing it. The farmer explains to me that younger farmers are entering the Creston Valley as market gardeners rather than as industrial farmers, unless they have inherited an industrial family farm. CG4 believes that because of the pressure from the industrial food system, local support mechanisms for small-scale farmers are all the more necessary. Asked why she has chosen this method of farming and what the challenges are, she explains that her neighbours use intense chemical fertilizers on their

alfalfa field right next to hers which she is not happy about. Also, since farmers in the Creston Valley must deal with extremely limited growing seasons and a smaller land-base, industrial farmers must compete in the global marketplace and therefore, the costs of production are inherently more expensive. Alternatively, expenses for market-gardeners are not as high as industrial farmers expenses because food is not shipped outside of the region. Several market gardeners I spoke with stated that chemical inputs were small or almost nil if practicing agroecological principles for local food supply.

One of her concerns she talks about is the quality of water in the Creston Valley is the chlorination of drinking water. She says:

I am really ticked off about the chlorine. They are shoving it down our throats. I went to an area B directors meeting in Lister and there wasn't a single person that wanted the chlorine and they just pacified us and then there it was. And we are paying for it. It is not healthy.

She explains that the government controls the drinking water supply and she believes that farmers should have some say in this decision indicating that she is not entirely sovereign in how she grows her sheep.

Furthermore, because market gardeners are not involved in colossal supply chains, local marketing is much easier for them when done through community channels making their costs much less than what industrial farmers must pay. For CG4, the only costs she has is for the bit of grain that she supplements her goat's diet with. She says that really, she loves producing local, natural, organic lamb meat. All of it is completely sold out each year indicating the demand for her product which supplies the community with meat. Other than her dismay with the chlorinated water supply, she believes that "Creston is a jewel".

Grain

Two of the 16 small-scale farmers that I interviewed in the Creston Valley grow some form of grains. One of them CG3 grows flax, barley, and ancient heirloom varieties of landrace wheats saved from intergenerational varieties of seeds from pre-breeding eras that have adapted to local environments. CG3 found the Creston Valley to be the most affordable to begin their farming dreams. CG3 as a family do not split their work outside of the farm operation but one of them stays home to raise their eight year-old son on their homestead in the Canyon Lister area and shares in the day to day growing, cleaning, milling, marketing, and transport of their products. Asked whether they consider their farm to be organic or certified organic they explained that their 635 acres of leased farmland are all certified organic by the strictest certifications, including the 65 acres that they personally own and live on.

In our case we have rotation; we rotate crops and we summer fallow; we seed back to alfalfa and see pulses to put more nitrogen back into the soil. Having the nutrients for whatever you are planting is for the crops. The soils must be healthy if you want to produce good healthy food. Having the nutrients are most important. We are certified by ProCert. And their federal certification is very high. They are the Canadian, and USDA and is the strictest possible which includes European standards as well as.

We had to wait to certify the soils which took some time to become certified, but it is worth it to us. Traditionally this land was all hay production but nothing to keep the soils nutrient dense. The farmers' variety of wheat products are sold throughout the East and Central Kootenays with their furthest market being in Vancouver. They believe that the demand for their product is growing and especially for certified organic as alternative ways of farming exemplifying CG&'s desire to grow food according to their desire to exert their choices and values over the food production system.

When asked why they chose the organic method of food production they said, “when we grew up on a ranch, we practiced natural agriculture; we never grew up with chemicals”. I then asked what their definition of organic is they said: “sustainable agriculture without using any chemicals and using natural methods”. They state that the “government is not feeding the world – it is not working” - so as a stand against the “catastrophic use of GMO seeds” and what they call the “corporate take-over of our food system” they have chosen an alternative method of farming. They believe that the industrial way of farming is over and will come to an end in their lifetimes reiterating the need to keep viable farmland protected for food production.

Asked about the challenges to farming they shared that land is at a premium and hard to find. The family has looked for more land to lease so they can increase production, asking the yaqan nu?kiy Nation, for instance, but were only offered 50 acres on the floodplain, which was not enough to grow grain crops. CG3 explains that the yaqan nu?kiy are also growing food for international markets and are not interested in collaborating with the organic heritage wheat farmers, perhaps because of their own food producing initiatives on their reserves.

Local Food Markets

The magnitude of the revitalized food movement and growth of local food initiatives in B.C. should not be underestimated. In the Creston Valley, despite the reduction in ALR farmland, farmers’ markets in the Central Kootenays continuously grow in size, number, and locations providing farm products regionally through small independent grocers and at the proliferation of year-round farmers’ markets. Figure 7.3 shows the Creston Valley Farmers Market in 2017.



Figure 7.3 - Creston Valley Farmers Market 2017 (permission granted).

Data from Connell et al. (2006:1) indicate that farmers markets are growing proportionately in B.C. and have contributed over \$65.3 million to local communities annually in B.C. Farmers' markets in B.C. have grown exponentially in the last 20 years (Engler-Stringer 2011). For example, small-scale cherry farmer CG15 not only supplies to independent grocers in the Central and East Kootenays but also to several other farmers' markets including Nobleford, Claresholm, Cardston, and Lethbridge in Alberta as well as Invermere, Fernie, Trail, Kimberley, and Creston farmers' markets in B.C. While the decreasing numbers of family farms is problematic, relationships between people who engage in family farming and those who support their local

farmers is strengthening due to a changing value system based on their desire to access sustainably grown food, eat well, and to know their sources of food. Farmers markets provide the perfect venue for accessing locally produced food and contributes to social capital and resilient communities.

The Creston Valley Farmers Market (CVFM) which started in 2003 and boasted 57 vendors in its busiest month of August (2018), is an example of linking market producers with consumers. As one of my observational studies, I volunteered with the Creston Valley Farmer's Market which operates weekly markets from May through December, and monthly indoor markets January through April. During three separate days, I was able to sit at a table that collected data from the market customers that would provide CVFM with stats on how popular it has become. It provides a venue for small-scale producers and artisans to sell direct to consumers in the Creston Valley. The crowded stalls indicated the immense interest and popularity of the community willingness and desire to access local, fresh food.

One program that works collaboratively with local farmer's markets is the Farmer's Market Nutrition and Coupon Program (FMNCP), coordinated and sponsored by the BC Ministries of Health and Agriculture. CG10 says that the Ministry of Health and Agriculture stepped in:

because if you have families eating healthy then they aren't going to the doctor, they aren't going to the dentist because they have bad teeth, and if you have bad teeth, you aren't eating properly because it hurts. And that's part of the program, when we partner with a community program they have to provide some of those services like awareness and meal prep.

The FMNCP began in 2007 in each of the five health regions of B.C. and started receiving annual funding from the Ministry of Health in 2012 (BC Association of Farmers' Markets 2010). The FMNCP in the Creston Valley is organized by the Creston Valley Food

Action Committee (CVFAC) which was the first of its kind in Canada. The coupon program has continued to grow, serving 57 communities, and is expected to reach over 3,900 households in 2018. Qualified members of the BC Farmers Market Association give out \$15 - \$21 per week in coupons to people of low income, single moms, or seniors to spend at the CVFM. CG10 explains that the coupons are only valid for purchase of veggies, fruit, meat, dairy, eggs but not bread, honey or crafts and nothing with sugar in it. This rule speaks to the nutritional component of community food security. Fifty-two farmers markets have signed up for this program in collaboration with a community partner. In Creston, CVFM farm market receipts stay in the community, with 95 percent of program coupons being used in Creston. The two provincial ministries provided \$750,000 to sponsoring communities, and in 2018 the CVFM received a CBT sponsored donation of \$100,000 to strengthen food security across British Columbia in 2019.²⁰ Building the relationship between farmer and community is undeniably critical in enhancing food sovereignty on both sides of the food equation – government initiatives and the local food producer.

Nevertheless, the growing demand for food by the consumer is still met with challenges by contradictory B.C. governments who, on the one hand foster incentives for production by local small market farms but then undermine their ability to grow food locally by excluding land from the ALR and growing global export trade networks and treaties. When asked how important ALR land is to agriculture in the Creston Valley CG2 replied: “Well its huge. That is how we began. We were an agricultural valley”. The land is the most basic and foundational necessity, as reiterated by all small-scale farmers, for small market farms to grow and thrive.

²⁰ Since the Creston Valley Farmers Market is run as a non-profit association, it was able to receive annual B.C. Gaming funding. However, since the CVFM began receiving more profits, funding has ceased.

Agricultural Services

As noted in Chapter 6, the agricultural extension services that B.C. farmers were once able to rely on have been discontinued or privatized. Unlike industrial farmers in the Creston Valley, who occasionally utilize private consultants, market gardeners tend to find support through local and regional community associations. Communities can help address local and regional challenges by supporting local food production systems, protecting farmland for future population growth and food production, and helping farmers access land through affordable leases.

The Creston Valley food producing hub includes the Creston Valley Food Action Coalition, the Creston Valley Farmers Market, and Fields Forward. Fields Forward has exemplified community farming by going beyond simply producing food. It also envisions stronger relationships between farmers, farmers markets and distribution networks, and improved price security through less dependence on volatile global commodity chains of production and transportation. Cooperation between several food producing initiatives ensures the viability of the market garden model of food production, thereby ensuring local food security while strengthening sustainable community food relations and networks.

Although none of my small-scale farm interviewees discussed the mobile press, one of my key contacts CG10 who is now the Community Liaison Officer with Fields Forward talked at length about community farming and the support it has received in the Creston Valley by many organizations, one of which is Fields Forward (FF), funded by Columbia Basin Trust (CBT). One of Fields Forward's initiatives is the purchase of a used mobile juice press from Vernon, B.C. So far, the press has processed 500,000 pounds of fruit for the community. The juice press

charges a fee for service and can not only make juice from fruit but pasteurize the juice if required. Fields Forward is also trying to acquire a mobile distillery.

I joined FF in February 2018, and we purchased the Mobile Juice Press from the outfit in Vernon, and we bought their used machine. Last year was our first year using the machine. It did really well. We did cherries for tons of people, and we did tons of apples, over 500,000 pounds of apples for the community. It is a fee for service. It just shows up on site. You have to have potable water and a bathroom. And it just goes. You can do pasteurized or unpasteurized.

CG10 explains that this strengthens the community by making it easier for farmers to produce added value products from their farms. Fields Forward was initiated in 2016 with a bursary of \$600,000 as a regional program based on Vermont's Sustainable Jobs Fund (VSJF 2018). The program is a collaboration between local school programs, business advisory teams, and various cultural groups such as the yaqun nu?kiy Nation and is headed by CG10. The Creston Valley is an important agricultural region contributing 80 percent of its food value from food produced in Central Kootenay Regional Areas A, B, and C, generating \$27.5 million dollars of the annual \$34.4 million for the entire region on 50 percent of available agricultural land (Fields Forward 2018).

The CVFAC is a non-profit network of local food producers, agricultural agencies, and citizens who genuinely care about procuring food in a "sustainable, healthy, secure and environmentally sound way" (CVFAC 2018). The coalition runs several initiatives such as the Creston Valley Farmers' Market, the Harvest Share program (CVHSP 2014), the College of The Rockies Dan McMurray Community Seed Bank, and with the help of the Creston Public Library, their Locavore Book Club Speaker Series. The Harvest Share program falls under the CVFAC umbrella and runs on volunteer homeowners and farmers who have an excess harvest to share. The excess produce is donated to groups such as schools, food banks, and church programs

which use the overabundance of food. From its website, CVFAC states that its Harvest Share program totals for 2017 were: 27,760 lbs of harvested produce; 19,750 lbs of distributed produce; and 1,528 hours of volunteer work by 469 volunteers (CFVAC 2018). The program addresses the need for community support in supplying food for those in need, a tenet of La Vía Campesina, and is a marker of community food resiliency in times of food deprivation.

Government Partnerships

The Canadian Agricultural Partnership is a five-year, \$3 billion dollar investment by federal, provincial, and regional governments to strengthen the agriculture and agri-food sector (Government of Canada 2018c). This partnership features programs and services which ostensibly help farmers manage risks that threaten the viability of their farm beyond their capacity to manage. Its website states that: “Agriculture and Agri-Food Canada delivers federal programs under the *Canadian Agricultural Partnership* aimed at generating economic growth in the agricultural sector” (Government of Canada 2018c). These federal programs are cost-shared by federal, provincial, and regional governments at a ratio of 60:40 and delivered by provinces and territories to ensure programs are tailored to meet local needs.

The partnership website lists several B.C. partnership initiatives, and key contact CG10 identified one of these projects that could take place in the Creston Valley. The B.C. Provincial Government has set aside money for development of local food hubs. Part of the local food system, a regional food hub is defined as a community-led initiative which emphasizes local, sustainably produced food and could have amenities such as an incubator kitchen, community café, or office space for organizations that deal with regional health programs, university researchers, and space for community socializing (Engler-Stringer 2011). Food hubs are critical

components of the local food system in which small farms are supported with the production, distribution, and marketing of services.

Currently the B.C. Province is developing a provincial Food Hub Network which will include the Food and Beverage Innovation Centre at the University of British Columbia Vancouver (operational by 2021) interconnected to other regional food hubs. Predicated on an economic and technological model, it foresees up to four regional food hubs within the B.C. Province by the end of the 2020/2021 fiscal year and will be tailored to include shared food innovation and processing facilities located across the province (Ministry of Agriculture 2019). Its outcomes state that they aim to enhance agri-food business but also includes micro, small, and medium enterprises supports to grow their businesses (Ministry of Agriculture 2019). CG10 explains that he had hoped Creston would be accepted for the creation of a food hub supported by an initial \$10,000 research and feasibility study grant. However, the application process died out and no progress has since developed²¹.

Contrary to my initial assumption CG10 explained that Nelson, B.C., a ninety-minute drive northwest of Creston, is simply a regional ‘marketing’ hub for the Central Kootenays, so that all farmers can access food for delivery and purchasing. In fact, however, Nelson meets the criterion for a food hub as defined by the provincial website and Creston is simply the main growing area for local food in the Kootenays. Nelson thus remains the unofficial economic food hub for the RDCK. Nonetheless, initiatives by Fields Forward, the Investment Agriculture Foundation of British Columbia, with support from the Ministry of Agriculture in B.C continues to focus on market development activities and provides labelling for products and packaging

²¹ The first regional full-scale food innovation and processing hub in B.C. serving as a pilot and demonstration site is at the Commissary Connect at its Laurel Street facility in South Vancouver.

with a Buy BC Logo for Creston Valley farmers, reflecting ongoing initiatives of economic and marketing support for Creston Valley farmers.

The incongruencies of the above two food hub projects illustrate the tensions that can arise among what Patel has described as “different geographies of citizenship” (2010:186). Through these discrepancies and gaps of understanding, perhaps the philosophies necessary to define food sovereignty can be fleshed out. However laudatory these initiatives may be, the Buy BC program struggled to receive its funding from the BC Ministry of Agriculture, and in 2003, the province handed over the responsibility of the program to the BC Agricultural Council without the initial funding (Wittman and Barbolet 2011). It failed to grow and prosper but was surprisingly reinstated in 2008, when the B.C. Budget set aside \$1 million over four years for its restoration. Such programs address the financial support necessary for marketing but fail to understand that community food initiatives, to be successful, require resolution of a whole complex of issues including the increasingly high cost of farmland, small financial returns for farmers, along with ALR land exclusions. Grassroots initiatives are working hard to strengthen local systems of sustainable food production despite the lack of a comprehensive food security policy, thereby challenging the neoliberal food systems of the provincial government, and thus food sovereignty principles.

Kootenay Farms On-line program (a virtual co-op and marketing platform) is yet another example of a civil-society program working to support community agriculture that would ostensibly help small-scale farmers in Creston. Described to me by key contact CG10, it is funded by the CBT and Kootenay Farms Co-op through the Buy BC Cost-shared Funding program for local farmers. The funding of \$10,000 provides administrative wages for the first year and a vehicle for delivery of bulk farm items that will be processed through a packing house

or growers supply. Producers can list their foods on the online program for example, on Tuesday and Thursday with pick up or delivery from the packing house on Wednesday. According to CG10, this program is an example of collective marketing distribution (Buy BC Cost-shared Funding 2018) and Columbia Basin Trust (CBT).

We hope that CBT will donate \$100,000. We hope to implement this program over 19 months, or two full summers of growing season, June to October of two harvests, and then operate through the winter too.

Though the funding is only \$10,000 through the former Federal-Provincial Safety Nets framework, the farmer says that it is an initiative nonetheless and will help local communities' access local food much easier through this online portal. In the absence of a comprehensive food security policy based within a food sovereignty framework, society, municipal, regional, and provincial initiatives will continue to fill the needs of food producers in the Creston Valley supporting what Koc and Bas (2012) suggested could become a substantial leveraging agent for change.

CG10 also talked to me about The Kootenay and Boundary Farm Advisors (KBFA) which is another example of a regional NGO set up with the aim of helping local farmers. It is funded by the Regional District of Central Kootenay, the Regional District of East Kootenay, the Regional District of West Kootenay and Boundary, and the CBT which gave \$300,000 to create and provide a website that lists various initiatives to help people in small agricultural ventures. Perhaps in place of the local extension agent, the "KBFA supports producers to improve agricultural production and efficiency by helping find solutions to farm-specific production issues, coordinating educational events and connecting producers to information" (KBFA 2018). CG10 explains that this website is mainly aimed at niche market specialists, hobby farmers, ecologists, and environmentalists instead of being able to assist farmers. He says:

It seems like it is more west and east Kootenay centric. They haven't really done much in the Central Kootenay because they say we don't need the help, that we are already farming. I can't really say what the initiative is, but it seems they hold workshops about how to be a gardener. It is more small-scale organic, and it should be more for commercial farming. This kind of service is much too small for Creston, as Creston is far too advanced and beyond the need of a service like this.

Perhaps replaced by the extension services that once supplied and supported farmers with technological knowledge, its website explains that it provides producers with free, technical support and information from a network of specialized resources, including independent consultants, and academics. Potentially, this program could fill the need for assistance and support for those small market gardeners who are entering into farming or wanting to grow their small market farm into different areas of crop production lending itself to assisting farmers within the community. While it is a service for small-scale farms, it does nonetheless support farming and agriculture which contributes to community food security.

Columbia Basin Trust

Despite the support that Columbia Basin Trust (CBT) gives to local agricultural initiatives, several farmers I interviewed disclosed their disappointment with the organization. CG3 vehemently disputes the help of this organization. Discussing Fields Forward and its support from CBT, CG3 states that it did not do anything to advance the growth of his organic wheat farm: "CBT had money, but they arbitrarily hand out the money (to whom they want)." For example, some money was allocated to a lady who was setting up dog kennels. A CBT representative did come to their farm at which time CG3 and his wife explained that they would need some money for a much-needed milling building, but they never heard from the representative again. The farmers say:

At least, out of common courtesy, a letter of decision could have been sent out. They have lots of money, but they gave money to a bakery that uses white industrial processed flour rather than ours. Additionally, a bakery in Creston who uses our organic flour was completely ignored by Fields Forward. They would not even go over to help the baker who needed labels.

CG3 attended several Fields Forward meetings where he spent hours giving input but was completely ignored. He states that government is subversive to small farmers' needs. Also, CBT invested in the failed Sailing Grain project, which was allegedly an illegal venture without jurisdictional permits for lake access. The evidence presented by CG3 and other farmers suggests that without a clear direction and criteria other than what is stated on their website, CBT funding allocation will continue to seem arbitrary and conflictive amongst local farmers creating a sense of disillusionment with CBT funded projects.

Crop Insurance

When asked about whether farm income insurance was used, CG15 explains:

First it is the frost and then you're covered for a little bit of hail/rain and then you up it because you have to buy up and they only give you 50 percent and now I have (bought) 80 percent. Depending like you have to build yourself up. Like how many pounds you actually sell kind of thing so if you have some bad years and I have had a couple bad years that have knocked me down, but I have paid a lot of it, so I am good. It is almost like a subsidy from the government. I usually spend about \$1200 per year and I am covered for 80 percent.

CG14 buys frost insurance and is thereby also covered for some hail and rain damage should he need to make a claim. CG15 says that he can purchase more insurance in increments each year depending on how much money he puts into it annually. He currently has 80 percent coverage for rain and hail. The cost of insurance is based on how many pounds of cherries he can produce in one year so after a few years of good crops, a claim can be made. This claim however is predicated on the number of years of contributing to insurance coverage. He says cherries are a

risky thing because so many factors affect the outcome for marketable cherries such as successful pollination and the weather. Ultimately, environmental processes are unmanageable for the local cherry producers, no matter how much they try to control their food system and CG10 says that he had four bad years due to frost and untimely weather patterns. Ultimately, farmers are at the mercy of weather.

Qualman (2011) describes how crop insurance helps to insure farmers against rain and hail, but also against insects, plant diseases, and other unpredictable events that cause crop damage. Qualman (2011) states that as a result, this program is a drain on government tax dollars. For example, the weather is a constant threat close to harvest time in the summer for all industrial and market cherry farmers and gardeners. While farm insurance provided by the provincial government is accessible to all farmers regardless of the size of the operation, most farmers do not purchase it. The reason to refrain from purchasing insurance is often because of the high price and the extensive paperwork involved. One exception to this type of insurance however is CG15 who is in a financial position to be able to purchase this insurance. Not all market gardeners are so lucky though.

Market gardeners do not have the capital to invest in technology and instead resort to having no insurance at all, except for the market cherry orchardist, CG15 who must provide annual income statements to apply for farm coverage. CG15 states that he has paid into insurance for a long time, so he is covered. He usually spends about \$1200 per year for 80 percent of crop coverage, which would be a payout of \$30,000 towards a loss of a higher value. Nevertheless, he does not want to purchase 100 percent coverage as costs increase significantly for that amount of coverage.

Land Availability

Local Agriculture

A significant issue for all farmers is the availability of productive farmland. The competition for land is growing, and the pressures from urbanization and land exclusion from the ALR continues unabated as explained by several farmers. When asked what the biggest concern to farming in the Creston Valley is, every market farmer discussed the lack of available farmland. CG3 stated that there is just not enough farmland for his certified organic grain production. CG7 also exclaims:

We should be very thankful that we have the ALR. I think if we are trying to set something like that up now it would never happen, and it was wise to put it in place and land is really scarce. I think if we want to have not even that long term of a vision, but just a slightly more than short term vision we would see that we should protect land.

To investigate this issue further, I telephoned the Agricultural Land Commission (ALC) Auditor for the ALC, Everett Lew (personal communication 2019) to illustrate this problem. We discussed the statistics provided by the ALC and Lew states that 82.78 acres have been added to the ALR within the Regional District of Central Kootenay (RDCK) since 2009, but 1,203.89 acres were excluded for a net loss of 1,121.11 acres (personal communication 2019). Also, the public is not able to see what type of land was removed from the ALR simply because they do not keep such data readily available for the public (see footnote 10, page 51).

In 2016, there were 33,060 acres of cultivated crops within 155,889 acres of total ALR land in the Regional District of Central Kootenay (BC Ministry of Agriculture 2016, 2017). Unfortunately, Lew explains that the data for each Area A, B, C within the RDCK in the Creston Valley cannot be broken down in terms of specific areas such as within the floodplain only for example.

Nonetheless, these alarming statistics indicate a trend of decreasing viable farmland. Neoliberal practices of eliminating farmland from the ALR threaten productive food regimes that stand outside the productivist model of food production and therefore directly impact food security. According to Wittman and Barbolet (2011), to produce enough food to feed one person for one year, 1.24 acres is needed (191). For a population of 2.78 million British Columbians by 2025, 6,869,530 acres of productive farmland will be needed to be 100 percent self-sufficient – an increase of 300 percent compared to 2001 (BCMAL 2006; Wittman and Barbolet 2011:192). Aside from these worrisome statistics, a rise of the number of small farms illuminates the mounting awareness for the need for a viable agricultural land base. This need is exemplified by the interest in organic, local, and sustainable food systems. According to Morton (2008) in 2006, 77 percent of all farms in B.C. were under ten acres, and 16 percent of all farms were classified as organic. Due to the scarcity of viable farm land, it becomes a question of equal access to farm land; in other words who gets access to the farmland. Resource development or food producers.

Community Values

Non-Food Farm Crops

The choice to grow crops for non-food uses, as in the case of biofuels, or for the elite rather than essential food markets, as in the case of beef or grapes for wine, has economic, environmental, as well as social implications. Since 2013 and 2016, grape vineyards and estate wineries have sprouted up in the Creston Valley. Four wineries were in operation in 2013, and that number now stands at five licensed estate wineries. These wineries produce wine from their own table and wine grapes. One vineyard processes grape juice as its sole business. There is also a new distillery which produces a variety of liquors from their grown fruit.

According to key consultant CG10 however, his 10-acre orchard and vineyard - two acres of which are leased in the Canyon area - produces apples, pears, peaches, plums, and apricots for local consumption and is considered a small-scale farm vineyard. His distillery also produces hard ciders, such as old fashioned apple, sparkling old fashioned apple and pear cider, and a sparkling rose wine. He also produces some vinegars along with a variety of fruit spreads. In 2015, CG10 produced 2,000 bottles of cider of which 1,000 bottles of apple cider sold at \$17 realizing a \$12 profit margin and 1,000 bottles pear cider sold at \$20 per bottle and realized a \$14 profit margin earning more per price of bottle than the apple cider.

While discussing his farm operation, CG10's talked about his profits. The most profitable product is the apple cider "vinegar", which is considered a food item and is the least expensive to produce. In the first year of production in 2016, CG10 sold 2,000 bottles at a 60 percent profit margin. His gross farm income for 2016 was \$37,000, and net profits were \$18,500. His net profit went entirely to expenses such as bottles, farm mortgage, taxes, and labour with any remaining profits reinvested into the winery.

In 2018, he sold 2,500 bottles of cider at \$20 per bottle and 1500 bottles of sparkling wine at \$20 per bottle. In 2018 his net farm profits were \$40,000, and for 2019 his gross profits are expected to be about \$150,000 with about \$90,000 net farm revenue to amortise the farm operation debt. When asked if CG10 plans to grow his operation he states:

There is not much left at the end of the day, but I keep doing it. With this cider and alcohol, I plan to keep staying where I am now but for the biggest profit, the cider vinegar, I hope to increase that.

Although his farm is growing in profits, it is the debt load that Qualman (2011) discusses that does not allow farmers to live from the farm income alone (unless there is no debt). CG10

also stated that he works for the yaqan nuʔkiy Nation which provides supplemental earnings from which he can live.

While discussing impediments to small scale farming in the Creston Valley, CG10 also believes that farmland is shrinking in the Creston area due to its prohibitive purchase cost and he cites the example of an orchard currently (2019) listed for \$1.6 million for 8.8 acres, averaging about \$100,000 per acre for productive orchard land. When asked about how the small market gardeners contribute to the local market economy, he believes that all dollars earned from local, market gardener food production stays in the community regardless of burdensome debts and cost of land.

CG10 produces alcoholic beverages as well as food products and this difference between food and non-food production is important. Like other high demand crops, distillation from fruit is more about food lifestyle and the highly energy intensive, environmentally degrading cost of growing crops to provide for increasingly meat and alcohol-focused diets. In this sense, the most fundamental nature of food is drastically reduced. Food becomes more about status, entertainment, and convenience and less about food items and agriculture based on food production for home provisioning, community resilience, nutrition, food security, and investment in food production in case of environmental or economic deprivation.

Grapes for wine, dairy, and beef production are now a part of the small scale food production landscape. These types of crops place the Creston Valley at risk of becoming part of the industrial food production paradigm which might also not only serve local markets but might also contribute to elite markets thereby losing valuable farm land that could otherwise be used for essential local food production. Without valuable farmland to contribute to healthy and resilient communities as well as strong regional economies of food production, negative impacts

of wine, beef, and dairy production does not contribute to the health of the environment nor social relationships within the community. These ramifications also perpetuate the use of alcoholic and drug for First Nations. Alcohol and industrial meat production is considered problematic when taking into consideration the social, economic, and environmental impacts of this form of agricultural production in the Creston Valley and therefore does not entirely contribute to resilient communities.

Resilient Regional Economies

Food Secure Canada's fifth pillar of food sovereignty asserts that it must reduce the distance between food producers and consumers to localize food systems (Food Secure Canada 2018; Keen et al. 1997; Kneen 2011:92). In doing so, the food sovereignty movement resists partaking in the neo-liberal food-producing industrial trade complex (Kneen 2011). But the emphasis on direct relationships between producers and consumers is also part of a worldview that values place-based identities, the concept of resilient, self-sufficient communities, and sustainable relationships to the local environment.

Several of the market gardeners in the Creston Valley who I interviewed gave numerous examples of the locality of their food production systems and spoke at length about how they recognized the need to reduce the burning of fossil fuels in order to reduce global warming and build community resilience within their food-producing hub. When asked what community food security meant to him, CG7 answered:

It is our ability to determine how we produce access and consume food. I guess we could feed ourselves if we wanted to and most of the broader region. We have way more capacity here than what we could consume so we would always be exporting to somewhere but where we export to is determined by larger forces, but I feel what we are doing in a tiny way is supporting that system but as a broader region we would have to take control over our food supply.

Food sovereignty was an important value for he and his family and that if he “I wanted to make money, I would not be in farming”. He also stated that industrial farms are profitable because they are efficient and, in some ways, small scale farmers are not very inefficient. However, he explains that “large scale farmers do not contribute to community” since they do not produce food for local consumption but rather for export. In this sense CG7’s explanation of food security is described in economic returns only, but he also believes that food security is not just about financial profits but social returns for the community in which the food is produced and thus contributing to community resiliency.

Most market farmers identified local, place-based regional hubs for their product. Notwithstanding the government initiatives to develop regional food hubs, market gardener food hubs include the Creston Valley, the Yasodhara Ashram, and the Kootenay Co-op in Nelson. Regional Farmer’s Markets are located in the East Kootenays - Elkford, Fernie, Cranbrook, Invermere, Radium, and Windermere; the Central Kootenays – Creston, Nelson, and East side of Kootenay Lake; the Kootenay Boundary regions; Rossland, Trail, Castlegar, Nelson; and some grape and soft tree fruit products are marketed in the Okanagan region. The heritage wheat farmer drives his wheat products to Vancouver, but this was the farthest distance traveled by a small-scale farmer in the province.

Seed Sovereignty

The issue of seed sovereignty is a particularly important cornerstone of agroecological farming as seeds are the building blocks of food. It is also an important tenet of the food sovereignty movement. Heritage wheat farmers CG3 explain that they grow their landrace wheat on 700 acres of certified organic land in the benchlands of Canyon/Lister using saving seeds. When

discussing what crops and varieties his farm grows, CG3 shared how they found their heritage seeds:

It started with a lot of searching on the internet because you realize there are no old variety there are just the modern varieties of grains. Then we bought out the University of Edmonton. They had an heirloom seedbank. They hadn't been grown for 15 some odd years and we bought the collection of 48 varieties. Then there were some private gardeners that had collections as well as the Canadian Seed Bank in Saskatchewan, and the USDA Seed Bank in Aberdeen, Idaho.

CG3 believe that saving and growing seeds stand against the corporate monopolization by Monsanto, Dupont, and Syngenta who account for 47 percent of the global genetically modified seed market. As a result, genetically modified seeds are one of the most significant contributors to the loss of biodiversity (ETC 2008). Furthermore, Shiva and Crompton (2002) report 147 private sector seed companies develop their seed varieties and hybrids and concentrate on their marketing and production, dominating the global supply of transgenic crop varieties, and ultimately excluding small farmers' traditional varieties of foods.

While the domination of crops continues, locally-produced, heritage, garden-saved seed varieties of plants, exchanged in local settings such as "Seedy Saturdays" where seeds are sold and exchanged. This initiative continues to grow. In Creston, Seed Savers is an initiative built up by Dan and Val McMurray in 2004 and was subsequently donated to the College of the Rockies and the Creston Valley Food Action Coalition in trust to the community, adding 1600 varieties of tomatoes, but downsized to 1,000 when the collection was later donated to Seeds of Diversity (CVFAC 2018). In 2015, a new initiative for the seed bank collects sustainable varieties of seeds based on its geographical location and accessibility by the community, thus supporting community agriculture (CVFAC 2018). Implementing a robust and traditional seed-saving initiative would ensure public ownership and control of genetic seed stocks, contributing to

financial stability within an inclusive Canadian agricultural policy, and building upon individual farmers sovereignty to have choice over what they grow.

CG3 explained that started with 10 grams of seeds for each variety of Einkorn, Emmer, and Spelt crops and began propagating and multiplied the number of seeds for seven years which continued to grow into the various crops on their numerous leased plots of land in Lister and Canyon. Like La Via Campesina's Biodiversity and Genetic Diversity Working Group which aims to reconnect the relationship between the land and society, these two Creston Valley groups are participating in a biodiverse agricultural system which supplies local needs before supplying the chains of globalized economies based on international trade networks.

Gender Equality

In the Creston Valley, several women farmers shared their daily farm work schedules and also discussed the challenges to their market gardens and the exercise of sovereignty over their market enterprises. Single-handedly, CG2 a women market gardener grows food for her community and has built up a small farm to supply her family with year-round food. CG2 speaks to the significance of having sovereignty over the food she produces within a feminist framework. CG2 stated:

It is culturally appropriate if you are female and farming as a small-market gardener. But if you want to get into anything bigger like livestock farming, it is Big Boys Only! They (male farmers) are completely oblivious and will literally not look at me. He (a male farmer) will answer my husband but will not answer the question I asked, directly to me. And my husband knows nothing about farming! I am the 1 who farms and is educated in this. But this is so prevalent that it is a joke. It is generational and maybe a patriarchal thing. It is a respect thing. There are a whole series of dynamic where they are all men. There is an extreme minority of female farmers. They just do not know how to deal with me. With my energy. Granted Creston is very conservative. Maybe the hippie generation is more receptive to me. But not with the conservative farmers.

I spoke with several other women farmers in the Creston Valley and many of them discussed the challenges of farming in a male dominated field. Interviews with women small-scale farmers reveal that they do form an integral part of food production, and are involved in decisions, operations, and management of their farms. Interestingly, these findings exemplify how female farmers have a more predominant involvement in small-scale farming compared to their counterparts in the industrial food system. According to Table 7.2, small-scale women farmers form 75 percent of the interviewee group as compared to just 10 percent of industrial farmers.

Table 7.2 – Gender comparisons of Creston Valley and Bonners Ferry Interviewees.

Gender	Creston				Bonners Ferry			
	Small-scale	%	Industrial	%	Small-scale	%	Industrial	%
Female	12/16	75%	1/10	10%	4/6	66%	1/5	20%
Male	4/16	25%	9/10	90%	2/6	33%	4/5	80%
Total Interviews	16/16	100%	10/10	26/26	6/6	99%	5/5	100%

Their thoughts and comments also reflected a seemingly gloomy prospect for farming women not just in the Creston Valley but globally. The need for fundamental changes in relations of power as it relates to equality, violence against women, and unequal gender relations must be addressed to be considered truly food sovereign. It is essential to understand the depth of women's strongly held connections to their land, farms, communities, and family during overwhelming challenges of weak economies and a hostile government. However, despite the grim farm challenges that gender inequality provokes, women continue to play critical roles in agriculture, their histories, their communities, and their land and water systems. Through distribution and consumption, and equal participation of women and men in key areas, including

the distribution of resources, and decision making in food-related policy and programs, the government must consider women farmers (Desmarais et al. 2011). At its most basic level, food sovereignty includes woman farmers within key decision-making areas rather than excluding them entirely and provides equal opportunities for decisions to be made.

At the fifth International Conference in Maputo, Mozambique, La Vía Campesina (2008) declared that “Food Sovereignty means stopping violence against women.” Following this poignant directive, Roppel et al. (2006) provided one of the most in-depth agricultural policy studies to propose food sovereignty to Canadian policymakers. In this text, the authors call for the needs and interests of Canadian farm women who have traditionally been silenced and mostly absent in rural populations of food production and food policy development (Roppel et al. 2006). Quite simply, women see farming as one of the most critical jobs on earth. Neoliberal industrial agriculture is a space where patriarchal authoritarianism is deeply rooted (Alston 1998). However, small market women gardeners assert their knowledge away from the gaze of the male farmer and to grow food for family and community in the Creston Valley.

Market Garden Effects on Environment

Small-scale farmers in the Creston Valley produce a multitude of food types such as dairy milk and cheese, various grains, various meat products, and fruit and vegetables. Within the sample of market gardeners, most farmers practiced some form of agroecological farming methods that provide the biophysical basis of organic foods (Perfecto et al. 2009). Since these practices are antithetical to the intensive inputs necessary on large allotments of land, market gardeners' farms are usually, but not always, of small size. CG7 grows his CSA on 1.5 acres of land for example while CG3 grows certified organic heirloom wheat on 700 acres.

Since large-scale industrial farms exist side by side, Creston Valley small-scale farmers cite the constant pressure of nearby high-input, industrial agriculture as a challenge to transitioning to full, small-scale agroecological farming methods. The existence of industrial food production next to small-scale farm productions necessarily influences the shared land, air, and water systems. Small-scale lamb farmer CG4 for example, is frustrated by her next door neighbour who uses roundup next to her non-sprayed field. She says cross contamination is a constant worry.

Only one of the current eight Creston Valley dairies is classified as a small-scale farm for the purposes of this study. On that farm, CG16 describes the agroecological principles applied through the use of certified organic practices which produce food on less intensive scales of production. Despite this production method and the certified organic designation, this farm still requires the use of large land bases and the expulsion of GHGs into the environment through the use of tractors. Water sources next to dairy production is also worrisome as animal sewage seeps into ground water.

Likewise, the small-scale certified organic grain farmer CG3 grows wheat based on an ethical decision to produce food for future generations that is nutritional and environmentally sustainable. Eschewing chemicals, he instead practices natural methods of sustainable agricultural but admits that he does burn some fossil fuels through the use of various tractor machines that harvest their wheat. They also drive their grains to various marketing outlets in the Central Kootenays and as far as Vancouver which uses gas and emits GHGs. Although agroecological practices are less harmful, they nevertheless contribute to environmental pollution.

A small-scale flax, wheat, barley, and hay farming family CG1, says that he used fertilizers in the past, but now relies on dry land farming techniques on its 80 acres to achieve a successful and smart way to farm: “It’s another way to farm, like my grandpa did and it feels good to produce food in a special land and climate, stated CG1.” Small-scale farming increasingly proves to have a multitude of benefits to society and the biosphere. For example, agroecology builds upon traditional local ecological knowledge specific to local geography, climate, and water sources where farmers can use their natural ecosystems to increase biodiversity and year-round yields and decrease the use of petrochemical inputs (Schanbacher 2010).

Of all interviewees, Market vegetable gardener CG2 came the closest to net GHG emissions by using permaculture techniques which encapsulate three main principles of agroecological farming: for the earth, for the people, and fair share. These three principles indicate that by governing societies’ own needs, farmers can set aside resources in order to further the earth and the people in a fair way (Holmgren 2002). These principles include returning waste into the soil system to recycle into productive and sustainable food production. The principle of fair share means that each of us should take no more than what we need before we reinvest the surplus (Fergus and Lovell 2014). CG2 states that she does not use chemical inputs but instead uses biofriendly pests to control other pests. CG7 has also devised a fire torch to burn weeds down the side of his vegetable rows necessitating the use of petroleum and thus contributing a small amount of GHGs.

I also interviewed three small-scale meat farms in the Creston Valley and even though GHGs from small market agriculture are much less than from industrial agriculture, this method still requires adopting best land management practices such as no-tillage which converts

degraded pasture land to integrated crop-livestock systems thus decreasing the ecological footprint. Best management practices also include bringing suitable land into production coupled with an increased use of agroeconomic methods on existing farmlands. When asked I asked CG9 what the methods of agriculture used were she stated that although they try to be as natural as possible, they are not organic and do use a nitrogen/phosphorus mixed fertilizer for hay, contributing to petrochemical use and therefore affecting ground water sources. CG17 also states that their beef cattle production is also not certified organic and therefore they use pesticides and vaccinations for their cattle. Although their ranch is on a much smaller scale than industrial beef production, the farm does however contribute to the use of strong petrochemicals. Scherr (2009) suggests that climate-friendly livestock production and protecting watershed habitat and rangelands can mitigate against, reduce, and sequester GHG emissions which could offset 25 percent of fossil fuel emissions per year. A full adaptation of agroecological principles by all small-scale and industrial meat producers would contribute to decreasing green house gasses in the Valley.

What was once a forested area on the benchlands of the Creston Valley, prior to European colonization, is now a patchwork of farms of both industrial and market garden varieties. Forests serve many functions providing benefits directly and indirectly for humans and the environment such as prevention of soil erosion, soil fertility maintenance, and sequestering atmospheric carbon while also providing timber, pulp, and biotechnology (McDonald 2010). Creston Valley farmers CG12 in the Wyndell area shared their consternation about the daily hum of logging trucks plying the forests right above their house. They mourned the fact that forests are disappearing at alarming rates affecting the watersheds that provide protection for ecosystems, and species that coexist within multitudinous and complex relationships with

humans. Deforestation, forest fires, and agriculture all contribute to environmental degradation in the Creston Valley to varying degrees. However, the impact of food production practices on climate change and land, soil, and water degradation can be mitigated, and the agroecology principles practiced by small market gardeners are contributing to a more sustainable model of agriculture.

Summary Assessment of Local and Regional Food Production

Research findings from this Chapter reveal that market gardeners face the same socio-economic and environmental challenges as the industrial farmers within the Creston Valley. Challenges to market gardeners include pressures on decreasing land availability as increased wealth seeps into the Valley, resulting in the decreased benefit of agricultural production on ALR lands. Increasing land prices for development purposes have created a net loss of available agricultural land, contributing to a decrease in the number of farms in B.C. Land that is available in the ALR is prohibitively expensive creating one of the largest impediments to small market gardening. Market farmers share their dismay at lost opportunities to supply local agricultural products high in demand, but which cannot be provided. Certified organic wheat farmers share their desire to expand their farm but do not have the opportunity to acquire more land because of the excessive cost and the lack of leasable farmland, usually located on the floodplain where the local Indigenous community holds most of the prime agricultural land on their reserves.

A Wyndell market cherry producer states that his orchard realizes a profit but only because financial circumstances allow he and his wife to run a profitable cherry business without any personal debt. He also shares that his wife earns a stable second income which helps to achieve a secure lifestyle. However, the majority of market gardeners are not in a secure

financial position and therefore require the economic assistance of a second family income.

Market gardeners realize positive net incomes, but these profits are predicated on second family income earners and their ability balance their debt rations, which is to say, to manage their debt load to income earned.

Although certified dairy farmers on the benchlands own their own land, barriers within the provincial quota system do not allow the dairy farmers to realize the full value of their dairy business. Loopholes in the quota system are emphatically voiced to the government but to no avail. Market garden meat products such as lamb and beef are grown sustainably on the benchlands and in Wyndell where pressures from neighbouring industrial farmers encroach onto organic land and water system creating discord between farmers' food production styles. Because most agricultural land exists within the ALR, small market farmers grow crops that are surrounded by industrial farms or farmers who use petro-chemicals, affecting how market gardeners grow their food.

Costs to growing food include crop insurance but the lengthy process and high cost of insurance dissuade most market gardeners from buying this product. If insurance is purchased to control for unforeseen environmental hardships, it is still not enough to cover the costs of such highly perishable products as cherries.

Agricultural extension services once existed to assist farmers with latest research information for adaptive agricultural products and systems. However, collaborations between various levels of government and local groups such as the Columbia Basin Trust, Fields Forward, now supply the financial and information support required by the market gardening community. Some food producers claim that small-scale farmers might face falling incomes due to the smaller size of local markets. In order to support small-scale farmers, several government

partnerships have also implemented local, regional, provincial, and federal initiatives to foster food production in the Creston Valley. These financial initiatives can contribute to profits staying within local and regional communities but strengthening smallholder farming through socio-economic risks to small-scale farming persist. Supporting agricultural areas overall is required by addressing food security policy.

Despite its central location in the province, and its growing agricultural production including its various initiatives aimed at connecting food and community, the Creston Valley has not become a regional food hub. Key contact CH10 believes that four regional food hubs were strategically pre-determined by the government indicating that government still controls where and how food is produced. Despite impediments to developing the local food system into a regional hub, local food movements continue to grow in size and numbers. Farmers Markets are one of the biggest growing food initiatives supported by provincial economic systems and an increasing awareness about food, sustainability, and community resiliency. Although contentions exist between government and civil society, local small-scale food production persists. However, without a comprehensive agricultural food security policy that considers politics, health care, civil society, and the planet, food production is still at risk.

Interviews with market gardeners also illuminate potential impacts of limited transparency and ongoing exclusion during the Columbia River Treaty negotiations. Some market farmers cited the Columbia Basin Trust as being exclusionary and arbitrary when it comes to making decisions about which farms would receive help. Organic wheat farmers believe that adopting inclusionary farm policy by the CBT would assist small-scale farmers in growing their agroecological farms. Directly funded by the Columbia River Treaty benefits, a renegotiated treaty to include agricultural policy was cited by one market gardener.

The increased demand for non-food related agriculture is growing in the Creston Valley and displacing farmers who grow traditional food crops. Wineries which produce alcoholic beverages for local consumption reduce their local GHG footprint but offset this progress by using intensive petrochemical inputs on their vineyards. Elite food preferences continue to influence the crops farmers grow and how valuable farmlands are used. Food is therefore becoming a symbol of prestige rather than a symbol of community resilience and justice.

Environmental degradation from agricultural practices continues in some areas of food production such as dairy, meat, and wheat farms alongside the growth of non-food item products such as wine and wine products. Small market farmers, however, do contribute much fewer GHGs and water pollution than intensive agricultural systems which require the use of petrochemicals and much larger volumes of land bases in order to supply global food chains and markets. Changing food preferences by consumers can ameliorate some of the environmental consequences but farmers too must bear the burden of making choices in types of sustainable food crops supplied to the consumer.

The effects of agriculture contribute to climate change induced drought on the benchlands where market gardeners share their concerns for ill-timed water patterns and late-season frost. As with the industrial farmers, all small market gardeners voiced their concerns to impending environmental challenges to farming in the Creston Valley. Several farmers explained that naturally timed rainfall is essential in the timing of the planting of alfalfa. As with rain-fed agriculture (Kandulu et al. 2012), below average rain and drought affect the quality and quantity of crops grown and therefore the long term economic viability of all agricultural systems; industrial and market gardens. Drought scenarios will especially affect the long term demands on limited fresh water, which will also increase as the demand for food and thus agricultural

increases (McDonald 2010). Adopting strategies such as agroecological and permaculture principles which include a diversification of sustainable production systems including less water-intensive farming is therefore critical, urgent, and imperative during global warming induced climate change. Most of the small market gardeners practice some form of resilient farm systems compared to their industrial cohort. Without reducing emissions from various forms of agriculture, contributions to climate change will continue, especially in the dairy, meat, and wine industries.

Gender equality exists for small market farmers more so than in industrial farming settings. Gender equality is an important cornerstone of food security principles where several small market woman farmers in the Creston Valley practice ecological, biodiverse food and farming systems. Market gardener women stated they provide valuable resources and are empowered to change the world by honouring the soils, families, and communities that they provide food for. Indigenous People and especially women have also been excluded from certain food production systems. Chapter 8 addresses the transformative nature of Indigenous food production systems within the Creston Valley and explains how integrated systems of food production emerge on the Creston Valley floodplain.

Chapter 8: Ktunaxa Food Security in the Creston Valley

The purpose of this Chapter is to critically evaluate Ktunaxa food security within the Creston Valley floodplain, where the yaqan nuʔkiy have lived since time immemorial. The Ktunaxa have experienced historical injustices such as settler colonization and dam construction, which have had irreversible consequences to Indigenous food procurement systems. Many, nevertheless, continue to fish, hunt, and gather wild foods. The yaqan nuʔkiy are also engaged in industrial agriculture, as well as regenerative gardening initiatives to provide food for their community. Because the yaqan nuʔkiy are heavily involved in both systems of agriculture, I use the same operationalized food security assessment framework described in Chapter 5 to analyse yaqan nuʔkiy's unique relationship to land and food and assess the level of food security they currently experience in the Creston Valley floodplain. However, I depart from the interview guide used for industrial and small-scale farmers and use a slightly modified set of questions for the yaqan nuʔkiy (see Appendix B) which I then apply to the food security assessment framework.

yaqan nuʔkiy Traditional Food Procurement

The Creston Valley in the Columbia River Basin is one example of a localized food system that has evolved over millennia to sustain traditional Ktunaxa people with a diet rich in calcium, iron, Vitamin C, healthy oils, and minerals. In order to capture this unique evolution of local food system, I interviewed eight yaqan nuʔkiy community members. Their life stories provide the data for the assessment of food security and are indicated in the following Table 8.1.

Table 8.1 – yaqan nuʔkiy Interviews in the Creston Valley of B.C.

#	M/F	Area	Type of Food Production	Market
CK1	f	reserve	yaqan nuʔkiy Community Gardens	community
CK2	m	reserve	hunting, gathering, fishing, canning, trading, freezing	community
CK3	m	reserve	hereditary Chief, traditional food procurement	community
CK4	m	reserve	hunting, gathering, fishing, canning, trading, freezing	community
CK5	m	reserve	nation director, industrial food paradigm	nation office
CK6	m	reserve	yaqan nuʔkiy Community Gardens	community
CK7	m	reserve	yaqan nuʔkiy Community Gardens	community
CK8	f	reserve	yaqan nuʔkiy Community Gardens	community

This table of participants differs from the industrial farmers and small-scale farmers' tables because they do not have the same access to land and production modes of agriculture. In this context, Indigenous peoples do not share in the same colonization of agricultural land but suffer irreparably from the colonization of their land. Historically, political, and economic marginalization has created high levels of Indigenous poverty with lower levels of access to adequate food, relative to the local settler population. The above table reflects the food procurement types of the Knowledge Holders interviewed but also includes yaqan nuʔkiy Nation Director's data. When asked what the main food source for him and his family is, local yaqan nuʔkiy interviewee CK1 describes some of their traditionally procured foods:

cattail roots, wild potatoes, onions, fiddleheads, pine mushrooms, chanterelles, morels, velvet caps, milkweed, thistle berry, thimbleberry, huckleberry, rosehips, and hawthorn.

Other wild foods that CK1 and her community currently gather are hazelnuts, berries, stinging nettle, and lovage. Huckleberries are picked by 80 percent of yaqan nuʔkiy members. CKI does admit though that their main food supply comes from supermarkets and other local grocery stores.

Asked whether any of their family members hunt, fish, gather wild foods, use wild foods for medicines or to make things, two interviewees, CK2 and CK3, who are brothers, also describe their ability to hunt for unlimited numbers of elk, moose, deer, small animals, and duck and other birds within their traditional Ktunaxa Nation territory. CK2 says:

I like to fill my freezer. Every year I like to make sure I have a good supply of meat for my family so every year I like to get a bull moose. I like to get probably two maybe three elk, and then three or four deer. That is for my family. But I do not limit my hunting just to my family. Everybody benefits.

CK2 and CK3 also fish on occasion for bass in Duck Lake in the Creston Valley and also obtain spring and sockeye salmon from the Skeena River in northern B.C. through family trading connections. However, when asked how much do they depend on fish or other types of foods for their diets, CK2 stated: “We don’t *depend* on fish because we have meat. And we don’t have fish because of the Columbia River Treaty” indicating that their Nation once were reliant on salmon but because of the decimation of fisheries, this is no longer possible.

The meat and fish they do procure are processed, packaged, and kept in the community deep freezers for community members to access during food insecure times. When discussing what the main food source is for he and his family, CK2 says that his family diet comprises at least 80 percent ancestral foods with the remaining foods coming from local farmers and grocery stores. He does state however, that his family is an exception though as the majority of the community rely on store-bought foods.

CK2 explains that few community members still hunt. He also explains that even though 20 percent of yaqan nu?kiy members have a garden, most community members rely on the industrial food system and whatever is in the community freezers from the meat that he and his brother provide from hunting. He said that because his family descends from his father’s

hereditary chief lineage, that he and his family are much more traditional than the rest of the community but are still part of the industrial food complex.

Economic Viability

yaqan nu?kiy Industrial Agriculture

Challenges to food procurement for Indigenous People are complex. The yaqan nu?kiy Nation presently has 6,000 acres of reserve lands, of which 1,500 is zoned for wetlands leaving them 3500 acres on which to grow food for their communities. While the only current small-scale system of food production on the reserve lands is the 20 acres of fruit and vegetable gardens described below, several partnerships were initiated at the yaqan nu?kiy Nation level with local farmers. Several industrial farmers described their farmlands as being owner operated with some land leased from the yaqan nu?kiy. No market gardeners indicated that they lease land from the yaqan nu?kiy. Table 8.2 indicates the farms and acreages of land leased from the yaqan nu?kiy by the industrial farmers interviewed in 2016.

Table 8.2 - Number of reserve land acres and leased from yaqan nu?kiy by industrial farmers.

Farmer	Number of Acres Owned	Number of Acres Leased from yaqan nu?kiy
CI1	120 acres	25 acres
CI2	1,500 acres	0
CI3	2,700 acres	2,000 acres
CI4	363 acres	100 acres
CI5	100 acres	0
CI6	20 acres	400 acres
CI7	145 acres	0
CI8	480 acres	0
CI9	4,000 acres	0
CI10	17 acres	0
Total	7,445 acres	3,525 acres

CK5 describes the Nation's reserve lands:

We have eight different reserves spread from Wyndell to the border comprising about 3500 acres of viable farmland. We lease and work in partnership with farmers and lease hay to Japan. We work with C13 on export alfalfa crops.

Industrial farmers explained that costs to lease land from the yaqan nu?kiy ranged from \$100 to \$125 per acre depending on the negotiated terms. With a total number of 3500 farmable acres at an average of \$100 per acre, the total amount of income that is potentially earned as revenue by the yaqan nu?kiy for leased out land is approximately \$350,000 per year indicating the economic potential for engagement with agricultural farmers on the Creston Valley Floodplain. Shared with me by CG10, Indian Reserves (IR) are operated as non-profit organizations and therefore all profits from these lands must be reinvested back into the yaqan nu?kiy Nation.

Several industrial and economic collaborations exist with industrial farmers. CK5 describes an industrial cherry orchard. He says:

When it is done, it will be the largest single cherry orchard in B.C. It will be 220 acres once it is all done. It is a partnership with a local cherry orchardist on IR5 and is the only place where we could have this orchard. There are methods we can use to keep the soil drier.

Key participant CG10 who works for the yaqan nu?kiy explained that the yaqan nu?kiy “are setting themselves up for success and will become major players shortly” meaning that the prime agricultural land that they manage will soon become even more economically productive by working together with other industrial food producers. Some of these food-producing initiatives are outlined below.

The yaqan nu?kiy also have a partnership with the Ktunaxa Nation who own and operate St. Eugene Golf Resort Casino and Restaurant in Cranbrook B.C. The yaqan nu?kiy own and operate Nupika wu’u Restaurant in the newly acquired Ainsworth Hot Springs in Nelson, B.C. The initial collaboration between the yaqan nu?kiy and the local beef farmer will also grow their partnership so that they have enough meat to supply the hot springs and golf resort restaurants while also supplying community freezers. According to CG10, in summer 2019, there were approximately 50 cow calf pairs which will provide local meat for the restaurants and all residual meat will be available for sale to the public after freezers are filled. These collaborations provide a new framework for food production that are helping the yaqan nu?kiy realize sovereignty over their land systems, and food security for their community.

Greenhouse and Food Store Sales Points

From ongoing discussions with yaqan nu?kiy farm manager CG10, explains that “yaqan nu?kiy Farms” have also recently purchased Morrison Greenhouse in Creston. The greenhouse will thus be a place to sell produce from their gardens. As well, in 2017, a young couple from Ontario purchased Extra Foods in Creston and now run it as Pealows Independent local grocery store.

Yaqan nu?kiy Farms have entered into an agreement with Pealows Independent Grocery to sell the excess produce from their 20 acre farm. Because Pealows is larger than a corner store but smaller than a Costco, it is considered a small market grocery store and therefore is perfectly suited to sell local products. These initiatives contribute to the yaqan nu?kiy's ability to make decisions independently about where their own food products are distributed indicating their sovereignty over their land and food production methods and how they distribute their product. By distributing and selling locally community is thereby strengthened.

Cherry Orchard Collaboration

In 2016, I was taken on a tour of a 200-acre industrial cherry orchard located on the flats on Indian Reserve IR5 lands. Farmer CI6 explained that this was a new partnership with the yaqan nu?kiy who provide the land and infrastructure such as fencing and irrigation while the farmer must manage the crops. While discussing the farm, he explained:

We took a chance. This is 70 acres planted here two weeks ago so a total of 85 acres in production; we own 10 acres and the rest is long term leased from and is owned by the yaqan nu?kiy Farms. When it is all finished, we will not be the largest but will be close to David Geen in Kelowna for growing cherries.

The profits will be split in an arrangement that is only known to the yaqan nu?kiy and the cherry farmer. I was not privy to the exact details of this collaboration but given the estimated gross profits of industrial cherries, this could be very profitable. When asked about how the orchardist will deal with drainage issues he commented:

We have tile drains. Over here you will see a dark strip. That is a low spot. And it goes from the power pole all the way through to that corner of the property. It is a low spot and so we have sunk drains into it and there are structures here to get rid of the water. But it is fairly dry. When we planted this it was dry.

Nonetheless, this initiative is not without its risks. Cherry roots do not like to grow in wet clay, making this a high risk gamble in floodplain soils that are notoriously composed of clay. Given the potential for flooding, the clay soils and the unknown outcome of the Columbia River Treaty, the cherry initiative could be disastrous, or lucrative. When asked about these externalities, the farmer explained that climate change-induced drought could work in favour of their operation, bringing less water rather than more. Furthermore, he states that is not afraid of flooding as long as the dam is there. However, he also admits that water does seep up from the water plate and saturates the ground: “It is great for growing things that like water on the flats as the land is always wet”. Given the risk for his new cherry orchard on the flats and the effects of climate change flooding on the floodplain, he states that “we are market driven”. The growing demand for cherries by increasingly wealthy populations in foreign markets is looked upon by industrial orchardists as a risk worth taking for the high financial returns that industrial cherry production brings. The profit for industrial cherries outweighs the risks that this area poses for a successful cherry orchard operation and speaks volumes to the globalization of the food supply where food is shipped overseas in order to realize high-profit margins while bringing a very high cost to the farmer in terms of risk, potential loss, and loss of food security food security.

Alfalfa, Hay, and Seed Production

CI3 explained that most of their alfalfa seed and export hay farm on the flatlands is leased from the yaqan nu?kiy. An extremely lucrative business which realized \$3.2 million gross income in 2015, from 7,700 tonnes of alfalfa and timothy hay is sent overseas is by all accounts a successful business as long as the land is there to grow and export the hay. CI3 explained that the yaqan nu?kiy lease land to their farm and also share in some profits. When discussing water and management issues on the lands that he leases from the yaqan nu?kiy shared that the eroding

diking system on the yaqan nu?kiy lands is a constant threat and feels that this problem should be addressed. He states:

Other than the diking system not getting repaired or maintained; one day there is going to be a big flood but for now the constant rising of the river for various reasons like fish habitat and revitalization, power generation, the river fluctuates wildly. I bet it came up six feet. I look after the pumps on some Indian land and one day I was out there, and it was up way high. It should be the responsibility of the provincial government.

Climate change brings the constant threat of unknown weather patterns, leaving the dikes to the fate of government bureaucracies who diminish the possible effects of climate change which could bring disastrous results for the yaqan nu?kiy Nation's agricultural initiatives and partnerships.

Agripocity Food Partnership Plan

Industrial farming is an exceptionally high risk venture due to unpredictable harvests, volatile prices, and unpredictable returns after crops are sold on the open market. Managing cash flows is complicated in these circumstances, especially as food prices continually fluctuate. Using a middle contact to sell their products, the yaqan nu?kiy have entered into discussions with Agripocity, a globalized trading scheme based in Dubai which couples global growers and buyers to provide their products on the open market (Agripocity 2019). In personal discussions with the yaqan nu?kiy farm manager he explains that the middle manager (Agripocity) assumes the risk of selling product within fluctuating markets, and guarantees consistent prices and supply chains, while the producer and buyer receive a share of the profit (personal discussions 2018). The yaqan nu?kiy are currently exploring this partnership, and while they have not yet entered into a contract stage, they believe that by using their farmlands in this way, they could capitalize on the globalized nature of food production and trade for profit by using their reserves

for this type of food production. While this type of food production does not contribute to the local community it does strengthen the economic resiliency of the yaqan nu?kiy and thus its community lending itself to food security.

Last Chance Foods

Built upon a similar premise as the Agripocity Partnership and capitalizing on the current social awareness of “conscious consumption”, Last Chance Foods is a scheme which endeavors to add value to local crops by culling seconds of a particular crop and converting them into viable processed products which are then sold to local food outlets and restaurants. In personal discussions with the yaqan nu?kiy farm manager, he explains that products which could be produced are fruit leather and baby foods that would in turn be sold in local grocery stores and to provide food to the local community (personal discussions 2018). This type of food production reduces waste and the environmental footprint of by eliminating export costs and associated greenhouse gasses. TaQado Mexican Kitchen, a restaurant chain in Dubai, have partnered with Last Chance Foods and is an example of novel ways to use food and eliminate product waste. In theory, TaQado orders wheat from local farmers in Dubai or, if forced to import, they do so through Last Chance Foods, and processes the wheat locally. The yaqan nu?kiy are currently exploring this business model, hoping to replicate it in the Creston Valley and then to eventually expand this concept to global markets.

Land Availability

Under article 8 of the 1876 Canadian Indian Act, Indigenous People are able to lease out uncultivated reserve lands to non-Indigenous people if the new leaseholder uses it for farming or pasture (Indian Act 1985). Because of this provision within the act and the fact that 3500 acres of

their reserve lands are suitable for agriculture, agricultural land availability is not an issue for the yaqan nu?kiy. In fact CG10's comment that the yaqan nu?kiy "are setting themselves up for success and will soon become major players" indicates the economic viability of food production for Indigenous people who have access to, and control of land in floodplain areas.

However, the yaqan nu?kiy are facing land availability issues in respect to ancestral food procurement practices. Many yaqan nu?kiy do not actually gather or hunt traditional foods any longer because much of their traditional lands have been extensively damaged through deforestation and damming including climate change. CK4 explains that "my brother and I are the only ones who fill the community freezer". CK4 also explains that climate change is affecting their ability to hunt. He explains:

Our seasons are all out of whack. Probably the last two years our winter was shorter and almost non-existent. It has affected the procurement of wild foods hugely. I think it pushes the animals to go into areas that are even harder to get to. The animals tend to go along a lot of clear cuts, the easiest path which are their migratory routes but now that it is not as cold, they are not going to those spots any more. They have to winter somehow so I do not know what they do now. It is affecting our food supply. There is not the snow pack anymore.

Because of climate change, ancestral foods are limited. Furthermore, since Indigenous rights are not respected or fully acknowledged by the courts, limited access to riparian environments and spawning grounds for fishing and hunting impede their ability to procure traditional foods and thus to be food secure. Ever since the first gold rush in B.C., the imposed Indian Act, Civilization Act, Grand Disenfranchisement Act, and the BC Land Act were part of the establishment of a legal doctrine in the 1800s that served to separate Indigenous peoples from their land. The political structures in which Indigenous people survive does not contribute to the health and wellbeing of Indigenous peoples, food production, and the environment.

Columbia River Treaty

In the Creston Valley of British Columbia, the contrast to traditional food systems is conspicuously evident where the ability of the Indigenous Ktunaxa yaqan nu?kiy to procure traditional foods has been compromised by colonialism and globalization (Sam 2013; Taiaiake 1999). On the Creston Valley floodplain, several thousand acres of reserve lands are leased to local settler farmers for the production of industrialized monocrops such as alfalfa and timothy hay exports to Asia. Through current land and treaty agreements with the Province of B.C. the Ktunaxa Nation are not only engaged in self-government treaty negotiations with the B.C. and Canadian governments, advocating for their right to manage land, water, and natural resources in their traditional territory but also within the Columbia River Treaty (CRT).

The CRT has entirely ignored the rights and interests of the Ktunaxa people traditional territories (Cohen and Norman 2018; Cosens 2012; Cosens et al. 2018; Cotter 2016; Paisley et al. 2015; Wilson 2016) and continues to exacerbate the restoration of once thriving fish populations and aquatic habitats by excluding Canadian Columbia Basin Indigenous people from treaty negotiations, further marginalizing their people and food systems. When discussing the CRT and how it has affected him, CK2 states:

A lot has to do with the fish. Our ancestors had salmon. I don't have salmon today. I was never taught or given the opportunity to understand the importance of salmon. That is how it has affected me. Ya. We have Trout. We have Kokanee. We have a large amount of Bass in Duck Lake. I enjoy those. But you know I can't enjoy salmon. The other way I am affected through the Columbia River Treaty is through Sturgeon. They are supposed to taste better than Cod. They are coming back but they haven't adapted to the way they are supposed to survive.

On June 5th of 2014, the Ktunaxa, in partnership with its sister Nations, the Okanagan and the Shuswap, released a public statement announcing their intention to open negotiations on

the CRT (Columbia River Treaty 2019). This statement highlights the historical significance of salmon to their culture and way of life and their intention to work to restore salmon and traditional salmon fisheries on the Kootenay River through the treaty re-negotiations and beyond. As the only First Nations with bargaining rights, these three Nations' contributions and goals will have a significant influence on the process. Since the ratification of the treaty and the subsequent construction of several large dams near the US border, salmon have been unable to return to the B.C. portion of the river, with great detriment to the traditional First Nations way of life, and great impacts on the river's ecosystems overall (Cotter 2016; Pearson 2012; Peery 2012; Penfold 2012). Whether ecosystem function is included in an updated treaty remains to be seen.

Tsosie (2007) argues that the governance of Indigenous farming communities nests within a unique set of historical and current realities, an array of formal and informal institutions: national agendas built around reform; customary laws; entitlements; intellectual property rights; and many Indigenous agencies. Indigenous fish revitalization could succeed if a human rights-based approach were used and notions of food security and food sovereignty could include the recognition of the positive contributions of Indigenous people (See UNDRIP declaration) in agricultural methods of food procurement, traditional ecological knowledge, and the transference of technology during climate change adaptation and mitigation.

Community Values

Traditional Food Procurement Systems

Traditional Indigenous food systems are predicated upon living in harmony with the natural environment in order to procure nutritious and abundant food (Rajotte 1998). This relationship today includes recovering and building upon traditional food producing knowledge and capacity

to procure foods specific to the yaqan nuʔkiy's fish based diet, and its cultural methods to procure wild meats and plants that were extinguished due to colonization. CK2 shares that he “was taught to go duck egg hunting but I don't do it for food procurement. I have instilled it in my kids though and if there was ever an apocalypse, my family and I would survive. But others here would not because too many people depend on the grocery store”. The unfortunate transition to market based food supply has affected Indigenous people although initiatives to provide food security for the yaqan nuʔkiy community exist through market gardens.

Market Garden Initiative

The yaqan nuʔkiy developed a small market garden where some yaqan nuʔkiy community members are able to grow an abundance of fruits and vegetables on their reserve lands in the belief that it will mitigate against the possible worst-case scenario. When discussing food procurement with CK7, as manager of the garden she explains what she believes will be “an eventual collapsing of the industrial food system” in her lifetime. CK7 runs a one-acre organic garden in the hopes that it will eventually become a self-sustainable source of food for the yaqan nuʔkiy 220 community members based on food sovereignty principles of natural agroecological food production and self-sustainability. She describes the garden passionately:

The challenge is for community members to get turned on to gardening. There was an idea that if we grew everything that would go into a stew, after harvest we would get everyone in the community into the kitchen to make stew. We grow potatoes, onions, carrots, zucchini, squashes, beets, garlic, a section of raspberries, a blackberry patch is getting started, strawberries, two plum and pear trees started, melons.

Figure 8.1 shows the one acre of fruit and vegetable gardens on the yaqan nu?kiy reserve that CK7 manages.



Figure 8.1 - yaqan nu?kiy organic gardens. Photo by author 2016.

CK7 wishes that, together with nutritious healing foods local to the region, and the abundance from their community gardens, community members will be able to avert an “apocalyptic scenario” by accessing locally procured foods that would allow them to be less dependent on industrialized grocery store foods. CK7 describes the soil on the floodplain as a veritable “gold mine” made up of 33 percent organic-rich alluvial material where she believes they can grow anything because of the once historic flooding of the flatlands that created the rich soils.

CK7 hopes that this will give families and children and especially those who grow the food, a sense of relationship to land, water, and soil.

Through Federal and Provincial funding the yaqun nuʔkiy received a Western Diversification Grant in 2017 that allowed yaqun nuʔkiy Farms to grow their one acre garden to 20 acres by 2019 as shown in Figure 8.2.



Figure 8.2 - yaqun nuʔkiy 20 acre farm 2019 (permission granted).

This \$200,000 grant allowed them to purchase fencing, irrigation and tractor equipment along with a full time farm director. Run by the yaqan nu?kiy Nation and non-Indigenous local farmers on IR lands, the yaqan nu?kiy believe that the produce will help to alleviate the cost of industrial food, petrochemical input costs, and disruptive weather patterns that jeopardize access to nutritious local foods.

Morrison (2011) explains that the most productive areas of agriculture take place on what were once “important traditional harvesting sites” (99), concentrated for example in the Creston Valley - a fertile Valley bottom. In 2016, through a partnership with a local farmer, the yaqan nu?kiy also began grazing ten beef cattle on another reserve on the floodplain. CK7 says this partnership contributes to the security of the community food supply. Yaqan nu?kiy’s 20 acres of market gardens will be grown primarily for the community and secondly for their two restaurants. CG10 also explained that as of summer 2019, the two yaqan nu?kiy community freezers are completely stocked with meat and vegetables providing a secure food base for their community and sense of food security. Based on an economic model, this food production model exemplifies a growing community based food production system for the yaqan nu?kiy.

The yaqan nu?kiy’s rights to use and manage their lands, territories, waterways, and wild foods, if fully exercised, could provide the basis for new social relationships free of oppression and inequalities. Revitalization of the Creston Valley floodplain is critical and would support community survival, social and economic justice, and ecological sustainability which would strengthen yaqan nu?kiy community resilience. Social alliances based upon traditional Indigenous practices in relationship with other food producers could also help achieve food security for the Creston Valley as a whole. Initiatives specific to fish restoration have already been proposed throughout the Kootenay River Floodplain as discussed in the following sections.

Yaqan nu?kiy Fish Revitalization Initiatives

Kootenay River Floodplain Management Plan

In 2013 and 2016 CK5, Director of Development Services at the yaqan nu?kiy Nation office shared that the yaqan nu?kiy Nation would like to collaborate with all six Creston Valley irrigation and diking districts. He explains that they have eight different Indian reserves that are leased out to various farmers and of these areas, approximately ten kilometers of eroding dikes require repair. Figure 8.3 indicates erosion taking place along Kootenay River.



Figures 8.3 - Erosion along Kootenay River in the Creston Valley. Photo by author 2016.

The yaqun nuʔkiy's goal is to revitalize these particular dikes so that they may function for both fish spawning habitat while providing flood protection for farmers and the yaqun nuʔkiy. This

revitalization project would simultaneously prevent further erosion on diked farm fields. As explained by CK5, they have not had much positive response from non-Indigenous farmers to collaborate on the repair of the dikes in the yaqun nu?kiy's proposed manner. CK5 states:

There is definitely not enough support for food revitalization from the government. Traditionally there used to be 100,000 kokanee salmon in the Kootenay River. But since the construction of Grand Coulee and Libby Dam, there has been none, and there are no sturgeon either.

Restoration of the Kootenay River floodplain could begin with the reparation of the yaqun nu?kiy dikes by following their revitalization plan. This plan would repair the specific eroding dike by following the natural curve of the river and pushing the dike further away from the river thereby allowing that area to flood. A more substantial flood once every ten years would inundate that portion of the pushed-back dike, allowing sediment to drop and provide habitat in situ. The money from a new industrial cherry orchard initiative on the flats in collaboration with a local cherry orchardist would help to finance the revitalization, CK5 says. Profits from this operation would also be distributed across various development sectors within the yaqun nu?kiy Nation. CK5 says, "small little grants help, but we need more money going into the future". The yaqun nu?kiy tabled this proposal to the federal government, thinking that post Lands and Resource Treaty negotiations, these will become yaqun nu?kiy fee simple lands. The yaqun nu?kiy will then be responsible for repairing their dikes. So before that happens, they would like to see the federal government contribute to dike reparation.

However, federal government policy maintains that their responsibility is to only repair dikes for public health and safety, which excludes reparation for farm production activities. Moreover, there are no legal setbacks or easements from the flow of the river, which would allow for dike revitalization. In addition, any provincial dike maintenance funding would go to

the lower mainland in Vancouver, B.C. where there is a higher density of population and millions of people living behind dikes, making Creston only a secondary priority. The Kootenay River, CK5 explains, is a vital part of the ecosystem that was decimated due to damming. Because of this, he says it should be maintained by the government who destroyed it in the first place. He states:

People at Columbia Basin Trust get it, but they are not doing enough. It is a multi-million dollar diking system with ongoing maintenance...somebody should be paying for it because of the loss of fish by the Colonial Treaties.

CK5 explains that the money to conduct their floodplain habitat restoration project came from the federal government and could also come from the Federal government during the renegotiation of the Columbia River Treaty. Libby Dam has the most significant influence on the Creston Valley Floodplain, but since there is no monetary benefit from the Libby Dam and the power it generates which stays in the U.S., the government is reluctant to put money back into the floodplain and the dams. The Regional District of the Central Kootenay could also put money into the repair of dikes through taxation, but they take no responsibility for the dikes either. CK5 explains that engineered repair work takes about a year and that the federal government does have a fund of about \$3-\$8 million that could go toward fixing approximately 1,000 meters of dikes. CK5 elaborates:

But everyone applies for this money. So they are all applying individually and haphazardly; farmers, diking districts, irrigation districts at 150 meters here and there and are granted some money piecemeal and arbitrarily. But we want to eliminate the diking districts and then prioritize the sections as a collective body and in a holistic manner.

CK5 goes on to say that older farmers have the perception that the Nations have a lot of money. But this is not the case, he says. It is more indicative of bad relations between the Indigenous and

non-Indigenous communities historically. For example, some of the farmers will send the yaqan nu?kiy a water tax bill. However, he states, “we send it back to them,” creating friction between the Indigenous and the non-Indigenous food producers on the floodplain. Some of the bigger and younger farmers “get it” he says, adding, “they understand what is going on and they also understand that engineers just want to fix the dikes with rip-rap rock”. He explains that fixing the dikes needs to be done in a holistic manner for ecosystem sustainability and long-term fish habitat and restoration. Despite providing flood control post-Libby Dam 1972, much socio-environmental damage has been wrought in terms of fish, food, and cultural destruction for the Ktunaxa People without any compensation for their food systems and traditional lifeways (Pearson 2012).

Goat River Floodplain Revitalization Plan

In 2019, according to elected Chief of the yaqan nu?kiy Jason Louie, initiatives are taking place at the confluence of the Goat River and the Kootenay River that would revitalize over 1,235 acres of what was once tradition hunting grounds at the Goat River Floodplain. QUOTE White sturgeon and brown bat populations could return (Columbia Basin Trust 2019). The Columbia Basin Trust has recently endowed \$3 million to various ecosystem projects throughout the Columbia Basin. Louie says, “culturally important plants, including wapato, cattail, sedges, and rushes, will be grown and returned in yaqan nu?kiy lands” (Columbia Basin Trust 2019). This endowment, as Morrison (2011) explains,

...provides a restorative framework for coordinated, cross-sectoral approach to policy reform in forestry, fisheries, rangeland, environmental conservation, health, agriculture, as well as rural and community development (101).

Morrison (2011) believes that restoration initiatives - such as the Goat River revitalization plan - are an example of reconciliation with Indigenous food, cultural values, and colonial laws.

Kootenai Tribe of Idaho Fish Revitalization Initiatives

Kootenai Tribe of Idaho Floodplain Management – Diking Districts

Erosion is also occurring along the U.S. portion of the Kootenai River in Idaho. In 2013 and 2016 I spoke with third generation Bonners Ferry farmer BW4 who is President of the Kootenai Valley Reclamation Association (KVRA). The KVRA was instituted in 1984. BW4 is Commissioner of his own diking district Number Six and explains that the USACE purchased easements of lands which were intended to provide a buffer for each of these districts to use for future levee repair. Even though dikes along the U.S. portion were built after the Creston Valley diking system, there is also much erosion occurring due to the location and flow of water out of the Libby Dam which hits Bonners Ferry first as it flows downstream towards the Creston Valley some 60 kilometers later. BW4 says that “some districts do a good job of repairing dikes and some do not.”

Concurrently, in the U.S. portion of the Kootenay River, the Northwest Power and Conservation Council (NWPCC) (2019) provides funding to the Kootenai Tribe of Idaho (KTI) for their fish restoration initiatives (Cosens 2012:65; Heikkila and Gerlak 2012; White 2012:57). According to conversations in 2016 with BW3, fish biologist and flood engineer with the United States Army Corps of Engineers (USACE) who works on the Kootenai River, the Kootenai River Habitat Restoration Program (KRHRP) was designed to restore fish spawning habitat ever since the sturgeon supply was devastated by dams in the Columbia River Basin (KRHRPMP 2009). Bonneville Power charges money for their hydro and a certain amount of those proceeds go into a mitigation fund which in turn goes to the NWPCC, and they then designate those funds much the same way that the Columbia Basin Trust does in Canada (Shurts 2012). Additionally, the KTI has been very successful in procuring some of those funds. There is some Tribal money,

but by and large, the project is funded by ratepayer hydro funds. Therefore, ratepayer dollars ultimately pay for fish and wildlife mitigation, BW3 explains. He also adds that since the implementation of VARQ, levees in Bonners Ferry began to degrade whether they were repaired or not.

The KTI KRHRP revitalization projects have garnered much attention as the full-scale reconstruction of vital habitat rearing areas began in 2009. Through various enhanced aquatic, floodplain, and riparian habitat projects from 2009 – 2016, some farmers' levees along with meander sites and braided reaches have also been reconstructed to not only restore spawning habitat (Schreier et al. 2016) but to halt dike erosion along their farmland. BW3 says that the issue is a:

socio-politically and economic hotspot and a lot of people don't like to talk about it. The Tribe does not like to talk about it within the current constraints of the dam and dikes policy. So it is a sticky path to walk down.

BW3 explains that the levees were initially built-in for agriculture and that there is a much-storied history between settler farmers and the Tribes similar to the strife between farmers and First Nations in Creston. Within the floodplain revitalization projects though, the levees are being set back to allow for new sections to be inundated, in the same proposed manner as was explained by CK5 in Creston.

However, as BW3 explains, "it all depends on the landowner" in the Bonners Ferry area. Many levees do not need to be restored so the KTI has purchased critical pieces of land integral to fish spawning zones along with key riparian habitats so that they can ultimately restore functionality. In Bonners Ferry, located downstream of Shorty's Island is the Clockman Ranch which was purchased by the KTI because it is an area that flooded each year. The KTI then began restoration on those particular dikes and floodplain by reconnecting habitat to critical

sturgeon spawning areas. Two settler farmers have successfully collaborated with the KTI so far, and while at first uncertain about the projects, both are pleased with the positive outcomes of the project. Attesting to the success of this initiative in summer 2017, BW3 shares the successful spawning of sturgeon eggs caught downstream of the restored spawning channel and states:

The egg capture was indeed a really positive indication that our restoration efforts are trending in the right direction. It is a combination of habit improvement, water temperature management, and flow shaping – a very collaborative approach.

BW3 also shares that due to the successful and collaborative efforts of the KTI, the Idaho Fish and Game Commission, the University of Idaho, fisheries managers from British Columbia and Montana, and other various local communities, restoration plans have successfully revitalized the Kootenai River burbot.

At the expense of dike repair, money from the NWPCC goes strictly to fish revitalization - a conundrum because farmers' dikes are inherently degrading much quicker since the implementation of VARQ at Libby for fish revitalization. Seemingly then, funding can be given to the KTI for fish restoration, and if that falls on farmers dikes then, those dikes can get repaired. If the dike is not within the mandated areas of key spawning channels, then money would not go to restore those particular dikes. The only recourse to diking repair BW4 says is through litigation by the Kootenai Valley Reclamation Association which he says is not happening. In separate interviews, both BW4 and BW3 agree that flooding can occur, and no one knows what is in store with climate change.

BW4 does not believe that there will be a breach of the dikes any time soon. BW3, however, takes a much more cautious approach. Asked about coordination between the Canadian

and American areas for floodplain management should climate change induced flooding occur,

BW3 answers:

I am the flood engineer for the floodplain here in Bonners Ferry, and I do not know of anyone on the B.C. side of the floodplain that is in charge of floodplain management should a flood occur.

Flooding would have adverse effects on the industrial farms on both Canada and the U.S. side of the floodplain, imperilling the food security of all farmers. BW3 goes on to explain that the USACE aids diking systems in flood events, but they do not provide monetary support to repair the dikes. In other words, they are not proactive in preventing floods - only in assisting those who suffer from flooding. He wonders if the revitalization of the dikes would also prevent against agricultural loss should a high water event occur.

According to BW4, food supplies were left to rot in fields during highwater years such as in 2015. He shared that farm insurance companies do not cover floods. BW4 explained that initially, the Army Corps would build the levees and then turn them over to the local districts. The districts would then have to apply for joint maintenance and cost of running them. Currently, of the 16 diking districts in Bonners Ferry, only two qualify for repair funding. All the rest of the dikes are eroding.

I asked BW3 whether he could organize a collaboration between B.C. and Bonners Ferry floodplain managers, and he agreed that he would like to see a joint initiative to revitalize the entire Creston Valley/Kootenai River Valley Floodplain between Canada and the U.S.A. He also agrees that the set-back levee revitalization project that the KTI has implanted and that CK5 of the yaqan nu?kiy wants to put in place is the only way to go other than the scientifically engineered riprap system which is simply a band-aid to flood prevention. It begins to get tricky

because, as BW3 states, the U.S. federal government is buying up all the land and taking it out of the tax base, leaving most local organizations helpless to repair lands. However, he says that first and foremost, it is only necessary to repair those critical areas that are crucial to fish spawning, which in turn helps farmers against erosion, and ultimately would prevent flooding of farmland should flooding occur.

The Libby Dam has enabled an entire industrial food system on its floodplain to grow and prosper but at the expense of the region's Indigenous Ktunaxa and Kutenai Tribe's sustainable food supply and non-Indigenous farmers who have had to learn to adapt to changing technologies, unnatural ecosystems, neoliberal economics, and governmental policies of the region (Bennett 1969; Harris 2001; Murton 2007). Farming, as many farmers admitted, is an inherently tenuous business and is entirely at the mercy of moisture (Bennett 1969). Climate change brings with it unpredictable futures for food production in the Creston and Bonners Ferry areas.

Kootenai Tribe of Idaho Burbot Fishery Revitalization Initiative

The construction of dams and dikes along the Kootenai River contributed to the decline of burbot stocks which plummeted to about 50 fish in 2004 (Idaho Department of Fish and Game 2019). In 2009 burbot were considered functionally extinct (KRHRPMP 2009). The Kootenai Tribe of Idaho envisaged the reintroduction of its resident burbot to the lower reaches of the Kootenai River (KRHRPMP 2009). In personal conversation with BW3 in 2019, he explained that there is “good news on the Burbot front as well”. The Kootenai River Revitalization Project has helped to significantly recover decimated stocks of burbot since the 1992 burbot fishing ban. Much of the funding for revitalization initiatives have come from the Bonneville Power Administration (Idaho Department of Fish and Game 2019). BW3 explained that in 2005 the Burbot

Conservation Strategy directed by the Kootenai Valley Resource Initiative, a community-driven natural resource collaborative, created a spawning site at the confluence of the Moyie and Kootenai Rivers in Idaho.

Through the building of a burbot hatchery at the site, the KTI hoped to provide the reproduction capacity for sturgeon, burbot, as well as kokanee salmon to “restore a fishery that people can use, appreciate, and utilize” as food sustenance for their community. He explains that through the “Native Burbot Conservation Aquaculture Program,” he is hopeful of revitalizing this vital food source. In fact, starting January 1st of 2019, a new Kootenai River burbot fishing season opened for fishermen (and fisherwomen). This indicates the success of collaborative efforts to revitalize burbot by the Kootenai Tribe of Idaho, Idaho Fish and Game, the University of Idaho, and fisheries management bodies in British Columbia and Montana including local communities in the Kootenai Valley (Idaho Department of Fish and Game 2019). Currently, approximately 40,000 to 50,000 burbot exist in the Kootenai River (Idaho Department of Fish and Game 2019). Revitalization efforts have proven to be successful elsewhere in Canada as the Sand Lake First Nation Community has successfully reintroduced burbot (Robidoux et al. 2009). Revitalization acts help to build cross-cultural relationships and social networks which offer opportunities to collaborate for research and policy as well as enacting systemic change – vital for Indigenous food security (Morrison 2011).

Effects on the Environment

The yaqan nuʔkiy strategically use their reserve land base to produce food in four main aspects:

1) leasing land to industrial farmers on the floodplain; 2) engaging in partnerships with local industrial farmers to grow industrial cherries and alfalfa, 3) in collaboration with global

initiatives to couple food producing land potential with distant restaurant food schemes; and 4) by growing a small amount of small market food for their community and for their two restaurants within the Kootenay Region. As discussed in Chapter 6, industrial farming contributes to global climate change in terms of greenhouse gas release from industrial wheat and alfalfa and industrial cherry production. The yaqan nu?kiy are also engaged in a partnership with a local beef producer and as discussed in Chapter 7, methane release from cattle production is concerning. Having said this, the yaqan nu?kiy also grow small-scale fruit and vegetables with much less petrochemical inputs for local and regional supply. This scale of food production is less harmful and contributes less to environmental pollution. The yaqun Nu?kiy also restore habitat and biodiversity in some situations. Perhaps the balance achieved by the yaqun nu?kiy among natural habitat and wild foods, market gardening, and industrial gardening is an ideal food producing scenario that all regions should strive towards.

However, global warming is adding to this disparity indicating that decreased snowpacks will make this region much more important in terms of water storage. Undoubtedly, lack of water resources will not only pose serious threats to Ktunaxa who are attempting to revitalize sustainable fish habitat, and to agriculturalists for irrigation but also to water security in general, a critical topic during bilateral Columbia River Treaty negotiations where Canada and the U.S. are vying for valuable hydro power water for generation and profits (Cosens 2012, Nolin 2012, Postel 2001, Shurts 2012).

Notwithstanding the degrading effects that regional dams have had on Indigenous salmon and sturgeon supply, drought is a concern in the Creston Valley as in other locations.

Lotze et al. (2019) explain in their recent study that increasing global temperatures are amplified at higher levels of marine food webs. Although these findings are a result of data

collected from ocean studies, the data also correlates to entire ecosystems where cumulative human effects also affect future species distribution and potential fisheries' vitality and supply (Deemer et al. 2016). These results affect inland fisheries and food supplies also. The effects of climate change induced drought on spawning fish is consequently worrisome for fish revitalization plans for the yaqan nu?kiy and their sister Tribe the Kootenai Tribe of Idaho.

Summary Assessment

The Ktunaxa People have experienced the traumatic impact and devastation of the residential schools and Sixties Scoop, and the cultural genocide, technological transformations, and non-Indigenous imposed institutions on food procurement and food security in their community and in Canada. Perhaps reclaiming food procurement and food security through restoration and collaboration for the next generation is a form of reconciliation, resilience, and adaptation. Indigenous food sovereignty efforts therefore are forms of anti-colonial resistance and are part of the continuing methods of resistance and legal and economic resurgence that the yaqan nu?kiy have engaged in to gain sovereignty over their economics, food and land supply in order to become food secure.

In some ways, Indigenous people who live on-reserve may be more food secure than those who live off-reserve because of the access they have to farmland. Indigenous food sovereignty offers a solutions-based strategy for improving food security for all Indigenous people, on and off reserve by addressing the industrial food system. This strategy is employed and modified by the yaqan nu?kiy as they partner with local industrial farmers and globalized trading houses to provide a mixed economy based on Indigenous values and principles. These initiatives add to the multiple small-scale and bioregional economic strategies which as a result

builds community and provides food security. On the Creston Valley Floodplain, the once vast traditional hunting, and fishing grounds were replaced with industrial food production systems. However, agroecological principles and market garden initiatives are possible ways for the yaqan nu?kiy community to become more food secure while restructuring the floodplain to a more natural flow which could return salmon runs to the once prolific numbers of fish that local Indigenous People depended on. Traditional farming practices are inherently more sustainable because they brings ecological balance, integration, harmony, and a holistic quality often neglected in intensive agro-capitalist systems. In light of the adverse effects of climate change, which are likely to disproportionately affect small farmers, traditional farming systems seem to offer a higher degree of resistance towards the devastating effects of climatic change and loss of biodiversity.

Efforts to revitalize fisheries on the Creston Valley floodplains have been tabled by the yaqan nu?kiy and by the Kootenai Tribe of Idaho as floodplain management plans and discussed with local and federal governments and local industrial farmers. However, a total return of a localized fish supply will be difficult given the large number of dams along the Columbia and Kootenay Rivers. Some key fish spawning areas have been revitalized though, on the U.S. side of the floodplain, offering some hope for a return of sturgeon and salmon.

The yaqan nu?kiy are engaged in industrial agriculture with local farmers who have voiced their concerns regarding the effects of climate change while the very neoliberal globalized food system they engage in contributes to climate change thus offering no real change to the existing social, political, and economic structures and policies that continue to cause destruction to the environment. Grappling with the competing demands of providing land for local agricultural production, the yaqan nu?kiy are diversifying the use of their lands by

engaging with globalized food production partnerships. Partnerships with distant countries may increase income from their lands but also expose themselves to the market failures that are inherent within industrialized food production.

The yaqan nu?kiy are transforming some of their lands to agroecological principles of food production for their community, ensuring a sufficient, healthy food supply while employing a core tenet of La Via Campesina philosophy, and thus ameliorating against food insecurity. Indigenous people who are actively engaged in their own struggles to regain traditional territories and the self-determination to control their own food systems, do not use the same narratives as food sovereigntists. Instead Indigenous people continue to decolonize political landscapes which include control of, autonomy, and independence for their own food-producing territories. The yaqan nu?kiy novel food production strategies offer an alternative approach in which Indigenous Peoples can speak to the trauma of colonialism and direct their food and land approaches in a way that promotes and protects land, culture, and their food systems will practicing Indigenous decolonization and Indigenous resurgence.

Chapter 9: Food Security in the Creston Valley

Food security is a global crisis that is likely to worsen significantly as a result of several socioeconomic and environmental problems. Urbanization, industrialization, and globalization have forced new challenges to lifestyles, consumptive patterns, and conditions of food production. Modern farming techniques compromise the quality of the food we eat and depend on synthetic inputs posing risks to the soil, water, and food supply. As a result of climate change, the intensity of floods and droughts affect the ability of industrial food commodity chains to produce sufficient food. New forms of inequity arise affecting access to food in critical ways. The number of chronically hungry people in the world is growing and the number of people living in absolute poverty without access to land on which to grow food or cash to buy farmland continues to increase. Lack of food security programs has resulted in higher rates of food insecurity, and along with the increasing integration into the global economy, these circumstances are disturbing. Food producers across B.C. are being negatively impacted by climate change and the mismanagement of resources requiring urgent attention to policies that will help create resilient, and food secure communities.

In order to answer this research study's questions, I organize this final Chapter around three main sections. In the first section I provide summary answers to each of my research questions based on my findings. Secondly, I provide policy recommendations for food security in the Creston Valley and Canada as a whole, and in the last section I suggest areas for further research based on gaps where data is missing or incomplete in food security research and literature.

Industrial Agriculture

What is the relationship of industrial agriculture in the Creston Valley to food security at local, regional, and national levels?

Agriculture in the Creston Valley is dependent upon and contributes to the economic viability of the community. Food security therefore is predicated upon secure livelihoods and sources of income that allow access to healthy, sufficient, and culturally appropriate food grown in a resilient and environmentally healthy community. In Canada for example, 45 percent of agricultural products were exported globally valued at \$42.8 billion (Qualman 2011:21). The dairy industry especially contributes to the local economy where one industrial dairy farmer shared that his annual gross income is in the \$5-6 million range and a mixed farm operation nets \$200,000 annually indicating the contribution to the local economy.

Although Creston Valley industrial farmers contribute to the local economy, economic security is compromised due to several anomalies which create a precarious situation for those who grow food products for international markets. The incessant push towards financialization, industrialization, and globalization and its emphasis on export crops bound for markets in Asia, Europe, and the US, along with the rapidly increasing demand for wine grapes and beef are reshaping Creston Valley's agriculture, environment, and food supply, placing undue pressures on land availability and the environment. Industrialized food is not produced for local consumption with the exception of some wineries selling at local farmers markets.

As elsewhere in British Columbia, Creston Valley industrial farmers currently depend on overseas food markets that are subject to unpredictable global trade agreements, skyrocketing petrochemical inputs, excessive transportation costs, and precarious environmental systems. Together with the demand for high value crops such as beef and wine grapes, and recently

legalized cannabis production, land use is continually changing to meet farmers' economic needs for financial security, thus affecting land availability, land system integrity, and ultimately negatively impacting the values of the community.

All but three of ten industrial farmers stated that they do not earn enough and require second family incomes. These precarious financial circumstances contribute to families not having the economic access they require to achieve a level of access to food security. Families are especially vulnerable to imported food price fluctuations and ultimately bear the consequences of international food production incongruities severely adding strain to economically burdened families. With the cost of agricultural chemical inputs and lack of local resource agents to advise on best prices for fertilizers, farmers' net income erodes. Citing the high cost of farm insurance, nine out of ten farmers cannot afford to have it in place to protect their crops in times of weather threats, resulting in a game of high risk stakes against impending climate change. Increasing land values, a decreasing land base within the ALR, and governmental threats to the dairy quota system also pose risks for industrial food growers, household income and the strength of the local economy.

Intensive industrialized food production is one of the leading causes of GHG emissions and is notable in the Creston Valley where heavy sprays, and transportation systems contribute to climate change. In fact, animal agriculture is one of the most damaging contributors to soil and water pollution globally. Industrial cherry production contributes to the unsustainable use of petrochemical inputs and global fossil fuel emissions through the use of helicopters. Due to monocropping within the Valley, intense petrochemical inputs in field crops such as wheat and alfalfa also contribute to high GHG emissions through the use of heavy machinery. Cutting across all agricultural sectors, fossil fuel emissions due to large transportation supply chains accounts

for a high degree of greenhouse gas emissions. The Creston Valleys' industrial farmers' over-reliance on fossil fuels, and the overuse of chemical inputs along with the mismanagement of water systems leaves a significant footprint on the ecosystem. The environment is left degraded, and sustainability is brought into question as systems and resources that should be used in a sympathetic way are continually overburdened, thus leaving industrial agricultural practices and its contributions to global climate change significant.

Industrial farmers form a food chain that does not contribute to community resiliency but rather reinforces inequities within the socio-economic and political valuations. Because of the industrial paradigm in which it operates industrial farmers do not produce food for local market sales, nor do they belong to local food hubs, or associations that are inclusive of other food production systems. These practices isolate them from recognizing and respecting inclusion and equality among farmers who contribute to community resiliency. This includes women farmers who are often ignored, and excluded from industrial food production systems, from industrial food producing organizations, and from decision making areas within the system. The neoliberal industrialized food system continues to undervalue women and their work contributing to a loss of community and cultural relationships which perpetuate gender inequality within its paternalistic system of industrial food production.

Local industrial practices work to reinforce the disjuncture between national agricultural and food security policy. Locally, it contributes in economic terms, but comes with high financial risk, environmental damage, and undermines community resilience. Regionally, industrial agriculture does not contribute significantly other than in terms of a small supply of asparagus to large super market chains with some residual sales at local venues. The wine industry neither contributes to food security at the local level or regional level because of its

classification as a non-food product. To the extent that the food goes overseas, it does not contribute to food security nationally and therefore has a net negative impact on food security at the national level.

Market Gardeners

What is the relationship of small market gardeners to food security at local, regional, and national levels?

Market gardeners form an alternative food production paradigm which shows more economic resiliency, allows growers to operate outside of global market systems, and provides food for local and regional markets which contribute to community networks and relationships, and shows consideration of the environment. However, market farmers experience the same economical burdens as industrial farmers and are therefore vulnerable to market realities. Market gardeners cannot operate without a second income, cost and availability of agricultural farmlands persist, and growing demand for non-food agriculture such as wine grapes continues to increase.

Decreasing these burdens though, and grounded in food sovereignty principles, Creston Valley small-scale farmers contribute to the local economy through various local, provincial, and federal partnerships that, in the absence of a comprehensive food security policy, address costs of farmland, financial returns for farmers, ALR policy, and contribute to strengthening local food production. Farmers markets, on-line farm programs, and farm advisories, are some of the civil society initiatives that contribute to creating a resilient food hub for the region.

Contributing to community resiliency, small-scale farming allows women farmers to take part in community agriculture where women decision makers are more involved than in industrial agriculture indicating a recognition of rights for minority food producers. Forming a

locus for women farmers, the Creston Valley Farmers Market includes several woman-run farmers where equality and community building can take place. Rejuvenating the local food economy, woman farmers are more likely to be involved as key decision makers. Local market farmers are also involved in seed saving initiatives which re-orient the local food economy and culture away from the industrial food chains prevalent in the Valley.

Market gardening also contributes to environmental degradation through dairy and meat production. Settler agriculture originally contributed to the destruction of eco-landscapes through deforestation in the Valley and eroded soils, fertility, and ultimately the reduction of carbon sequestration capacity. Greenhouse gasses from small-scale cattle and milk production emit toxic gasses and machinery contributes to burning fossil fuels. Nevertheless, because agroecological principles reduce the carbon footprint, small-market gardening is less damaging to the environment than industrial agriculture. Through agroecological practices such as no-tillage, certified organic methods of milk production, and no-chemical input farming, these methods reduce the environmental impacts of agricultural and food production.

Local small-scale farm practices work to reduce the disruption between national agricultural and food security policy. Locally, it contributes significantly in economic terms, but continues to experience the same economic risk that industrialized agriculturists experience. The risk, however, is reduced due to the localized nature of its economies where it stands outside of globalized trade policy and transportation networks. Although environmental damage persists, it does so at a less degree which contributes to community resiliency by protecting agricultural land rather than degrading it. Regionally, small-scale agriculture contributes significantly to regional food hubs such as within the Creston Valley, and strengthens the Central and East

Kootenays food webs²². Local market gardeners do not sell food outside of the region and therefore have no impact on food security at the national level aside from the fact that its sales network can stand as an example to other food producing areas in Canada.

In B.C. food security statistics are alarming. In the Creston Valley some of the most fertile land in Canada is capable of growing a diversity of foods. And yet, statistics indicate that food is exported out of the Valley necessitating imports of industrialized food. In spite of the import and export of food, food insecurity persists in the Creston Valley. In British Columbia the highest provincial record of poverty exists where one in five children grow up in economic deprivation (First Call 2015). In fact, 26.1 percent of children aged zero to 17 live in low income families in the Creston Valley creating a food insecure situation (First Call 2015). The contrast from a seemingly abundant food growing area and the incongruent statistics of poverty is conspicuously evident. While Canadian farms are growing in size and efficiency, intensity of inputs, and use of high technology to produce greater output per acre, its ability to provide food security is brought into question. Small-scale food production is central in providing answers to these questions.

Ktunaxa - yaqan nuʔkiy Nation

How has the sovereignty of the local yaqan nuʔkiy's traditional food pathways been affected by colonization; how food secure are they today; and what is the relationship of their food procurement strategies to food security in the Valley as a whole?

²² For a discussion on food webs see Qualman 2019.

Processes of colonization, environmental dispossession, economic transitions, and material poverty are just some of the factors that have resulted in the loss of local Indigenous food systems. Traditional hunting of elk, deer, moose, and fowl has been reduced along with the harvesting of wild plants such as root vegetables, potatoes, mushrooms, berries and nuts and other wild food plant foods. Due to settler encroachment, deforestation, reserve assignment, overfishing and the construction of dams on the Columbia and Kootenay rivers, key fisheries such as spring and sockeye salmon and white sturgeon have been lost entirely.

First Nations seek a return of salmon to the Canadian portion of the Columbia, but salmon have not migrated across the border since the U.S. commissioned the Grand Coulee dam on the Columbia main stem in Washington State in 1944. The Columbia Treaty negotiations now offer an opportunity to create a lasting legacy that would be able to stand as a model for further international water treaties as global warming affects this era. However, if the exclusion of the U.S. Basin Tribes from Columbia River Treaty talks is not acknowledged, then the status quo has likely prevailed and neither governments will truly seek change for the betterment of food security in the Columbia River Basin for the Ktunaxa.

The decimation of ecosystem and fisheries, and Indigenous cultures on both sides of the border has occurred where the Columbia River Treaty has ignored the rights and interests of the Ktunaxa in restoring their once thriving fish populations and aquatic habitats. Colonial practices and patterns of colonization and environmental dispossession through treaty making continue to marginalize and subordinate food systems for other Indigenous people and communities across Canada.

While industrial agriculture does provide some food security and economic benefit to the yaqan nu?kiy community through various food production initiatives, its environmental integrity

and community resiliency is compromised due to the same socio-environmental characteristics that agricultural farming embodies. Nonetheless, the yaqan nuʔkiy are engaged in several food production initiatives. The yaqan nuʔkiy have grown their 20 acres of community gardens which contribute to filling community freezers for use by members in times of food deprivation.

While the yaqan nuʔkiy lease their reserve lands to industrial agriculturalists, they have also engaged in a high risk partnership with a local cherry farmer to grow 400 acres of industrial cherries for export. A partnership with a local beef producer who uses agroecological principles to supply food for the community and two other Ktunaxa restaurants is an example of local collaborations with other non-Indigenous food producers. The newly acquired greenhouse acts as a resource to sell their produce while growing Indigenous species of local herbs and plants. The yaqan nuʔkiy have also begun to sell their excess product at a local independent grocer. These local partnerships contribute to the economy of the Valley and thus strengthen the yaqan nuʔkiy community while gaining some economic resources. Outside of the region though, the yaqan nuʔkiy are entertaining the possibility of partnering with two global food production schemes exemplifying new and innovative ways to obtain food security for their community.

While not completely contributing to community resiliency, the community gardens and freezers contribute to its community members being able to access food in times of food deprivation. However, unless more community members can become involved in local food production, including a return to traditional fishing and hunting practices, the yaqan nuʔkiy community is vulnerable to various levels of food insecurity. Land rights and treaty issues must be addressed and resolved in order for a full return of salmon and food resources where cultural activities contribute to resilient community's and economic strength.

The yaqan nu?kiy are in the process of exploring ways in which a return to traditional ecological methods re-localizes Indigenous knowledge - the foundation to feeding the world in the future. Combining local knowledge systems of food production with local agricultural producers is not only feasible, possible, valid, and essential, these new relationships constitute an innovative and alternative way of food production that is essential in a globalized, modern world. Land and water treaties could provide the space for the building of strong economies, resilient communities, environmental integrity, and food security policy, during socio-economic and environmental threats to food security for all groups of food producers and consumers.

Columbia River Treaty and Libby Dam

How does the management of Libby Dam affect food security for farmers and local communities, both Indigenous and non-Indigenous on the Creston Valley floodplain?

The Libby Dam controls the flow of water on the Kootenay River floodplain and is currently a key point in the renegotiation of the Columbia River Treaty. Although several industrial farmers stated that they were able to increase the size of their farms and productivity because the risk of flooding has been reduced since the implementation of Libby dam, they voiced their concerns about the erosion of dikes on their farmlands. The current treaty negotiations do not include discussions that would repair the diking infrastructure and without a comprehensive floodplain management plan in place to protect the dikes, climate change induced flooding is a concern for Creston Valley farmers as in several places in Canada. With recent high water mark years, farmers also stated their concerns about potential flooding that could destroy crops bound for global markets. Without farm insurance in place, many farmers would suffer economic hardship. Weather, as many farmers stated, is not within their control. Without the conversion to

sustainable farm practices potential climate change induced flooding will continue to impede food production along the Kootenay River floodplain. With the persistent threat of climate change, farmers cannot safely plan for financial security and thus the current management regime of the Libby dam hinders the viability of food producers on the Valley floor. Should catastrophic flooding occur, food resources would contribute to economic hardship for the community of Creston Valley farmers and consumers.

The construction of Libby Dam has contributed to the decimation of salmon, sturgeon, burbot and riparian floodplain habitat. Other land and migratory routes along the river system have also been destroyed leaving the Ktunaxa on both sides of the border to engage in fisheries and floodplain management plans that would see a restoration of traditional fisheries and environmental sustainability. These initiatives have been proposed by the yaqan nu?kiy to local floodplain farmers while the Kootenai Tribe of Idaho have successfully collaborated with local farmers to revitalize key areas of salmon and burbot habitat that offers some hope for future floodplain restoration for fisheries and wildlife habitat while strengthening farmers diking systems.

Policy Recommendations

In Chapter 5, I described the food security matrix I used for assessing food security in the Creston Valley as indicated in Figure 5.1. Figure 9.1 is a modified version of that figure which includes government policy and thus provides a better framework for the discussion that follows.

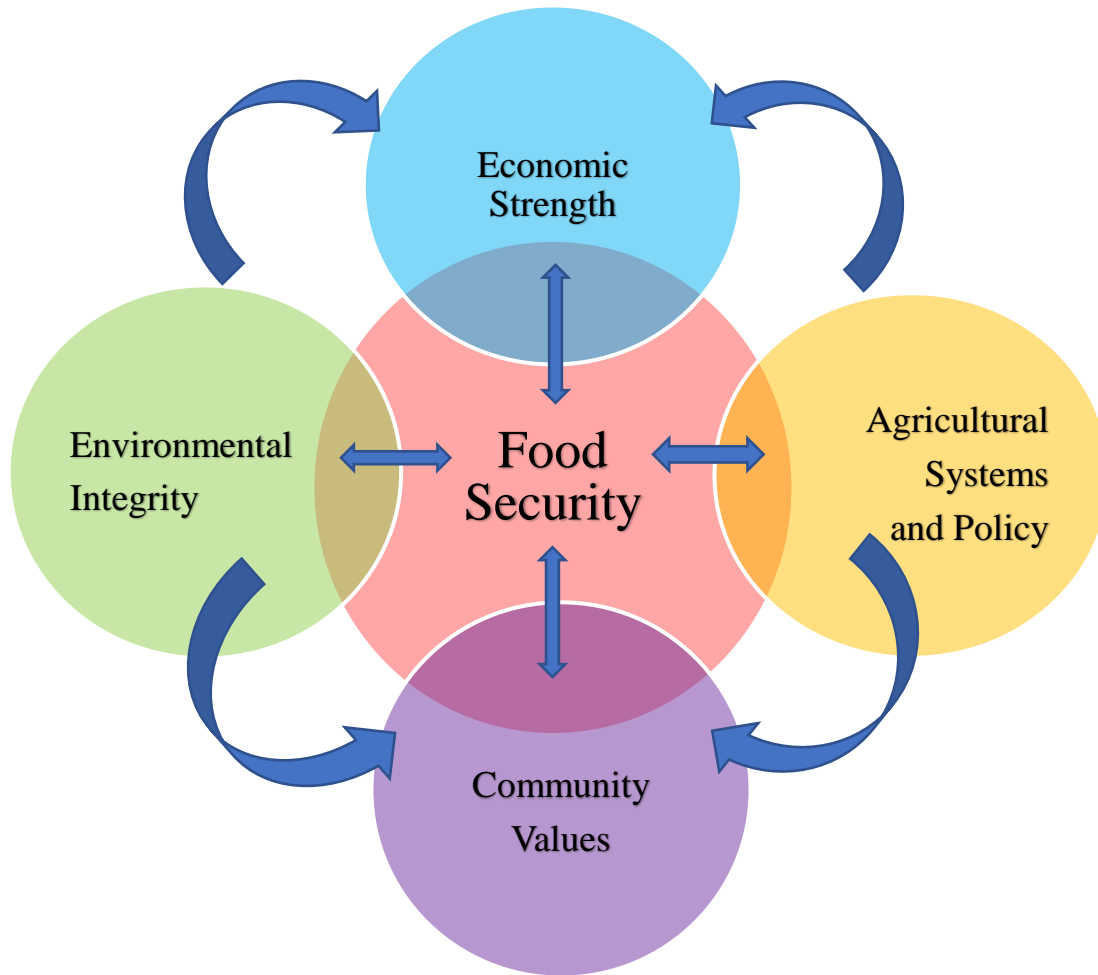


Figure 9.1 - Inter-reliant connection between all contributing factors to food security.

The economic viability and land availability categories in figure 5.1 are now combined under the heading of economic strength - an essential pillar of food security. Agricultural systems, taken in their totality, and the policy that supports or constrains those systems, have been added as a distinct category. Community values and environmental integrity remain as separate categories as they do in Figure 5.1. Building upon these four pillars, I outline policy recommendations for developing an inclusive Canadian Food Security Policy.

Supports for Enhancing Small-scale Methods of Food Production

As a first recommendation, I suggest that stronger local and provincial initiatives should be developed in support of small-scale approaches to agriculture. Built upon principles of the sustainable food movement and the growing awareness of the linkages of food systems to a healthy environment and community resilience, my findings confirm that small-scale farming, as practiced by Creston Valley market gardeners, is inherently more sustainable because it brings ecological balance, community integration, stable local markets, and a holistic quality of production often negated in intensive agro-capitalist systems. In light of the adverse effects of climate change, sustainable, agroecological farming systems offer a high degree of resilience towards the devastating effects of climatic change and loss of biodiversity.

Regional organizations such as Farm Folk City Folk (2018) have already developed recommendations for growing the local food economy that could be implanted at the Kootenay Regional level. Recommendations include supporting agroecological principles that outline environmental stewardship such as regenerative farming, permaculture, seed saving, and organic certification. Provincial government support for regional initiatives, including the development of a more robust Food Hub is essential. More provincial financial support for local farmers associations is also urgently required, support that goes beyond the budget and scope of the CBT.

The protection of farmland within the ALR is vitally important for agricultural production. However, this research has indicated the ongoing challenges for farmers to be able to access viable farmland. Improved protection for diminishing ALR lands is imperative and improved access to land leases for those who can't afford to purchase farmland could be included in changes to the existing ALR. Rezoning a portion of ALR lands to include small-scale

farming only could help market farmers access productive lands for younger farmers wanting to enter small-scale food production.

A Renegotiated Columbia River Treaty

The terms of the Columbia River Treaty need to be renegotiated so as to allow for the inclusion and engagement of Indigenous communities on both sides of the border. Their inclusion in the CRT negotiations themselves would help reverse ongoing processes of colonialism, and the continued oppression and discrimination against Indigenous People in Canada that contribute to poverty and food insecurity.

The new treaty should include a comprehensive plan for floodplain restoration that builds upon the successful work of the KTI and includes provisions for both dike revitalization and fisheries restoration on both sides of the border. This would facilitate the restoration of yaqan nuʔkiy dikes and not only benefit the various fish and wildlife ecosystems but also strengthen and protect the integrity of the diking system and floodplain agriculture. The current treaty is strangely silent on the issue of agriculture, but a renewed treaty could include provisions for enhancing the agricultural value of the floodplain, transforming it into a model for food security.

As Paisley et al. (2015) have suggested, provisions could be embedded within a newly revised Columbia River Treaty that would not simply recognize Indigenous rights but provide a leadership role for Tribes and First Nations. But this governance model would be inclusive of all sectors in the ongoing conservation, management, and distribution of economic benefits including hydropower profits. Wagner and Taylor (2019) have similarly emphasized the transformative potential of a governance structure based on alliances of Indigenous and non-Indigenous actors. This approach would be consistent with the goals of supporting resilient

communities, strong economies, environmental integrity, and sustainable food production systems – the pillars on which food security rest.

Canadian Food Security Policy

In order to achieve food security on the national scale, Canada needs to integrate its agriculture and food security policies. Kneen (2011) provides a socio-historical context for the failed attempts by civil food action groups to implement a Canadian food policy at the federal level to replace policies which have essentially remained unchanged since 1969. Food Secure Canada is one of the most influential organizations in Canada addressing food policy during a time when the federal government of Canada deliberately supports a technocratic and neoliberal food production system dependent upon global export markets (Kneen 1997; Kneen 2011). But because food security and food sovereignty principles do not mesh with the federal government's initiatives to support the current industrial economic food production system, it urgently requires a transition away from the global free-trade agenda if Canada is to address climate change and economic disparities. A new agricultural policy based on a coherent, vigorous, and adequately funded food *security* policy rather than a food-policy-only framework and one that is aligned with the four pillars of this research paper – economic strength, environmental integrity, agricultural systems and policy approach, and community values - is fundamental to a national food security policy which is urgently needed to eliminating growing poverty and hunger in Canada and globally.

Gaps in the Literature and Future Research Priorities

Despite the array of growing research and literature on alternative food networks in North America and Europe (Tarasuk et al. 2014) formal food security policy at the state level has not

been developed. The effectiveness of neoliberal industrial food regimes in the Creston Valley have been questioned, and many challenges have been identified including broad gaps in food security policy, notably related to local agricultural food producing areas. A growing body of information addressing small-scale food production and community based food production systems such as Farm Folk/City Folk exists. But often recommendations from the Ministry of Agriculture at the provincial and federal level agencies responsible for food security, create food security task forces intended to develop strategies for strengthening agriculture that only continue to support export intensive approaches. These approaches fall short in creating food security policy where local Indigenous and small-scale food production could instead be recognized and supported.

Research focused on local, community-based food production systems requires further support and development. Support for policies and programs which address economic, Indigenous food security, and environmental challenges and relationships to local food production systems must be created and can be developed through case studies which account for all types and levels of food production systems within a region. These studies are imperative in addressing food security policy at the national and provincial levels.

This dissertation investigates food security and food sovereignty in the Creston Valley of B.C. and discusses the impact that industrial agriculture has upon achieving food security for consumers and food producers using an assessment framework designed specific to this research study. This information highlights the important role that food sovereignty regimes can help in achieving food security during a time of unprecedented environmental and social-economic change. Food sovereignty as a process and tool, is in a key position to assess and mitigate

potential impacts of resource development and other activities, and aid planning in a rapidly changing environment.

Improved contributions to existing bodies of First Nation traditional food production knowledge in their aims to revitalize Indigenous fisheries and land based ancestral food systems is imperative if social inequalities in food production is to be addressed. Documents such as “Northern Food Systems” has been created to address food insecurity in the north through an Indigenous food sovereignty lens and outlines how a community-based approach for food security can be achieved through collaboration with academic researchers, Indigenous communities, farming instates, and other non-governmental groups (Wilson et al. 2019). In order to voice and showcase ecological and social findings through the academic literature and through practical applied anthropology leading up to outcomes of the Columbia River Treaty negotiations it is critical to disseminate the findings of this research study in hopes that it will influence policy makers both locally and internationally.

As mentioned previously I was not able, within the scope of a single doctoral study, to gather all the primary data relevant to an analysis of food security in the Creston Valley. I was not able to gather information about nutrition, for instance, even though I included it in my food security definition. The time required to conduct an analysis on the nutritional component at the household level was simply not feasible within the timeline of this dissertation. The limitations of this study thus also point to a need for collaborative case studies in which several researchers, through their combined efforts, can gather all the information required for a fully comprehensive analysis of the food security status of a given region or community.

The Canadian government’s continued support of its export based industrial food economy has resulted in Canada’s current agricultural food crisis and only contributes to further

impoverishment and malnutrition, and ultimately to a major international food catastrophe. This critical global trend presents a clear danger facing our world during calamitous climate change, and neo-liberal policies that continue to gut our world food supply for the wealthy elite at the expense of those who suffer the most – Indigenous people and small-scale farmers.

Indigenous food sovereignty is also not fully addressed in this dissertation due to the limited number of interviews conducted with the yaqan nu?kiy Nation. For a more robust study addressing Indigenous food insecurity and food sovereignty, a larger number of participants that would equally represent food producers in the Valley would need to be interviewed. Because of the gap in interview numbers, Indigenous food sovereignty is not fully represented and would benefit by a study that focusses specifically on the Ktunaxa Nation which would contribute to understanding Indigenous food sovereignty locally and globally as a viable alternative to the industrial food production paradigm.

Additionally, due to the geographical limitations of this research study, a thorough analysis of food systems in Idaho, U.S.A. where I conducted some interviews and observational studies was not included in this dissertation. An understanding of the federal agricultural policies, international trade agreements specific to the region, and a historical analysis describing the precedents to agricultural production in the area would need to be included. However, due to the time limitation, it was not included within the scope of this dissertation. This study would therefore benefit by having a comparative analysis between the socio-political and economic food production regimes which would contribute a general understanding of the mechanisms that contribute to food security internationally.

We urgently need a radical re-envisioning of the present food system that recognizes and addresses poverty, hunger, climate change, capitalism, and existing frameworks of colonialism

designed to disappear Indigenous People' and farmers' food systems. We need to be courageous in our efforts to unsettle all systemic aspects of our current land and food system and only then can food security be attained.

Together with Creston Valley food producers in all levels of production, I seek to contribute to recommendations for food security policies. I am equally conscious of the need to advocate for food security and food sovereignty through the application of sustainable agroecological practices as alternatives to the industrial agriculture predominantly being practiced in the Creston Valley as in most of the global north.

As Figure 9.2 shows, Creston Valley's diverse farming practices are the vital building blocks of Canadian food supply. They vary in size and form, and include multi-generational families, a high proportion of individual farmers, industrial farmers, market farmers, and Indigenous food producers. To the consumer, Indigenous People, market gardeners, industrial farmers, and single women farmers who invest time, care, and love into food procurement, your labour of love is not in vain.



Figure 9.2 – Creston Valley Benchlands looking North. Photo by author 2016.

List of References

- Abbassi, Abdessalem and Bruno Larue. 2012. Multiple marginalization and trade liberalization: The case of the Canadian Dairy industry. SPAA Working Paper No. 1393-2016-117146.
- ACT Adaptation to Climate Change Team. 2019. Columbia River Treaty Re-negotiations: Opportunity for a new age of water governance? URL: <http://act-adapt.org/columbia-river-treaty-re-negotiations-opportunity-for-a-new-age-of-water-governance/>. Accessed May 2019.
- Acquavella, John, Bruce Alexander, Jack Mendel and Christophe Gustin. 2006. The farm family exposure study: Acquavella et al. respond. *Environmental Health Perspectives* 114 (11): A633-4.
- Adams, Jane. 2003. *Fighting for the farm: Rural America transformed*. Philadelphia: University of Pennsylvania Press.
- Aerni, Philipp. 2011. Food sovereignty and its discontents. *ATDF Journal* 8 (1-2): 23-40.
- Agar, Michael. 1986. "Introduction." In *Speaking of Ethnography*. Newbury Park, CA: Sage Publications.
- Agar, Michael. 2006. Culture: Can you take it anywhere? *International Journal of Qualitative Methods* 52 (2).
- Agarwal, Bina. 2014. Food sovereignty, food security and democratic choice: Critical contradictions, difficult conciliations. *Journal of Peasant Studies* 41 (6): 1247-68.
- Agriculture and Agri-Food Canada (AAFC). 2010. Canada brand international, market research in key export markets. URL: <https://web.archive.org/web/20120119190829/http://www.marquecanadabrand.agr.gc.ca/research-etudes/research-etudes-eng.htm>. Accessed October 31, 2018.
- Agriculture and Agri-Food Canada (AAFC). 2012. Canada's farm income forecast for 2011 and 2012. URL: http://www5.agr.gc.ca/resources/prod/doc/pol/pub/pdf12/fif_11-12_hl_eng.pdf. Accessed on November 14, 2018.
- Agripocity. 2019. Agripocity. URL: http://agripocity.com/?fbclid=IwAR3VuFpcIK_kFLskWI2yueYmJsMKWMgl_a_NRIXZoO3-haoutovma3CVMcg#home. Accessed April 2, 2019.
- Akinabode, Isaac Adefolu. 1996. The relationship between the socio-economic characteristics of farmers in British Columbia and their contacts with district agriculturalists. *Master thesis*. The University of Ife, Nigeria.

- Alemu, A.W., H. Janzen, S. Little, X. Hao, D. J. Thompson, V. Baron, A. Iwaasa, K. A. Beauchemin, R. Kröbel. 2017. Assessment of grazing management on farm greenhouse gas intensity of beef production systems in the Canadian Prairies using life cycle assessment. *Agricultural Systems* 158: 1-13.
- Alfred, Taiaiake G. 2009. Colonialism and state dependency. *Journal of Aboriginal Health* 5 (2): 42-60.
- Alkon, Alison Hope and Kari Marie Norgaard. 2009. Breaking the food chains: An investigation of food justice activism. *Sociological Inquiry* 79 (3):289-305.
- Allen, Patricia. 2010. Realizing justice in local food systems. *Cambridge Journal of Regions, Economy and Society* 3 (2):295-308.
- Alston, Margaret. 1998. Farm women and their work: Why is it not recognised?" *Journal of Sociology* 34 (1): 23-34.
- Altieri, Miguel A. 1995. *Agroecology: The science of sustainable agriculture*. Boulder: Westview Press.
- Altieri, Miguel A., and Fernando Funes-Monzote. 2012. The paradox of Cuban agriculture. *Monthly Review* 63 (8): 23-33.
- Altieri, Miguel A. and Clara I. Nicholls. 2008. Scaling up agroecological approaches for food sovereignty in Latin America. *Development* 51: 472-80.
- Andrews, Richard N. L. 2006. *Managing the environment, managing ourselves: A history of American environmental policy*. New Haven, CT: Yale University Press.
- Angeles, L. 2017. "Transporting difference at work: taking intersectionality seriously in climate change agendas." In *Climate Change and Gender in Rich Countries: Work, Public Policy and Action*, edited by M. Griffin-Cohen, 103-118. London: Routledge.
- Ansell, Aaron. 2014. *Zero hunger: political culture and antipoverty policy in Northeast Brazil*. Chapel Hill: The University of North Carolina Press.
- Archibald, Jo-ann. 2008. *Indigenous storywork: Educating the heart, mind, body and spirit*. Vancouver: University of British Columbia.
- Armstrong, Jeanette. 2005. "I Stand With You Against the Disorder." In *Paradigm Wars: Indigenous People' Resistance to Economic Globalization*, edited by Jerry Mander and Victoria Tauli-Corpuz. International Forum on Globalization. Accessed October 28, 2012. URL: <http://www.yesmagazine.org/issues/spiritual-uprising/i-stand-with-you-against-the-disorder>.

Atkinson, Paul, Amanda Coffey, and Sara Delamont. 2003. *Key Themes in Qualitative Research: Continuities and Changes*. Walnut Creek, CA: AltaMira.

Atkinson, Paul, Amanda Coffey, Sara Delamont, John Lofland, Lyn Lofland. 2007. *Handbook of Ethnographies*. London: Sage Publications.

BC. 2019. Water Use During Scarcity. URL: <https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/water-licences-approvals/water-use-during-scarcity>. Accessed March 31, 2019.

BC Ministry of Agriculture. 2016. Agricultural Land Use Inventory: Regional District of Central Kootenay. URL: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&cad=rja&uact=8&ved=2ahUKEwjouq-ru_HhAhWKHTQIHYeRAIkQFjABegQIBBAC&url=https%3A%2F%2Fwww2.gov.bc.ca%2Fassets%2Fgov%2Ffarming-natural-resources-and-industry%2Fagriculture-and-seafood%2Fagricultural-land-and-environment%2Fstrengthening-farming%2Fland-use-inventories%2Frdck_aluireport_may11_2017.pdf&usg=AOvVaw1e3PA5FqwaUraV2CDmy1None. Accessed April 26, 2019.

BC Association of Farmers' Markets. 2010. The Farmers' Market Nutrition and Coupon Project. URL: <http://www.bcfarmersmarket.org/nutrition-coupon-program>. Accessed September 5, 2018.

BC Farm Industry Review Board (FIRB). 2019. URL: <https://www2.gov.bc.ca/gov/content/governments/organizational-structure/ministries-organizations/boards-commissions-tribunals/bc-farm-industry-review-board>. Accessed March 17, 2019.

BC Food Security Gateway. 2019. Food Security Networks, Policy Councils, and Agencies. URL: <https://bcfoodsecuritygateway.ca/about-bc-food-security-gateway/key-food-security-agencies/>. Accessed March 17th, 2019.

BC Hydro. 2018. Columbia Region. URL: <https://www.bchydro.com/energy-in-bc/operations/our-facilities/columbia.html>. Accessed March 2018

BC Milk Marketing Board. 2018. Quota. Accessed April 30, 2018. URL: <http://www.bcmilk.com/resources/calculators/index>.

BC Ministry of Agriculture, Fisheries and Food. 1995. Securing our food future, an agri-food policy for British Columbia: Draft discussion document. Victoria: Ministry of Agriculture, Fisheries and Food.

BC Ministry of Agriculture and Lands (BCMAL). 2006. BC's Food Self-Reliance. URL: http://www.agf.gov.bc.ca/resmgmt/Food_Self_Reliance/BCFoodSelfReliance_Report.pdf. Accessed November 15, 2018.

- BC Ministry of Agriculture, Fisheries and Food. 2018. Strengthening Farming. URL: <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/strengthening-farming>. Accessed November 18, 2018.
- BC Provincial Health Services, Act Now BC. 2006. Perspectives on community based food security projects: A discussion paper. Provincial Health Services Authority. URL: https://www.google.com/search?client=firefox-b-d&ei=C_HEXIrgF-uU0gLgvpOYCQ&q=British+Columbia+Provincial+Health+Services%2C+Act+Now+BC.+2006.++Perspectives+on+community+based+food+security+projects%3A+A+discussion+paper.++Provincial+Health+Services+Authority.&oq=British+Columbia+Provincial+Health+Services%2C+Act+Now+BC.+2006.++Perspectives+on+community+based+food+security+projects%3A+A+discussion+paper.++Provincial+Health+Services+Authority.&gs_l=psy-ab.3...402075.402075..403237...0.0..0.0.0.....1....2j1..gws-wiz.B5u5emwSuDw. Accessed April 27, 2019.
- BC Stats. 2010. British Columbia Population Projections 2010 to 2036. British Columbia, Canada: BC Stats. URL: [file:///C:/Users/joann/Downloads/British%20Columbia%20Population%20Projections%202016-2041%20\(1\).pdf](file:///C:/Users/joann/Downloads/British%20Columbia%20Population%20Projections%202016-2041%20(1).pdf). Accessed October 15, 2018.
- Baillie-Grohman, William Adolph, 1851-1921. 1900. *Fifteen years' sport and life in the hunting grounds of western America and British Columbia*. Vancouver: University of British Columbia Library.
- Baillie-Grohman, William Adolph. 1918. A paradise for Canadian and American soldiers. *Nineteenth Century, LXXXIII*: 770-771.
- Baker, Beth, A., Bruce H. Alexander, Jack S. Mandel, John F. Acquavella, Richard Honeycutt, Pamela Chapman. 2005. Farm family exposure study: Methods and recruitment practices for a biomonitoring study of pesticide exposure. *Journal of Exposure Analysis and Environmental Epidemiology* 15 (6): 491-9.
- Baker, Paul. 1955. *The forgotten Kutenai: A study of the Kutenai Indians, Bonners Ferry, Idaho, Creston, BC, Canada, and other areas in British Columbia where the Kutenai are located*. Boise, Idaho: Mountain States Press, Inc.
- Bankes, Nigel. 1996. *The Columbia Basin and the Columbia River Treaty: Canadian Perspectives in the 1990s*. Portland, OR: Northwest Water Law & Policy Project.
- Bankes, Nigel. 2017. "The Columbia River Treaty between Canada and the United States of America – time for change?" In *Water Resource Management and the Law*, 262-278. Cheltham, UK: Edward Elgar Publishing.
- Barker, Brittany, and Thomas Kerr, Gerald Taiaiake Alfred, Michelle Fortin, Paul Nguyen, Evan Wood, and Kora DeBeck. 2015. High prevalence of exposure to the child welfare system

- among street-involved youth in a Canadian setting: implications for policy and practice. *BMC Public Health* 14:197.
- Barnett, T. P., J. C. Adam and D. P. Lettenmaier. 2005. Potential impacts of a warming climate on water availability in snow-dominated regions. *Nature* 438 (7066): 303-9.
- Barton, James D. and Kelvin Ketchum. 2012. "The Columbia River Treaty: Managing for uncertainty." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Battaglin, W.A. 2014. Glyphosate and Its Degradation Product AMPA Occur frequently and widely in U.S. soils, surface water, groundwater, and precipitation. *Journal of the American Water Resources Association* 50(2):275-290.
- Battiste, Marie Ann, and Xwi7xwa Collection. 2016. *Visioning a mi'kmaw humanities: Indigenizing the academy*. Sydney, Nova Scotia: Cape Breton University Press.
- Bealby, John Thomas. 1911. Fruit Ranching in British Columbia. URL: <http://ezproxy.library.ubc.ca/login?url=http://c19index.chadwyck.com/>. Accessed September 2016.
- Beischer, Ailsa and Jon Corbett. 2016. Food justice as a response to hunger on our Canadian foodscapes: How a community-gleaning project is addressing depoliticized food insecurity through a food justice praxis. *Justice Spatiale Spatial Justice*. URL: <https://halshs.archives-ouvertes.fr/halshs-01507266>. Accessed August 17, 2017.
- Bello, Walden and Mara Baviera. 2010. "Capitalist agriculture, the food price crisis and peasant resistance." In *Food sovereignty: Reconnecting food, nature and community*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe. Halifax: Fernwood Publishing.
- Bennett, John. 1969. *Northern Plainsmen: Adaptive Strategy and Agrarian Life*. London: Aldine Transaction.
- Bernard, Russell. 2011. *Research methods in anthropology: Qualitative and quantitative approaches*. Maryland: AltaMira Press.
- Beuchelt, Tina and Detlef Virchow. 2012. Food Sovereignty or the Human Right to Adequate Food: Which Concept Serves Better as International Development Policy for Global Hunger and Poverty Reduction? *Agricultural Human Values* 29 (2): 259-73.
- Biehl, Joao, J. Good and Arthur Kleinman. 2007. *Subjectivity: Ethnographic Investigations*. Berkeley: University of California Press.
- Blackwell, Tom. 2018. U.S. Dairy Farmers Wary of New Deal; Market Access 'Tiny' might Not be the 'Victory' Trump Predicted. *Montreal Gazette*, Oct 03, 2018.

URL: .ubc.ca/login?url=https://search.proquest.com/docview/2115975870?accountid=14656.
Accessed February 27, 2019.

Blaikie, P. and H.C. Brookfield. 1987. *Land degradation and society*. London: Methuen.

Blaikie, P. 1996a. Post-modernism and global environmental change. *Global Environmental Change* 6 (2): 81-5.

Blaikie, P. 1999b. A review of political ecology: issues, epistemology and analytical narratives. *Zeitschrift für Wirtschaftsgeographie* 43 (3-4): 131-47.

Blaikie, P. 2012. Should some political ecology be useful? The inaugural lecture for the cultural and political ecology specialty group, annual meeting of the association of American geographers, April 2010. *Geoforum* 43 (2): 231-39.

Blair, R. C. 1949. Farm management and land use in the Creston area of British Columbia 1946-47. *The Economic Annalist* 19: 78-82.

Bomford, David. (2000). Introduction. *Studies in Conservation* 45: 1. URL: <https://doi.org/10.1179/SIC.2000.45.S4.001>. Accessed April 28, 2019.

Boas, Franz. 1918. *Kutenai tales together with texts collected by alexander Francis Chamberlain*. Nineteenth Century Index.

Boas, Franz. 1922. *Mind of primitive man*. New York: The Macmillan Company.

Boehm, Terry, Hilary Moore, and Naomi Beingessner. 2011. "Getting to food sovereignty: Grassroots perspectives from the National Farmers Union." In *Food Sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 47-58. Nova Scotia: Fernwood Publishing.

Boehmer Ruth. 2010. The experience of a female being raised in an isolated polygamous community in British Columbia: A heuristic study. *PhD dissertation*, Capella University.

Boerma, A.H. 1967. Statement following election as Director-General of UNFAO. URL: http://www.ipcinfo.org/fileadmin/user_upload/FAODG/FormerDGs/Boerma/boerma_1967.pdf. Accessed May 15, 2019.

Bora, Zelia M. 2018. "Introduction." In *Narratives of environmental challenges in Brazil and India: Losing Nature*, edited by Zelia M. Bora and Murali Sivaramakrishnan. London: Lexington Books.

Bowden, Gary. 1971. Alternatives for development of un-reclaimed land in the Kootenay River Floodplain, Creston, British Columbia: A benefit-cost analysis. *Master thesis*. University of British Columbia.

- British Columbia Food Systems Network (BCFSN). 2019. URL: <http://bcfsn.org/>. Accessed June 5, 2019.
- Britnell, G.E. and V.C. Fowke. 1962. *Canadian agriculture in war and peace, 1935-50*. Stanford, CA: Stanford University Press.
- Brunton, Bill. 1998a. "Kootenai." In *Handbook of North American Indians*, Volume 12: Plateau, edited by William C. Sturtevant. Washington: Smithsonian Institute.
- Brunton, Bill. 1998b. "The Stick Game." In *Handbook of North American Indians*, Volume 12: Plateau, edited by William C. Sturtevant. Washington: Smithsonian Institute.
- Bryman, Alan. 2001. *Social research methods*. New York: Oxford University Press.
- Brynne, Abra. 2011. Regional District of Central Kootenay Agricultural Plan. URL: http://www.rdck.bc.ca/publications/pdf/RDCK_AgPlan_only-1.pdf. Accessed March 13, 2013.
- Burnett, Kim and Sophia Murphy. 2014. What place for international trade in food sovereignty? *Journal of Peasant Studies* 41 (6): 1065-84.
- Butcon, Jesson V. and Engle Angela Chan. 2017. Certainty in uncertainty: Our position on culture, focused ethnography, and researching older people. *International Journal of Qualitative Methods* 16:1-9.
- Buttel, Frederick H., Philip McMichael, and Emerald Social Sciences Book Series. 2005. *New directions in the sociology of global development*. Bingley: Emerald Group Publishing Limited.
- Buy BC Cost-shared Funding. 2018. URL: <http://iafbc.ca/buy-bc/cost-shared-funding/> Accessed September 12, 2018.
- Cadieux, Kirsten Valentine and Rachel Slocum. 2016. What does it mean to *do* food justice? *Political Ecology* (22): 1-26.
- Cairns, Alex and Karl Meilke. 2012. Price Ceilings on Milk Production Quota Values: Future or Folly? *Canadian Journal of Agricultural Economics/Revue Canadienne d'Agroeconomie* 60: 93-112.
- Cannabis Distribution Act. 2018. URL: <http://www.bclaws.ca/civix/document/id/complete/statreg/18028>. Accessed June 4, 2019.
- Canadian Wheat Board (CWB). 2019. Overview. URL: <https://www.nfu.ca/campaigns/grain-marketing-and-transportation/canadian-wheat-board/>. Accessed June 4, 2019.

- Canadians for a Sustainable Future. 2019. Land Use. URL: <https://sustainablesociety.com/environment/land-use>. Accessed June 20, 2019.
- Canadian Dairy Information Centre. 2018. Monthly Milk Quota Exchange. URL: http://www.dairyinfo.gc.ca/index_e.php?s1=dff-fcil&s2=quota&s3=qe-tq. Accessed April 25, 2018.
- Cancian, Francesca M. 1992. Feminist science: Methodologies that challenge inequality. *Gender and Society* 6 (4): 623-42.
- Cannon, Martin and Lina Sunseri. 2011. *Racism, colonialism, and Indigeneity in Canada*. Don Mills: Oxford University Press.
- Carlson, Jonathan. 2009. Reflections on a problem of climate justice: climate change and the rights of states in a minimalist international legal order. *Transnational Law and Contemporary Problems* 18 (1): 45-68.
- Carney, Judith. 2008. Reconsidering *sweetness and power* through a gendered lens. *Food and Foodways* 16 (2): 127-34.
- Center for Food Safety. 2018. About genetically engineered foods. URL: <https://www.centerforfoodsafety.org/issues/311/ge-foods/about-ge-foods>. Accessed July 5, 2018.
- Chan, Lourie, Olivier Receveur, Donald Sharp, Harold Schwartz, Amy Ing and Constantine Tikhonov. 2011. First Nations Food, Nutrition and Environment Study (FNFNES): Results from British Columbia (2008/2009). Prince George: University of Northern British Columbia.
- Chernoff, Alex W. 2016. Between a cap and a higher price: Modelling the price of dairy quotas under price ceiling legislation, *Canadian Journal of Economics/Revue Canadienne d'Economique*, 48 (4): 1403-29.
- Childe, V. Gordon, Thomas C. Patterson, and Charles E. Orser. 2004. *Foundations of social archaeology: Selected writings of V. gordon childe*. Walnut Creek, CA: AltaMira Press.
- Choquette, Wayne. 1972. Archaeological investigations in the East Kootenay region, BC. *Canadian Archaeological Association* 4: 83-4.
- Choquette, Wayne. 1973. Archaeological investigations in the Rocky Mountain Trench and adjacent mountains southeastern British Columbia, 1973. *Canadian Archaeological Association* 5: 117-9.
- Choquette, Wayne. 2007. Archeological overview assessment of landscape units K16 – 18 and K20 – 24, Kootenay Lake Forest District. URL: <http://www.for.gov.bc.ca/ftp/archaeology/external!/publish/web/raad/Kootenay%20Lk%20LU%20AOA/LU%20K16%20thru%2018%20and%20K20%20thru%2024.pdf>. Accessed Nov 5, 2013.

- Christenson, J.H., B. Hewitson. 2007. "Regional climate projections." In *Climate change 2007: The physical science basis. Contributions of working group I to the 4th assessment report of the intergovernmental panel on climate change*, edited by S. Solomon. Cambridge: Cambridge University Press.
- Clapp, Jennifer. 2016. *Food*. Cambridge, UK: Polity Press.
- Clapp, Jennifer and Marc. J. Cohen. 2009. *Global food crisis: Governance challenges and opportunities*. North York, Waterloo: Wilfrid Laurier University Press.
- Clark, Robert. 1995. *River of the West: A chronicle of the Columbia*. New York: Picador.
- Clendenning, Jessica, Wolfram H. Dressler, and Carol Richards. 2016. Food justice of food sovereignty? Understanding the rise of urban food movements in the U.S.A. *Agriculture and Human Values* 33 (1): 165-77.
- Clifford, James and George Marcus. 1986. *Writing culture: The poetics and politics of ethnography*. Berkeley: University of California Press.
- Clifford, James. 1990. "Notes on (field)notes." In *Fieldnotes: The making of anthropology*, edited by R. Sanjek, 47-70. Ithaca, NY: Cornell University Press.
- Cohen, Alice and Emma S. Norman. 2018. Renegotiating the Columbia River Treaty: Transboundary governance and Indigenous rights. *Global Environmental Politics* 18 (4): 4-24.
- Cohen, Stewart J., Kathleen A. Miller, Alan F. Hamlet, and Wendy Avis. 2000. Climate change and resource management in the Columbia River Basin. *Water International* 25 (2): 253-72.
- Coleman, Robert. 2013. Landscape of Power, Landscape of Identity: The Transforming Human Relationship with the Kootenai River Valley. *Master Thesis*. Arizona State University. URL: <http://search.proquest.com.ezproxy.library.ubc.ca/docview/1354493191?accountid=14656>. Accessed September 22, 2013.
- Columbia Basin Trust. 2019. Projects will have significant positive environmental impacts. URL: <https://ourtrust.org/projects-will-have-significant-positive-environmental-impacts/> Accessed February 26, 2019.
- Columbia Basin Trust. 2006. Preliminary analysis of climate variability and change in the Canadian Columbia River Basin: Focus on water resources. Nakusp, BC: Columbia Basin Trust. URL: <https://www.globalnature.org/bausteine.net/f/6669/ClimateChangeAnalysisFULLCBT.pdf?fd=2>. Accessed May 15, 2019.
- Columbia River Inter-Tribal Fish commission. 2019. Fisheries Management Overview. URL: <https://www.critfc.org/tribal-treaty-fishing-rights/fisheries-management-overview/>

Accessed May 19, 2019.

- Columbia River Treaty. 2018. Columbia River Treaty. URL: <https://engage.gov.bc.ca/columbiarivertreaty/>. Accessed April 17, 2018Crickmay.
- Columbia River Treaty. 2019. Technical Studies Reports: Columbia River Treaty Negotiations Status. URL: <https://engage.gov.bc.ca/columbiarivertreaty/>. Accessed May 15, 2019.
- Columbia River Treaty Review. 2013a. Columbia River Basin sounding board group: Terms of reference. URL: <http://engage.gov.bc.ca/columbiarivertreaty/2013/06/03/june-3-2013/>. Accessed on May 2, 2018.
- Columbia River Treaty Review. 2013b. Columbia River Basin sounding board group: Terms of reference: Interests and decisions table. URL: <http://engage.gov.bc.ca/app/uploads/sites/6/2013/04/Interests-and-Decisions-Table-SB-Nakusp-2013-06-031.pdf>. Accessed on May 2, 2018.
- Columbia River Treaty Review. 2013c. Comments on the Columbia River Treaty public consultation report working draft. URL: <http://engage.gov.bc.ca/columbiarivertreaty/2013/10/02/comment-on-the-columbia-river-treaty-public-consultation-report-working-draft/>. Accessed May 2, 2018.
- Comaroff, Jean and John. 1991. Of revelation and revolution: Christianity, colonialism, and consciousness in South Africa, Volume One. Chicago and London: University of Chicago Press.
- Condon, Patrick M., Kent Mullinix, Arthur Fallick, and Mike Harcourt. 2010. Agriculture on the edge: Strategies to abate urban encroachment onto agricultural lands by promoting Via human-scale agriculture as an integral element of urbanization. *International Journal of Agricultural Sustainability* 8 (1-2): 104-15.
- Connell, David J., Teresa Taggart, Kyle Hillman, and Adam Humphrey. 2006. Economic and community impacts of farmers markets in British Columbia: Provincial report. British Columbia Association of Farmers' Markets and School of Environmental Planning, University of Northern British Columbia, Prince George.
- Connors, James. 2013. The history of future farmer organizations around the world. *Journal of Agricultural Education* 54 (1): 60-71.
- Constable, George and Bob Somerville. 2003. *A century of innovation: Twenty engineering achievements that transformed our lives*. Washington, DC: Joseph Henry Press.
- Conway, Gordon and Rajiv Shah. 2012. *One billion hungry: Can we feed the world?* Ithaca, New York: Cornell University Press.

- Corbin, Juliet and Anselm Strauss. 2008. *Basics of qualitative research*. Thousand Oaks, CA: Sage.
- Coulthard, Glen Sean. 2014. *Red skin white masks: Rejecting the colonial politics of recognition*. Minneapolis: University of Minnesota Press.
- Cosens, Barbara. 2012. "Changes in empowerment: Rising voices in Columbia Basin resource management." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Cosens, Barbara, Matthew McKinney, Richard Paisley, and Aaron T. Wolf. 2018. Reconciliation of development and ecosystems: the ecology of governance in the international Columbia River Basin. *Regional Environmental Change* 18: 1679-92.
- Coté, Charlotte. 2016. "Indigenizing Food Sovereignty". Revitalizing Indigenous Food Practices and Ecological Knowledges in Canada and the United States. *Humanities* 5 (3): 57.
- Cotter, Anthony. 2016. Valuing ecosystem services in the Columbia River Treaty. Burnaby, BC, CA: Adaptation to climate change team, Simon Fraser University. *Master thesis*. Simon Fraser University.
- Council of Canadian Academies (CCA). 2014. Aboriginal food security in Northern Canada: An assessment of the state of knowledge. Ottawa: The expert panel on the state of knowledge of food security in Northern Canada, Council of Canadian Academies. URL: https://www.scienceadvice.ca/wp-content/uploads/2018/.../foodsecurity_fullreporten.pdf.
- Cran, Gregory J. 2006. *Negotiating buck naked: Doukhobors, public policy and conflict resolution*. Vancouver: UBC Press.
- Crawley, Trevor. First Nations excluded from Columbia River Treaty talks. Cranbrook: Cranbrook Daily Townsman. URL: <https://www.cranbrooktownsman.com/news/first-nations-excluded-from-columbia-river-treaty-talks/>. Accessed July 2018.
- Creston Valley Harvest Share Program (CVHSP). 2014. URL: <https://www.crestonfoodaction.ca/site/harvest-share-program/>. Accessed April 28, 2019.
- Creston Valley Wildlife Management Area. 2015. History. URL: <https://www.crestonwildlife.ca/about/history>. Accessed April 20, 2015.
- Creston and District Historical and Museum Society. 2015. Taming the Kootenay. Accessed April 20, 2018. URL: http://www.virtualmuseum.ca/sgc-cms/histoires_de_chez_nous-community_memories/pm_v2.php?id=exhibit_home&fl=0&lg=English&ex=00000322. Accessed March 31, 2013.
- Creston Valley Food Action Coalition (CVFAC). 2018. URL: <https://www.crestonfoodaction.ca/site/>. Accessed April 27, 2019.

- Creswell, John W. 2007. *Qualitative Inquiry and Research Design: Choosing Among 5 Approaches*. Thousand Oaks: Sage.
- Crickmay, C.H. 1964. The Rocky Mountain Trench: A Problem. *Canadian Journal of Earth Sciences* 1(3):1-22.
- Daigle, Michelle. 2019. Tracing the Terrain of Indigenous Food Sovereignities. *The Journal of Peasant Studies* 46 (2): 297-315.
- Dairy Farmers of Canada. 2018. The facts. Accessed April 30, 2018. URL: <https://www.dairyfarmers.ca/what-we-do/supply-management/the-facts>. Accessed April 26, 2019.
- Dance, Anne. 2015. Dikes, ducks, and dams: Environmental change and the politics of reclamation at Creston Flats. *BC Studies* 184:11-44.
- De Schutter, Olivier. 2011. Agroecology and the right to food: Report submitted by the special rapporteur on the right to food, 16th edition. New York: United Nations Human Rights Council. URL: http://www.srfood.org/images/stories/pdf/officialreports/20110308_a-hrc-16-49_agroecology_en.pdf. Accessed September 11, 2018.
- De Schutter, Olivier. 2012. Report of the Special Rapporteur on the Right to Food. United Nations General Assembly. Addendum: Mission to Canada (6 to 16 May 2012). New York: United Nations Human Rights Council. URL: https://www.ohchr.org/EN/.../HRC/.../A_HRC_25_57_ENG.DOC. Accessed April 27, 2019.
- De Schutter, Olivier. 2013. Interim report of the Special Rapporteur on the right to food. Report to 68th session of the UN General Assembly. URL: www.srfood.org/en/documents. Accessed April 27, 2019.
- De Schutter, Olivier. 2014. Final report: The transformative potential of the right to food. Report to the 25th Session of the Human Rights Council HRC/25/57, January. URL: <https://www.right-docs.org/doc/a-hrc-25-57/>. Accessed April 27, 2019.
- Delehanty-Pearkes, Eileen. 2016. *A river captured: The Columbia River Treaty and catastrophic change*. Victoria, BC: Rocky Mountain Books.
- Denzin, Norman K. and Yvonna S. Lincoln. 1994. *Handbook of qualitative research*. Thousand Oaks. California: Sage Publications.
- Desjardins, R.L., M.V.K. Sivakumar and C. de Kimpe. 2007. The contribution of agriculture to the state of climate: Workshop summary and recommendations. *Agricultural and Forest Meteorology* 142 (4): 314-24.

- Deemer, Bridget R., John A. Harrison, Siyue Li, Jake J. Beaulieu, Tonya DelSontro, Nathan Barros, José F. Bezerra-Neto, Stephen M. Powers, Marco A. dos Santos, J. Arie Vonk, Greenhouse Gas Emissions from Reservoir Water Surfaces: A New Global Synthesis, *BioScience*, Volume 66, Issue 11, 1 November 2016, Pages 949–964. Cite in conclusion,
- Desmarais, Annette Aurelie, Priscilla Claeys, Amy Trauger. 2017. Public policies for food sovereignty: Social movements and the state. London; New York: Routledge, Taylor and Francis Group.
- Desmarais, Annette Aurélie, and Hannah Wittman. 2014. Farmers, foodies and First Nations: Getting to food sovereignty in Canada. *The Journal of Peasant Studies* 41(6): 1153-73.
- Desmarais, Annette Aurélie, Carla Roppel and Diane Martz. 2011. “Women farmers define a food sovereignty policy for Canada.” In *Food Sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 91-105. Nova Scotia: Fernwood Publishing.
- Desmarais, Annette Aurélie. 2015. The gift of food sovereignty. *Canadian Food Studies* (2): 154-163.
- Desmarais, Annette Aurélie. 2012. “The Vía Campesina : Women on the Frontiers of Food Sovereignty,” *Cahiers genre et développement*. Gender and Development Centre, Graduate Institute of International and Development Studies, Geneva, pp. 443-450.
- Desmarais, Annette Aurélie. 2011. “The International Women’s Commission of La Vía Campesina,” in N.Visvanathan, L. Duggan, L. Nisonoff and N. Wiegiersma (eds.) (2011) *The Women, Gender and Development Reader*, 2nd. Edition, Zed Books: London, pp. 408-413.
- Desmarais, Annette Aurélie. 2008. The Power of Peasants: Reflections on the Meanings of the Vía Campesina. *Journal of Rural Studies* 24(2): 138-149.
- Desmarais, Annette Aurelie. 2007. *La Via Campesina: Globalization and the Power of Peasants*. Halifax and London: Fernwood Publishing and Pluto Press.
- Desmarais, Annette Aurélie. 2005. ‘You are mostly promised you will not be alone’: Farm Women Leaders Speak about Resistance and Agrarian Activism. *Canadian Woman Studies/les cahiers de la femme* 24(4): 7-11.
- Desmarais, Annette Aurélie. 2004. The Vía Campesina: Women on the Frontiers of Food Sovereignty. *Canadian Woman Studies/les cahiers de la femme* 23(1): 140-146.
- Desmarais, Annette Aurélie. 2002. The Vía Campesina: Consolidating an International Peasant and Farm Movement. *Journal of Peasant Studies* 29(2): 91-124.
- Deutsch, Nancy L. 2004. Positionality and the pen: Reflections on the process of becoming a feminist researcher and writer. *Qualitative Inquiry* 10 (6): 885.

- Dietrich, William. 1995. *Northwest Passage: The Great Columbia River*. Seattle: University of Washington Press.
- Djoudi, H., B. Locatelli, C. Vaast, K. Asher, M. Brockhaus, and B. Basnett Sijapati. 2016. Beyond dichotomies: Gender and intersecting inequalities in climate change studies. *Ambio* 45 (3): 248-62.
- Dowler, E. 2003. Food and Poverty: Insights from the 'North'. *Development Policy Review* 21 (5-6): 569-80.
- Easterling, W.E., and M. Apps. 2005. Assessing the consequences of climate change for food and forest resources: A view from the IPCC. *Climatic Change* 70 (1-2): 165-89.
- Edelman, Marc and Tony Weis, Amita Baviskar, Saturnino M. Borras Jr, Eric Holt-Gimenez, Deniz Kandiyoti and Wendy Wolford. 2014. Introduction: Critical perspectives on food sovereignty. *The Journal of Peasant Studies* 41 (6): 911-31.
- Eifert, B., C. Galvez, N. Kabir, A. Kaza, H. Moore and C. Pham. 2002. The world grain economy to 2050: A dynamic general equilibrium, 2 sector approach to long-term world-level macroeconomic forecasting. *University Avenue Undergraduate Journal of Economics* 7 (1):1-31.
- Emerson, Robert M., Rachel I. Fretz and Linda L. Shaw. 2007. *Participant Observation and Fieldnotes in Handbook of Ethnographies*, edited by Atkinson et al. London: Sage Publications.
- Engler-Stringer, Rachel. 2011. "Community nutrition practice and research: Integrating a food sovereignty approach." In *Food Sovereignty in Canada: Creating just and sustainable food systems*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 134-150. Nova Scotia: Fernwood Publishing.
- Erickson, Frederick. 1977. Some approaches to inquiry in school-community ethnography. *Anthropology & Education Quarterly* 8 (2): 58-69.
- Erosion, Technology and Concentration Action Group (ETC). 2008. Who owns nature? Corporate power and the final frontier in the commodification of life. URL: <http://www.etcgroup.org/content/who-owns-nature>. Accessed September 27, 2018.
- Escobar, Arturo. 1995. *Encountering development: The making and unmaking of the third world*. Princeton, NJ: Princeton University Press.
- Escobar, Arturo. 1996. Construction nature: elements for a post-structuralist political ecology. *Futures* 28 (4): 325-43.

- Escobar, Arturo. 1999. After nature: Steps to an antiessentialist political ecology. *Current Anthropology* 40 (1): 1-30.
- Evans, A. 2009. *The Feeding of the Nine Billion: Global Food Security*. London: Chatham House.
- Evans, Pete. "China halts canola shipments from major Canadian supplier," March 5, 2019 Toronto: CBC News. Accessed April 27, 2019.
- Export Action Global. 2018. Dairy systems around the world: Are Canadian consumers and farmers better off with the Canadian model? URL: https://www.exportactionglobal.com/wp-content/uploads/2018/04/Dairy-Systems-Around-The-World_Export-Action-Global_April-2018.pdf. Accessed May 17, 2019.
- Fader, Marianela, Dieter Gerten, Michael Krause, Wolfgang Lucht and Wolfgang Cramer. 2013. Spatial decoupling of agricultural production and consumption: quantifying dependences of countries on food imports due to domestic land and water constraints. *Environmental Research Letters* 8: 014046.
- Fairbairn, Madeleine. 2010. "Framing resistance: International food regimes and the roots of food sovereignty." In *Food sovereignty: Reconnecting food, nature and community*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe. Halifax: Fernwood Publishing.
- Farm Folk City Folk. 2018. What is a CSA Program. URL: <https://www.farmfolkcityfolk.ca/resources/knowledge-pantry/csa/>. Accessed September 20, 2015.
- Feagan, Robert. 2007. The place of food: Mapping out the 'local' in local food systems. *Progress in human geography* 31 (1): 23-42.
- Fergus, Rafter Sass and Sarah Taylor Lovell. 2014. Permaculture for agroecology: Design, movement, practice, and worldview. A review. *Agronomy for Sustainable Development* 34 (2): 251-74.
- Ferguson, Michael A. D. and François Messier. 1997. Collection and analysis of traditional ecological knowledge about a population of arctic tundra caribou. *Artic* 50 (1):17-28.
- Ficklin, D. L., B. L. Barnhart, J. H. Knouft, I. T. Stewart, E. P. Maurer, S. L. Letsinger and G. W. Whittaker. 2014. Climate change and stream temperature projections in the Columbia river basin: Habitat implications of spatial variation in hydrologic drivers. *Hydrology and Earth System Sciences*, 18 (12): 4897.
- Fields Forward. 2018. Home. URL: http://www.fieldsforward.ca/wp-content/uploads/2016/12/Fields-Forward_1pager.pdf. Accessed September 14, 2018.

- Fieldhouse, P. and S. Thompson. 2012. Tackling food security issues in Indigenous communities in Canada: the Manitoba experience. *Nutrition & Dietetics* 69 (3): 217-21.
- First Call. BC, youth advocacy coalition. 2015. Child Poverty Report Card. Vancouver: First Call. URL: <https://firstcallbc.org/publications/2015-bc-child-poverty-report-card/>. Accessed June 2017.
- First Call. 2017. 2017 BC Child Poverty Report Card. URL: <https://stillonein5.ca/wp-content/uploads/2017/11/2017-BC-Child-Poverty-Report-Card.pdf>. Accessed September 20, 2018.
- First Call. 2019. Child poverty report card. URL: <https://firstcallbc.org/child-poverty-report-cards/>. Accessed September 21, 2018.
- First Nations Food, Nutrition & Environment Study (FNFNES). 2018. Welcome to First Nations Food, Nutrition & Environment Study. URL: <http://www.fnfnes.ca/>. Accessed December 20, 2018.
- Flachs, Andrew. 2016. Redefining success: the political ecology of genetically modified and organic cotton as solutions to agrarian crisis. *Journal of Political Ecology* 23 (1): 1-22.
- Food Banks Canada. 2013. *HungerCount 2013*. Toronto: Food Banks Canada.
- Food Banks Canada. Hunger Count. 2012. URL: http://www.foodbankscanada.ca/getmedia/46650005-3c7f-4637-ae7e-43f5f1464f05/FBC_AR12_ENG_FINAL.pdf.aspx?ext=.pdf. Accessed September 6, 2018.
- Food Secure Canada. 2013. Food secure Canada stands in solidarity with Idle No More. Press release, January 10, Toronto: Food Secure Canada.
- Food Secure Canada. 2018. Seven pillars of food sovereignty. URL: <https://foodsecurecanada.org/who-we-are/what-food-sovereignty>. Accessed September 28, 2018.
- Food Secure Canada. 2019. The launch of the first 'Food policy of Canada – Everyone at the table': What you need to know. URL: <https://foodsecurecanada.org/first-national-food-policy-for-canada?fbclid=IwAR2Wlgh-j0KkcGELt7213jaeExf-EoKi40nyzauozeU4lO7LjFafAYKjf8s>. Accessed August 8, 2019.
- Forsey, Martin Gerard. Ethnography as Participant Listening. 2010. *Ethnography* 11 (4): 558-72.
- Foster, John Bellany. 1999. Marx's theory of metabolic rift: classical foundations for environmental sociology. *American Journal of Sociology* 105: 366-405.
- Fowke, Vernon Clifford. 1946. *Canadian agricultural policy: the historical pattern*. Toronto: University of Toronto Press.

- Fowke, Vernon Clifford. 1957. *National policy and the wheat economy*. Toronto: University of Toronto.
- Frantz, Charles Eugene. 1958. The Doukhobor Political System: Social Structure and Social Organization in a Sectarian Society. PhD Dissertation, Department of Anthropology, The University of Chicago, Illinois.
- Freeman, Otis W. 1947. Development of the Columbia Basin Reclamation project. *Yearbook - Association of Pacific Coast Geographers* 9: 15. URL: https://www.jstor.org/stable/24042278?seq=1#page_scan_tab_contents. Accessed on April 30, 2018.
- Friedmann, Harriet. 1993. The political economy of food: A global crisis. *New Left Review* 197 (29).
- Funderburk, R. S. 1954. Irrigation begins in the Columbia basin project. *Journal of Geography* 53 (1): 1-10.
- Galbraith, J. 2019. NAFTA is renegotiated and signed by the United States. *American Journal of International Law* 113 (1): 150-9.
- Gale, Donald Thomas. 1973. Belief and the Landscape of Religion: The Case of the Doukhobors. Master's Thesis, Department of Geography, Simon Fraser University, Vancouver, BC. Canada.
- Galletta, Anne. 2001. *Mastering the semi-structured interview and beyond*. New York: New York University Press.
- Galletta, Anne and William E. Cross. 2013. *Mastering the semi-structured interview and beyond: From research design to analysis and publication*. New York: NYU Press.
- Galt, Ryan E. 2016. The relevance of regional political ecology for agriculture and food systems. *The Journal of Political Ecology* 23 (1): 126-33.
- Garbrecht, G. 1997. "Sadd-el-Kafara, the world's oldest large dam." In *Dams*, edited by D. Jackson. London: Routledge.
- Gardner, Gary. 1997. *Recycling Organic Wastes*. Washington, D.C.: Worldwatch.
- General Assembly of the United Nations. 2012. Report of the Special Rapporteur on the right to food: Mission to Canada. URL: http://www.srfood.org/images/stories/pdf/officialreports/20121224_canadafinal_en.pdf. Accessed on September 21, 2018.
- Geertz, Clifford. 1973. "Thick description: Toward an interpretive theory of culture." In *The Interpretation of Cultures*, 3-30. New York: Basic Books.

- Ghanem, Z. and P. Cross. 2008. Food prices: A boon for producers, a buffer for consumers. *Canadian Economic Observer* (21) 6: Statistics Canada Catalogue no. 11-010-X.
- Gibson, Mark. 2012. *The Feeding of Nations: Redefining Food Security for the 21st Century*. Boca Raton: CRC Press/Taylor & Francis Group.
- Gliessman, Stephen R. 1998. *Agroecology. Ecological processes in sustainable agriculture*. Chelsea, MI: Ann Arbor Press.
- Gliessman, Stephen R. 2007. *Agroecology: The ecology of sustainable food systems*. New York: Taylor & Francis Group.
- Gliessman, Stephen R. and Martha Rosemeyer. 2010. *The conversion to sustainable agriculture: principles, processes, and practices*. Boca Raton, FL: CRC Press.
- Godfray, H., J. Charles, J.R. Beddington, R. Ian, Lawrence Haddad, David Lawrence, James F. Muir, Jules Pretty, Sherman Robinson, Sandy M. Thomans and Camilla Toulmin. 2010. Food security: The challenge of feeding 9 billion people. *Science, New Series* 327 (5967): 812-18.
- Government of Canada. 2010. Hancock Agricultural Investment Group attracted by Canada's fertile fields. Invest in Canada website, Newsfeed: Agri-Food, February.
- Government of Canada. 2012. The household food security survey module (HFSSM). URL: <https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-community-health-survey-cchs/household-food-insecurity-canada-overview/household-food-security-survey-module-hfssm-health-nutrition-surveys-health-canada.html>. Accessed June 27, 2017.
- Government of Canada. 2018a. Canada's first poverty reduction strategy. URL: <https://www.canada.ca/en/employment-social-development/programs/poverty-reduction/reports/strategy.html#h2.6>. Accessed September 5, 2018.
- Government of Canada. 2018c. Canadian Agricultural Partnership. URL: <http://www.agr.gc.ca/eng/about-us/key-departmental-initiatives/canadian-agricultural-partnership/?id=1461767369849>. Accessed September 12, 2018.
- Government of Canada. 2018d. We grow a lot more than you may think. URL: <http://www.agr.gc.ca/eng/about-us/publications/we-grow-a-lot-more-than-you-may-think/?id=1251899760841>. Accessed June 20, 2019.
- Government of Canada. 2019a. Indigenous and Northern Affairs: Registered population. URL: http://fnp-ppn.aandc-aadnc.gc.ca/fnp/Main/Search/FNRegPopulation.aspx?BAND_NUMBER=606&lang=eng. Accessed June 12, 2019.
- Government of Canada. 2019b. Indigenous and Northern Affairs Canada: Reserves/Settlements/Villages. URL: <http://fnp-ppn.aandc->

aadnc.gc.ca/fnp/Main/Search/FNReserves.aspx?BAND_NUMBER=606&lang=eng.
Accessed June 12, 2019.

- Government of Canada. 2019c. Federal government announces Columbia River Basin Indigenous Nations to participate as observers in Columbia River Treaty negotiations. URL: <https://www.canada.ca/en/global-affairs/news/2019/04/federal-government-announces-columbia-river-basin-Indigenous-nations-to-participate-as-observers-in-columbia-river-treaty-negotiations.html>. Accessed April 27, 2019.
- Government of Canada. 2019d. “Everyone at the table!” Government of Canada announces the first-ever food policy for Canada. URL: <https://www.canada.ca/en/agriculture-agri-food/news/2019/06/everyone-at-the-table-government-of-canada-announces-the-first-ever-food-policy-for-canada.html>. Accessed June 18, 2019.
- Grant, Cynthia and Daniel R. Tomal. 2013. *How to finish and defend your dissertation: Strategies to complete the professional practice doctrine*. UK: Roman and Littlefield Education.
- Grey, S., and Raj Patel. 2015. Food sovereignty as decolonization: Some contributions from Indigenous movements to food system and development politics. *Agriculture and Human Values* 32 (3): 431-44.
- Guillou, Marion. 2014. *The World's Challenge Feeding 9 Billion People* Amsterdam: Springer.
- Guyader, J., S. M. Little, R. Kröbel, C. Benchaar, K. A. Beauchemin. 2017. Comparison of greenhouse gas emissions from corn- and barley-based dairy production systems in Eastern Canada. *Agricultural Systems* 152: 38-46.
- Hall Findlay, Martha. 2012. Supply management: Problems, politics - and possibilities. Calgary: School of Public Policy, University of Calgary.
- Hamelin, A. M., J.P. Habicht and M. Beaudry. 1999. Food Insecurity: Consequences for the Household and Broader Social Implications. *Journal of Nutrition* 129: 525S-528S.
- Hamm, Michael W. and Anne C. Bellows. 2003. Community food security: Background and future directions. *Journal of Nutrition Education and Behavior* 35(1): 37-43.
- Hammersley, Martyn and Paul Atkinson. 2007. *Ethnography: Principles in practice*. New York: Routledge.
- Harden, Blaine. 1996. *A River Lost: The life and death of the Columbia*. New York: W.W. Norton & Co.
- Harding, Sandra G. 1987. *Feminism and methodology*. Bloomington: Indiana University Press.

- Harris, Douglas C. 2001. *Fish, law, and colonialism: The legal capture of salmon in British Columbia*. Toronto: The University of Toronto.
- Harrison, John. 2008. Columbia Basin Project. Columbia River History Project. URL: <https://nwcouncil.org/history/ColumbiaBasinProject>. Accessed March 4, 2018.
- Hayward, Jonathan. 2018. B.C. at the heart of changing nature of Canada's forest supply as fires, bugs, and climate bite. The Canadian Press. URL: <https://www.cbc.ca/news/business/canada-forest-fire-bugs-climate-change-1.4961044>. Accessed on May 17, 2019.
- Hazell P, and S. Wood. 2008. Drivers of change in global agriculture. *Philosophical Transactions Royal Society B* (363): 495-515.
- Hearns, Glen. 2008. The Columbia River Treaty: A synopsis of structure, content, and operations. URL: <http://www.ccrf.ca/assets/docs/pdf/columbia-river-treaty-synopsis-ccrf-final-sept-2008.pdf>. Accessed August 6, 2013.
- Heckelman, Amber, and Hannah Wittman. 2015. Food sovereignty: A framework for assessing agrarian responses to climate change in the Philippines. *Austrian Journal of South-East Asian Studies* 8 (1): 87-94.
- Heikkila, Tanya and Andrea K. Gerlak. 2012. "Institutional adaptation and change in collaborative watershed management: An examination of the northwest power and Conservation Council's Fish and Wildlife Program." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Higginbottom, Edward N. 1988. The changing geography of salmon canning in British Columbia, 1870-1931. *Master thesis*, Simon Fraser University. URL: <file:///C:/Users/joann/Downloads/b15029542.pdf>. Accessed August 31, 2018.
- Higginbottom, Gina M. A., Jennifer Pillay and Nana Y. Boadu. 2013. Guidance on performing focused ethnographies with emphasis on health care. *The Qualitative Report* 18: 1-16.
- Hirt, Paul W. and Adam M. Sowards. 2012. "The past and future of the Columbia river." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Ho, Mae-Wan. 2008. Organic agriculture and localized food and energy systems for mitigating climate change. *ISIS Reports*. London: The Institute of Science in Society.
- Hochedez, Camille and Julie Le Gall. 2016. Food justice and agriculture: Introduction. *Justice Spatiale - Spatial Justice* 9: 1-29.
- Hofer, John. 1996. *The History of the Hutterites*. Manitoba: Friesen's Corporation.

- Hohenthal, Johanna, Marinka Rasanen and Paola Minoia. 2018. Political ecology of asymmetric ecological knowledges: diverging views on the eucalyptus-water nexus in the Taita Hills, Kenya. *Journal of Political Ecology* 25 (2): 1-19.
- Holm, Wendy. 2018a. *Damming the peace: The hidden costs of the Site C Dam*. Toronto: James Lorimer & Company Ltd. Publishers.
- Holm, Wendy. 2018b. American whining much a-moo about nothing; U.S. dairy crisis a globalization problem, not a Canada problem, Wendy Holm writes. *The Vancouver Sun*, June 27. URL: <http://ezproxy.library.ubc.ca/login?url=https://search.proquest.com/docview/2060766791?accountid=14656>. Accessed February 27, 2019.
- Holm, Wendy. 1994. *Evaluation of the effect of downstream benefits to Washington State agriculture under the Columbia River Treaty on the competitive position of BC products*. Bowen Island, BC: W.R. Holm and Associates.
- Holmgren, David. 2002. *Permaculture: Principles and pathways beyond sustainability*. Holmgren Design Services.
- Holt-Gimenez, Eric. 2009. From food crisis to food sovereignty: The challenge of social movements. *Monthly Review* 61 (3): 142-56.
- Holt-Gimenez, Eric. 2011. *Food movements unite! Strategies to transform our food systems*. Oakland, CA: Food First Books.
- Holt-Giménez, Eric, and Annie Shattuck. 2011. Food crises, food regimes and food movements: Rumblings of reform or tides of transformation? *Journal of Peasant Studies* 38(1): 109-44.
- Holt-Giménez, Eric, and Miguel Altieri. 2013. Agroecology, food sovereignty, and the new green revolution. *Agroecology and Sustainable Food Systems* 37(1): 90-102.
- Holt-Giménez, E. and Raj Patel. 2009. *Food rebellions!* Oxford: Pambazuka Press.
- Holt-Giménez, E., and Yi Wang. 2012. Reform or transformation? The pivotal role of food justice in the U.S. food movement. *Race/Ethnicity: Multidisciplinary Global Contexts* 5 (1): 83-102.
- Huffman, James L. 1980. Agriculture and the Columbia river: A legal and policy perspective. *Environmental Law* 10 (2): 281-314.
- Idaho Department of Fish and Game. 2019. New Kootenai River burbot fisher opens for anglers on January 1, 2019. URL: <https://idfg.idaho.gov/blog/2018/12/kootenai-river-burbot-fishery-open-january-1>. Accessed January 4, 2019.
- Indian Act. 1985. 2019. Justice Laws Website. URL: <https://laws-lois.justice.gc.ca/eng/acts/i-5/fulltext.html>. Accessed April 12, 2019.

- Indigenous Food Systems Network. 2019. Indigenous Food Sovereignty. URL: <https://www.Indigenousfoodsystems.org/food-sovereignty>. Accessed March 23, 2019.
- Industry Canada. 2009. Trade Data Online (formerly called Stategis). Ottawa, Canada: Industry Canada. URL: <http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home>. Accessed August 15, 2018.
- Iniesta-arandia, Irene, Federica Ravera, Stephanie Buechler, Isabel Díaz-Reviriego, Maria E. Fernández-Giménez, Maureen G. Reed, Mary Thompson-Hall, Elizabeth Edna Wangui. 2016. A synthesis of convergent reflections, tensions and silences in linking gender and global environmental change research. *Ambio* 45: 383-93.
- Intergovernmental Panel on Climate Change (IPCC). 2019a. Chapter 5: Food Security. URL: https://www.ipcc.ch/site/assets/uploads/2019/08/2f.-Chapter-5_FINAL.pdf. Accessed August 2019.
- Intergovernmental Panel on Climate Change (IPCC). 2019b. Chapter 3: Desertification. URL: https://www.ipcc.ch/site/assets/uploads/2019/08/2d.-Chapter-3_FINAL.pdf. Accessed August 2019.
- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). 2019. Media Release: Nature's dangerous decline 'unprecedented'; Species extinction rates accelerating'. URL: <https://www.ipbes.net/news/Media-Release-Global-Assessment#4-Policy%20Tools>. Accessed August 6, 2019.
- International Fund for Agricultural Development (IFAD) 2013. Annual Report: Highlights. URL: https://beta.ifad.org/documents/38714170/39625537/Highlights+AR+2013_E.pd.pdf/7e166e7b-a027-4d95-af00-6b7dbb2b5eb6. Accessed August 2019.
- International Planning Committee on Climate Change (IPCC). 2001. *Climate change: The scientific basis*. Cambridge: Cambridge University Press.
- International Planning Committee for Food Sovereignty (IPCFS). 2015. Final declaration. People's food sovereignty forum. Rome, Italy. URL: https://www.foodsovereignty.org/wp-content/uploads/2016/03/Draft_CSO-SoW-BFA_ThematicStudy_20Nov2015.pdf. Accessed June 30, 2016.
- International Assessment of Agricultural Knowledge, Science, and Technology for Development: Agriculture at a Crossroads (IAAKSTD). 2009. *Global Report*. Washington, DC: Island Press. URL: [http://www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20\(English\).pdf](http://www.unep.org/dewa/agassessment/reports/IAASTD/EN/Agriculture%20at%20a%20Crossroads_Global%20Report%20(English).pdf). Accessed February 10, 2016.
- Jamison, Michael. 2004. Dead and buried: Reflections on life before the Libby Dam. URL: <https://missoulain.com/news/state-and-regional/dead-and-buried-reflections-on-life-before->

- the-libby-dam/article_766ffec0-742d-56d6-bf12-7b01cda83120.html. Accessed June 16, 2016.
- Janzen, H. H., D. A. Angers, M. Boehm, M. Bolinder, R. L. Desjardins, J. A. Dyer, B. H. Ellert, D. J. Gibb, E. G. Gregorich, B. L. Helgason, R. Lemke, D. Massé, S. M. McGinn, T. A. McAllister, N. Newlands, E. Pattey, P. Rochette, W. Smith, A. J. VandenBygaart and H. Wang. 2006. A proposed approach to estimate and reduce net greenhouse gas emissions from whole farms. *Canadian Journal of Soil Science* 86: 401-18.
- Jarosz, Lucy. 2014. Comparing Food Security and Food Sovereignty Discourses. *Dialogues in Human Geography* 4 (2): 161-81.
- Jones, Demos J. 1973. The results of role-playing in anthropological research. *Anthropological Quarterly* 46 (1): 30-7.
- Jordan, Mable E. 1956. The Kootenay reclamation and colonization scheme and William Adolph Baillie-Grohman. *British Columbia Historical Quarterly* 20 (3): 187.
- Kaiser, L. 1999. Boyle and Morris, 1999 – Community nutrition in action: An entrepreneurial approach Boyle MA, Morris DH. 1999. *Journal of Nutrition Education* 31(6): 365-6.
- Kandulu, John M., Brett A. Bryan, Darran King, and Jeffery D. Connor. 2012. Mitigating economic risk from climate variability in rain-fed agriculture through enterprise mix diversification. *Ecological Economics* 79: 105-12.
- Katz, Diane. 2009. The BC Agricultural Land Reserve: A critical assessment. URL: <https://www.fraserinstitute.org/sites/default/files/BCAgriculturalLandReserve.pdf>. Accessed June 2019.
- Keller, James. 2014. Bountiful elementary-secondary school closes, students in polygamous community now home-schooled. URL: http://www.huffingtonpost.ca/2012/11/04/bountiful-bc-school-closes_n_2070748.html. Accessed January 21, 2015.
- Kendall, A., C.M., Olsen, and E.A. Frongella, Jr. 1996. Relationships of Hunger and Food Insecurity to Food Availability and Consumption. *Journal of the American Dietetic Association*. 96: 1019-1024.
- Kepkiewicz, Lauren and Bryan Dale. 2019. Keeping 'our' Land: Property, Agriculture and Tensions between Indigenous and Settler Visions of Food Sovereignty in Canada. *The Journal of Peasant Studies* 46 (5): 983-1002.
- Kershner, Jim. 2006. *For a time a river ran through it*. Spokane: Spokesman Review.
- Keske, Catherin M. H., Jennifer Brooke Dare, Tiffany Hancock and Myron King. 2016. The connectivity of food security, food sovereignty, and food justice in boreal ecosystems: the case of Saint-Pierre and Miquelon. *Spatial Justice* (9): 1-26.

- Khoury, Colin K., Anne D. Bjorkman, Hannes Dempewolf, Julian Ramirez-Villegas, Luigi Guarino, Andy Jarvis, Loren H. Rieseberg and Paul C. Struik. 2014. Increasing homogeneity in global food supplies and the implications for food security. *PNAS* 111 (11): 4001-6.
- Kilbride, P. L. 1992. "Unwanted children as a consequence of delocalization in modern Kenya." In *Anthropological research: Process and application*, edited by J. J. Poggie, B. R. DeWalt, and W. W. Dressler, 185-206. Albany: State University of New York Press.
- King, Anthony. 2000. Thinking with Bourdieu against Bourdieu: A 'practical' critique of the habitus. *Sociological Theory* 18 (3): 417-33.
- Kinkade, Dale M., William W. Elmendorf, Bruce Rigsby and Haruo Aoki. 1998. *Languages in handbook of North American Indians*, Vol. 12: Plateau. Washington: Smithsonian Institute.
- Kirkpatrick, S. I., & Tarasuk, V. 2008. Food insecurity is associated with nutrient inadequacies among Canadian adults and adolescents. *The Journal of nutrition*, 138(3), 604-612.
- Kluckner, Michael. 2005. *Vanishing British Columbia*. Vancouver: UBC Press. Accessed January 28, 2015. ProQuest ebrary.
- Kneen, Cathleen. 2011. "Food secure Canada: Where agriculture, environment, health, food and justice intersect." In *Food sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 80-96. Nova Scotia: Fernwood Publishing.
- Kneen, Brewster. 1997. *A baseline for food policy in British Columbia*. 1st ed. Vancouver: FarmFolk/CityFolk Society.
- Knuttifa, K. Murray. 2003. "From the national policy to continentalism and globalization: The shifting context of Canadian agricultural policies." In *Fighting for the farm: Rural America transformed Jane Adams*, 47-74. Philadelphia: University of Pennsylvania Press.
- Knoblauch, Hubert. 2005. Focused ethnography. *Forum: Qualitative Social Research* 6 (3): 1-15.
- Koc, Mustafa and Japji Anna Bas. 2012. "Canada's action plan for food security: The interactions between civil society and the state to advance food security in Canada." In *Health and sustainability in the Canadian food system: Advocacy and opportunity for civil society*, edited by Elisabeth A. Abergel and Roderick J. MacRae, 173-203. Vancouver: UBC Press.
- Koc, Mustafa, Rod MacRae, Ellen Desjardins and Wayne Roberts. 2008. Getting civil about food: The interactions between civil society and the state to advance sustainable food systems in Canada. *Journal of Hunger and Environmental Nutrition* 3 (2-3): 122-44.
- Koc, Mustafa and Rod MacRae. 2001. *Working together: Civil society working for food security in Canada*. Toronto: Media Studies Working Group.

- Koc, Mustafa 2013. "Discourses of Food Security." In *Accumulations, Crises, Struggles: Capital and Labour in Contemporary Capitalism*, edited by B. Karaagac, 245-65. Berlin/London: LIT Verlag.
- Kootenai Culture Committee Confederated Salish and Kootenai Tribes 2019. URL: <http://www.csktribes.org/history-and-culture/kootenai-culture-committee>. Accessed April 27, 2019.
- Kootenai River Habitat Restoration Project Master Plan (KRHRPMP). 2009. URL: http://www.kootenai.org/documents/KRHRP-MP-0709-Print_001.pdf. Accessed December 30, 2018.
- Kootenai River Network, Inc. 2019. URL: <http://www.kootenairivernetwork.org/>. Accessed April 2019.
- Kootenay and Boundary Farm Advisors (KBFA). 2018. Home. URL: <https://www.kbfa.ca/>. Accessed April 27, 2019.
- Kotyk, Alyse. 2018. Richmond council unanimously in favour of bylaw to further limit ALR home sizes. Richmond news, November 6, 2018. URL: <https://www.richmond-news.com/real-estate/richmond-council-unanimously-in-favour-of-bylaw-to-further-limit-alr-home-sizes-1.23489293>. Accessed April 27, 2019.
- Kremen, C., A. Iles, and C. Bacon. 2012. Diversified farming systems: an agroecological, systems-based alternative to modern industrial agriculture. *Ecology and Society* 17(4): 288-306.
- Kröbel, R., M. A. Bolinder, H. H. Janzen, S. M. Little, A. J. Vandenbygaart, T. Kätterer. 2015. Canadian farm-level soil carbon change assessment by merging the greenhouse gas model Holos with the Introductory Carbon Balance Model (ICBM). *Agricultural Systems* 143: 76-85.
- Krutilla J. 1967. The Columbia River Treaty: The economics of an international river basin development. Resources for the future, Washington, DC, U.S.A.
- Kvale, S. 1996. "Interviews." In *An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage.
- La Vía Campesina (LVC). 1996a. Proceedings of the II International Conference of the Vía Campesina. Held on April 18-21 in Tlaxcala, Mexico. Brussels: NCOS Publications.
- La Vía Campesina (LVC). 1996b. The Right to Produce and Access to Land. URL: <http://voiceoftheturtle.org/library/1996%20Declaration%20of%20Food%20Sovereignty.pdf>. Accessed: May 25, 2015.

- La Vía Campesina (LVC). 2003. Our world is not for sale. Declaration on food sovereignty. URL: <https://Viacampesina.org/en/people-food-sovereignty-wto-out-of-agriculture/>. Accessed May 25, 2015.
- La Vía Campesina (LVC). 2008. Declaration of Maputo: V international conference of La Vía Campesina, Maputo Mozambique, October 19-22. URL: <https://Viacampesina.org/en/declaration-of-maputo-v-international-conference-of-la-Vía-campesina/>. Accessed April 27, 2019.
- La Vía Campesina (LVC). 2009. La Vía Campesina policy documents. Ecuador: La Vía Campesina. URL: <https://Viacampesina.org/en/la-Vía-campesina-policy-documents/>. Accessed June 20, 2015.
- La Vía Campesina (LVC). 2011. What is La Vía Campesina? The international peasant's voice. URL: <https://Viacampesina.org/en/international-peasants-voice/>. Accessed June 20, 2015.
- Lambin, E.F., B.L. Turner, H.J. Geista, S.B. Agbolac, A. Angelsen, J.W. Bruce, O.T. Coomes, R. Dirzog, G. Fischer, C. Folke, P.S. George, K. Homewood, H. Imbernon, R. Leemans, X. Lin, E.F. Morano, M. Mortimore, P.S. Ramakrishnan, J.F. Richards, H. Skaness, W. Steffent, G.D. Stlu, U. Svedinv, T.A. Veldkamp, C. Vogelx and H. Xuy. 2001. The causes of land-use and land-cover change: Moving beyond the myths. *Global Environmental Change* 11 (4): 261-9.
- Language Map of British Columbia. 2019. URL: <http://www.fpcc.ca/language/language-map/>. Accessed May 15, 2019.
- Leathers, Howard D., and Phillips Foster. 2009. The world food problem: Toward ending undernutrition in the third world. Boulder, Colo: Lynne Rienner Publishers.
- LeCompte, Margaret D. and Jean J. Schensul. 2010. "Qualitative research designs." In *Designing and Conducting Ethnographic Research*, 112-28. Walnut Creek, CA: AltaMira Press.
- Lederman, R. 2007. Comparative "Research": A modest proposal concerning the object of ethics regulation. *Political and Legal Anthropology Review* 30: 305-27.
- Lee, Doris. 1925. Some factors making for the success or failure of agriculture in British Columbia. *Master thesis*. The University of British Columbia.
- Lee, Sangmi. 2015. Questions from the field: Anthropological self-reflexivity through the eyes of study participants. *Anthropology in Action* 22 (3): 39-42.
- Leslie-Bole, Haley and Eric P. Perramond. 2017. Oyster feuds: conflicting discourses and outcomes in Point Reyes, California. *Journal of Political Ecology* 24 (1): 1-23.
- Lesser, Jonathan. 1990. Resale of the Columbia river Treaty downstream power benefits: 1 road from here to there. *Natural Resources Journal* 30 (3): 609-28.

- Leventon, Julia and Josefine Laudan. 2017. Local food sovereignty? Highlighting interplay challenges. *Geoforum* 85 (2017): 23-6.
- Libby Coordination Agreement. 2000. URL: <https://www.bpa.gov/news/pubs/RecordsofDecision/rod-20000215-Libby-Coordination-Agreement.pdf>. Accessed April 28, 2019.
- Libby Coordination Agreement. 2008. Libby dam VAR-Q agreement. URL: <https://www.usbr.gov/pn/fcrps/hydro/varq/usace-rod-UCEIS-june2008.pdf> Accessed April 28, 2019.
- Lincoln, Yvonna S. and Norman K. Denzin. 2003. *Turning points in qualitative research. Tying knots in a handkerchief*. Walnut Creek: AltaMira Press.
- Lincoln, Yvonna S. and Egon G. Guba. 1985. *Naturalistic inquiry*. Beverly Hills, CA: Sage.
- Lincoln, Yvonna S. and Egon G. Guba. 2003. "Ethics: The failure of positivist science." In.) *Turning points in qualitative research. Tying knots in a handkerchief*, edited by Yvonna S. Lincoln and Norman K. Denzin, 219-41. Walnut Creek: AltaMira Press.
- Lindberg, Tracey. 2010. *The doctrine of discovery in Canada in discovering Indigenous lands: The doctrine of discovery in the English colonies*. New York: Oxford University Press.
- Little, Shannan M., Chaouki Benchaar, H. Henry Janzen, Roland Kröbel, Emma J. McGeough and Karen Beauchemin. 2017. Demonstrating the effect of forage source on the carbon footprint of a Canadian dairy farm using whole-systems analysis and the Holos model: Alfalfa silage vs. corn silage. *Climate* 5: 87-105.
- Lobao, L. and Katherine Meyer. 2001. The great agricultural transition: Crisis, change and social consequences of twentieth century US farming. *Annual Review of Sociology* 27: 103-24.
- Lofland, John, H. 1971. *Analyzing social settings. A guide to qualitative observation and analysis*. Belmont, CA: Wadsworth.
- Loo, Clement. 2014. Towards a more participative definition of food justice. *Journal of Agricultural and Environmental Ethics* 27 (5): 787-809.
- Loo, Tina, 2004, *People in the way: Modernity, environment, and society on the Arrow Lakes*. 142/143: 161-96.
- Lotze, Heike K., Derek P. Tittensor, Andrea Bryndum-Buchholz, Tyler D. Eddy, William W. L. Cheung, Eric D. Galbraith, Manuel Barange, Nicolas Barrier, Daniele Bianchi, Julia L. Blanchard, Laurent Bopp, Matthias Büchner, Catherine M. Bulman, David A. Carozza, Villy Christensen, Marta Coll, John P. Dunne, Elizabeth A. Fulton, Simon Jennings, Miranda C. JIs, Steve Mackinson, Olivier Maury, Susa Niiranen, Ricardo Oliveros-Ramos, Tilla Roy, José A. Fernandes, Jacob Schewe, Yunne-Jai Shin, Tiago A. M. Silva, Jeroen

- Steenbeek, Charles A. Stock, Philippe Verley, Jan Volkholz, Nicola D. Walker, and Boris Worm. 2019. Global ensemble projections reveal trophic amplification of ocean biomass declines with climate change. *Proceedings of the National Academy of Sciences of the United States of America*.
- Lower Kootenay Band: Community Constitution. 2013. URL: http://lowerkootenay.com/wp-content/files/LKB_DRAFT_Constitution_October_2013.pdf. Accessed June 17, 2015.
- Lower Kootenay Band. 2013. Building an Economy Economic Sector Strategic Plan. 2013. URL: [file:///C:/Users/joann/Downloads/LKB_Economic_Sector_Strategy_2013-2017%20\(1\).pdf](file:///C:/Users/joann/Downloads/LKB_Economic_Sector_Strategy_2013-2017%20(1).pdf) Accessed June 10, 2014.
- Lunenburg, Fred C. and Beverly J. Irby. 2008. *Writing a successful thesis or dissertation: Tips and strategies for students in the social and behavioural sciences*. Thousand Oaks: Sage.
- Lyons, Kristen. 2014. Urban food advocates' tactics to rebuild food systems: Convergence and divergence in food security and food sovereignty discourses. *Dialogues in Human Geography* 4 (2): 212-17.
- MacDonald, David and Daniel Wilson. 2013. *Poverty or prosperity: Indigenous children in Canada*. Canadian Centre for Policy Alternatives.
- MacDowell, Laurel Sefton. 2012. *An environmental history of Canada*. Vancouver: UBC Press.
- MacRae, Rod. 1999. "Policy failure in the Canadian food system." In *Hunger-Proof Cities: Sustainable Urban Food Systems*, edited by M. Koc, Rod MacRae, L. Mougeot and J. Welsh, 182-94. Ottawa: International Development Research Centre.
- MacRae, Rod, and Kendal Donahue. 2013. Municipal food policy entrepreneurs: a preliminary analysis of how Canadian cities and regional districts are involved in food system change. Toronto: Toronto Food Policy Council; Vancouver Food Policy Council; CAPI-ICPA. URL: tfpc.to/wordpress/wp-content/.../2013/05/Report-May30-FINAL.pdf. Accessed April 28, 2019.
- Magnan, Andre. 2015. The financialization of agri-food in Canada and Australia: Corporate farmland and farm ownership in the grains and oilseed sector. *Journal of Rural Studies* 41 (2015): 1-12.
- Magdoff, Harry. 2013. Primitive accumulation and imperialism. *Monthly Review*, 65 (5): 13-25.
- Mah, Shirley. 1997. *East Kootenay Trench Restoration Program: Ktunaxa Ethnobotany and Fire Ecology*. Victoria, BC: Forest Renewal BC.
- Makortoff, Fred. 2009. The Krestova Doukhobors: Devotion/knowledge-a divided path. *PhD dissertation*, Royal Roads University: Victoria, Canada.

- Malm, Andreas, and Alf Hornborg. 2014. The geology of mankind? A critique of the anthropocene narrative. *The Anthropocene Review* 1 (1): 62-9.
- Mansfield, Brent. 2014. *Wake Up Call: California Drought and B.C.'s Food Security*. Vancouver: Vancity.
- Martin, Sarah J. and Jennifer Clapp. 2015. Finance for agriculture or agriculture for finance? *Journal of Agrarian Change* 15 (4): 549-59.
- Martz, Diane J.F. and Ingrid Bruechner. 2003. *The Canadian farm family at work: Exploring gender and generation*. Muenster: Centre for Rural Studies and Enrichment.
- Marx, K. 1973 [1939]. *Grundrisse: foundations of the critique of political economy*. New York: Vintage Books.
- Marx, K. 1976. *Capital, volume one*. New York: Vintage.
- Masioli, Itelvina and Paul Nicholson. 2010. "Seeing like a peasant: Voices from La Via Campesina" In *Food sovereignty: Reconnecting food, nature and community*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe. Halifax: Fernwood Publishing.
- Mayan, Maria. 2009. *Essentials of qualitative inquiry*. Walnut Creek, CA: Left Coast Press.
- McAreavey, R., and C. Das. 2013. A delicate balancing act: Negotiating with gatekeepers for ethical research when researching minority communities. *International Journal of Qualitative Methods* 12 (1): 113-31.
- McCain, Margaret N., J.F. Mustard, and Ontario. Ministry of Education and Trainings. 1999. Reversing the real brain drain, early years study: Final report. Toronto: Ministry of Education and Training.
- McDonald, J.D. 1993. Storm over high arrow: The Columbia river treaty (history). Rossland, BC: Rotary Club of Rossland.
- McDonald, Bryan L. 2010. *Food Security*. Cambridge: Polity Press.
- McGuire, Shelley and FAO, IFAD, WFP. 2015. "The state of food insecurity in the world 2015." In *Meeting the 2015 international hunger targets: Taking stock of uneven progress. Advances in nutrition* 6 (5): 623-24.
- McIntyre, L., and K. Rondeau. 2009. 'Food Insecurity in Canada'. In D. Raphael (Ed.), *Social Determinants of Health: Canadian Perspectives* (pp. 188-204). Toronto: Canadian Scholars' Press.

- McIntyre, Lynn, Ryan Lukic, Patrick B. Patterson, Laura C. Anderson, and Catherine L. Mah. 2016. Legislation debated as responses to household food insecurity in Canada, 1995-2012. *Journal of Hunger and Environmental Nutrition* 11 (4): 441-55.
- McKinney, Matthew. 2012. "Managing Transboundary Natural Resources: An assessment of the Need to Revise and Update the Columbia River Treaty." In *The Columbia river treaty revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- McKinney, Matthew, Lorie Baker, April Buvel, Andy Fischer, Dana Foster and Christine Paulu. 2009. *Managing Transboundary Natural Resources: An Assessment of the Need to Revise and Update the Columbia River Treaty*. University of Montana Public Policy Research Institute. URL: https://repository.uchastings.edu/hastings_environmental_law_journal/volone6/iss2/2. Accessed April 28, 2019.
- McLash, Robert Allen. 2018. *Island voices: First Nations excluded from Columbia river treaty negotiations*. Victoria: Times Colonist.
- McMahon, Martha. 2011. Standard fare or fairer standards: Feminist reflections on agri-food governance. *Agriculture and Human Values* 28 (3): 401-12.
- McMichael, Philip. 1992. Tensions between national and international control of the world food order: Contours of a new food regime. *Sociological Perspectives* 35 (2): 343-65.
- McMichael, Philip. 2004. *Development and social change: A global perspective*. Thousand Oaks, CA: Pine Forge Press.
- McMichael, Philip. 2005. "Global development and the corporate food regime." In *Research in Rural Sociology and Development*, edited by F. Buttel and P. McMichael. Oxford, UK: Elsevier Press.
- McMichael, Philip. 2009. A food regime genealogy. *The Journal of Peasant Studies* 36 (1): 139-69.
- McMichael, Philip. 2012. The land grab and corporate food regime restructuring. *The Journal of Peasant Studies* 39 (3-4): 681-701.
- McMichael, Philip. 2014. Historicizing food sovereignty. *Journal of Peasant Studies* 41 (6): 933-57.
- McMichael, Philip and Mindi Schneider. 2011. Food security politics and the millennium development goals. *Third World Quarterly* 32 (1): 119-39.
- Menezes, Francisco. 2001. Food sovereignty: A vital requirement for food security in the context of globalization. *Development* 44(4): 29-33.
- Merriam, Frank. 1989. The Dewdney Trail through the Kootenays. *British Columbia, Historical news* 22 (1): 7-9.

- Merton, Robert, K. 1987. The focussed interview and focus groups: Continuities and discontinuities. *The Public Opinion Quarterly* 51 (4): 550-66.
- Mihesuah, Devon A., Elizabeth Hoover and Winona LaDuke. 2019. Indigenous food sovereignty in the United States: Restoring cultural knowledge, protecting environments, and regaining health. Oklahoma: University of Oklahoma Press.
- Miles, Matthew, B. and A. M. Huberman. 1994. *Qualitative data analysis*. Thousand Oaks, CA: Sage.
- Ministry of Agriculture. 2017. Factsheet: BC. Agriculture Industry Highlights. URL: <https://news.gov.bc.ca/factsheets/factsheet-bc-agriculture-industry-highlights>. Accessed April 30, 2018.
- Ministry of Agriculture. 2019. Regional Food Innovation and Processing Hubs. URL: https://www.bcbid.gov.bc.ca/open.dll/showDisplayDocument?sessionID=34223322&disID=41886286&docType=Tender&dis_version_nos=4&doc_search_by=Tend&docTypeQual=TN. Accessed July 1, 2019.
- Minister of Agriculture's Advisory Committee. 2018. Revitalizing the Agricultural Land Reserve and the Agricultural Land Commission. URL: <https://engage.gov.bc.ca/app/uploads/sites/327/2018/08/Minister-Advisory-Committee-What-We-Hear-Report-ALR-and-ALC-Revitaliz....pdf>. Accessed October 2018.
- Ministry of Agriculture and Lands. 2006. BC's food self-reliance: Can BC's farmers feed our growing population? Victoria: Ministry of Agriculture and Lands.
- Ministry of Environment Kootenay Region Environmental Protection Effectiveness Evaluation Plan of Creston Valley, BC. 2008. URL: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/monitoring-water-quality/kootenay-wq-docs/wq_ko_creston_eval_aug2008.pdf. Accessed March 2014.
- Mitchell, B. 1961. Rufus Woods and Columbia river development. *The Pacific Northwest Quarterly* 52 (4): 139-44.
- Moore, Jason, W. 2000a. Environmental crises and the metabolic rift in world-historical perspective. *Organization & Environment* 13 (2): 123-57.
- Moore, Jason, W. 2000b. *Capitalism in the web of life*. London: Verso.
- Morse, Janice M. and Lyn Richards. 2002. Read me first for a user's guide to qualitative methods. Thousand Oaks, CA: Sage.
- Morrison, Dawn. 2011. "Indigenous food sovereignty – A model for social learning." In *Food sovereignty in Canada: creating just and sustainable food systems*, edited by Hannah

- Wittman, Annette Aurélie Desmarais and Nettie Wiebe. Halifax: Fernwood Publishing: 97–113.
- Morrison, Dawn and Abra Brynne. 2016. Responsibilities and relationships: Decolonizing the BC Food Systems Network / Indigenizing our praxis. Vancouver: Indigenous Food Systems Network.
- Morrison, Dawn and Heather Pritchard. 2015. Cross cultural interface: Where Indigenous and sustainable Agri-food systems intra-act: Session Report. Vancouver: Indigenous Food Systems Network.
- Morrison, Dawn. 2019. BC Centre for Disease Control. Conceptual framework for food security indicators in British Columbia: Summary report. Vancouver, B.C.: BC Centre for Disease Control, Population and Public Health.. 2019.
- Morton, Brian. 2008. BC farmers earning less: Profits plummet as fuel and feed costs soar, survey finds. Vancouver Sun May 26, 2011.
- Mouat, Jeremy. 2012. “The Columbia exchange: A Canadian perspective on the negotiation of the Columbia River Treaty, 1944-1964.” In *The Columbia river treaty revisited*, edited by Barbara Cosens. Corvallis: Oregon State University Press.
- Mousseau, Frederic. 2009. “From food handouts to integrated food policies.” In *Global Food Crisis: Governance challenges and opportunities*, edited by Jennifer Clapp and Marc J. Cohen. North York, Waterloo: Wilfrid Laurier University Press.
- Muecke, Marjorie. 1994. “On the evaluation of ethnographies.” In *Critical issues in qualitative research methods*, edited by Janice M. Morse. Thousand Oaks, CA: Sage.
- Murphy, Kevin James Douglas. 1983. Land use trends and the influence of orchard management in the soils of Creston, BC. *Master thesis*, University of British Columbia.
- Murton, James Ernest. 2002. Creating a countryside in British Columbia: An alternative modernity, 1919-1935. *PhD dissertation*, Queen’s University.
- Murton, James Ernest. 2007. *Creating a modern countryside: Liberalism and land resettlement in British Columbia*. Vancouver: UBC Press.
- National Council of Welfare. 2004. *Poverty Profile 2001*. Ottawa: Minister of Public Works and Government Services Canada.
- National Farmers Union (NFU). 2010. Losing our grip: How a corporate farmland buy-up, rising farm debt, and agribusiness financing of inputs threaten family farms and food sovereignty. NFU brief, June 7. URL: <https://www.nfu.ca/policy/losing-our-grip-how-a-corporate-farmland-buy-up-rising-farm-debt-and-agribusiness-financing-of-inputs-threaten-family-farms-and-food-sovereignty/>. Accessed April 28, 2019.

- National Farmers Union (NFU). 2019. Constitution and Bylaws of the National Farmers Union. URL: <https://www.nfu.ca/about/nfu-constitution-and-bylaws/>. Accessed April 5, 2019.
- Naylor, Rosamond L. 2014. *The evolving sphere of food security*. New York: Oxford University Press.
- Nesbit, Jack. 1994. *Sources of the river: Tracking David Thompson across Western North America*. Seattle: Sasquatch Books.
- Nixon, Denver V., and Lenore Newman. 2016. The efficacy and politics of farmland preservation through land use regulation: Changes in southwest British Columbia's agricultural land reserve. *Land Use Policy* 59: 227-40.
- Nolin, Anne, Eric Sproles, and Aimee Brown. 2012. "The effects of climate change on snow and water resources in the Columbia, Willamette, and McKenzie river basins, U.S.A." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University.
- Nonini, Donald M. 2013. The local-food movement and the anthropology of global systems. *American Ethnologist* 40(2): 267-75.
- Norman, Emma S. 2015. *Governing transboundary waters: Canada, the United States and shared waters*. New York: Routledge.
- Northwest Power and Conservation Council. 2019. Council seeks comments on recommendations to amend the Columbia river basin fish and wildlife program. URL: <https://www.nwcouncil.org/news/council-seeks-comments-recommendations-amend-columbia-river-basin-fish-and-wildlife-program>. Accessed January 6, 2019.
- Nyéléni Forum for Food Sovereignty. 2007. Declaration of the Forum for Food Sovereignty. Selingue, Mali, 23-27 February. URL: <http://nyeleni.org/spip.php?article290>. Accessed December 28, 2015.
- O'Connor, Niamh, Karim Farag and Richard Baines. 2016. What is food poverty? A conceptual framework. *British Food Journal* 118 (2): 429-49.
- O'Hara, P. 1994. "Constructing the future: Co-operation and resistance among farm women in Ireland." In *Gender and rurality*, edited by S. Whatmore, Terry Marsden and Philip Lowe, 50-68. London: David Fulton Publishers.
- Obersteiner, Michael, Mark Stafford Smith, Claudia Heipe, Mike Brklacich and Winston Rudder. 2010. "Green food systems for 9 billion." In *Food security and global environmental change*, edited by John Ingram, Polly Ericksen and Diana Liverman. London: Earthscan.

- Oldeman, L.R., R.T.A. Hakkeling and W.G. Sombroek. 1991. World map of the status of human-induced soil degradation. Global Assessment of Soil Degradation.
- Ontario Public Health Association. 2002. A systemic approach to community food security: A role for public health. URL: https://opha.on.ca/OPHA/media/Resources/Resource%20Documents/2002-01_pp.pdf?ext=.pdf. Accessed April 2016.
- Organisation for Economic Co-operation and Development (OECD). 2008. Growing unequal? Income distribution and poverty in OECD countries. Paris: URL: <https://doi-org.ezproxy.library.ubc.ca/10.1787/9789264044197-en>. Accessed September 3, 2018.
- Ortner, Sherry O. 2006. *Anthropology and social theory: Culture, power, and the acting subject*. Durham: Duke University Press.
- Ostry, Aleck. 2010. Food for thought: The issues and challenges of food security. Vancouver: Provincial Health Services Authority.
- Ostry, Aleck, Christiana Miewald and Rachelle Beveridge. 2011. Climate change and food security in British Columbia. The Pacific Institute for Climate Solutions, Victoria: University of Victoria.
- Ostry, Aleck, and Kathryn Morrison. 2010. A health and nutritional evaluation of changes in agriculture in the past quarter century in British Columbia: Implications for food security. *International Journal of Environmental Resources and Public Health* 7 (6): 2653-65.
- Paci, C.D. James, C. Dickson, S. Nickels, L. Chan, and C. Furgal. 2004. Food security of Northern Indigenous People in a time of uncertainty. URL: https://www.rha.is/static/files/NRF/OpenAssemblies/Yellowknife2004/3rd-nrf_plenary-4_pp_paci-et-al.pdf. Accessed May 2019.
- Paisley Richard Kyle, Matthew McKinney, Molly Smith Stenovec. 2015. A sacred responsibility: Governing the use of water and related resources in the international Columbia basin through the prism of tribes and first nations. Universities Consortium on Columbia River Governance. *Public land & resources law review* 37: 159. URL: <https://scholarship.law.umt.edu/plrlr/vol37/iss1/1>. Accessed April 28, 2019.
- Palmer, Vaughn. 2019. Vaughn Palmer: Once outstanding in their field, NDP bill makes B.C. farmers unpersons. April 1, 2019. URL: <https://vancouver.sun.com/opinion/columnists/vaughn-palmer-once-outstanding-in-their-field-ndp-bill-makes-b-c-farmers-unpersons>. Accessed May 4, 2019.
- Paragamian, V. L. 2012. Kootenai river white sturgeon: Synthesis of 2 decades of research. *Endangered Species Research* (17): 157-67.

- Parry, Martin, Cynthia Rosenzweig, and Matthew Livermore. 2005. Climate change, global food supply and risk of hunger. *Philosophical Transactions of the Royal Society of London B - Biological Sciences* 360 (1463): 2125-38.
- Patel, Rajeev. 2006. Transgressing rights: La Vía Campesina's call for food sovereignty. URL: <https://www.tandfonline.com/doi/abs/10.1080/13545700601086838>. Accessed August 21, 2018.
- Patel, Rajeev. 2009. What does food sovereignty look like? *The Journal of Peasant Studies* 36 (3): 663-706.
- Patel, Rajeev. 2010. "What does food sovereignty look like?" In *Food sovereignty: Reconnecting food, nature and community*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe. Nova Scotia: Fernwood Publishing.
- Patel, Rajeev. 2012. Food sovereignty: power, gender, and the right to food. *PLoS Medicine* 9 (6): 1-4.
- Paul, Benjamin, D. 1953. "Interview techniques and field relationships." In *Anthropology today: An encyclopedic inventory*, edited by A.L. Kroeber. Chicago: University of Chicago.
- Pearson, Mary L. 2012. "The river people and the importance of salmon." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Pechlaner, Gabriela and Gerardo Otero. 2010. The Neoliberal Food Regime: Neoregulation and the new division of labour in North America. *Rural Sociology* 75(2): 179-208.
- Peekhaus, Wilhelm. 2013. *Resistance is fertile: Canadian struggles on the BioCommons*. Vancouver: University of British Columbia Press.
- Peery, Chris. 2012. "The effects of dams and flow management on Columbia river ecosystem processes." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Pellegrino Cerri, Carlos Eduardo, Carlos Clemente Cerri, Stoccio Malta Ferreira Maia, Cherubin, Mauricio Roberto, Feigl, Brigitte Josefine, et al. 2018. Reducing Amazon deforestation through agricultural intensification in the Cerrado for advancing food security and mitigating climate change. *Sustainability* 10 (4): 989.
- Penfold, George, 2012. *A Review of the Range of Impacts and Benefits of the Columbia River Treaty on Basin Communities, the Region and the Province*. Ministry of Energy, Mines and Natural Gas: Columbia River Treaty Review.
- People's Food Policy Project (PFPP). 2010. First principles protocol for building cross-cultural relationships. URL:

- http://foodsecurecanada.org/sites/foodsecurecanada.org/files/First_Principles_July_2010.pdf
Accessed July 27, 2016.
- People's Food Policy Project (PPFP). 2011. Resetting the table: a people's food policy for Canada. URL: www.peoplefoodpolicy.ca. Accessed May 13, 2015.
- Perfecto, Ivette. 1992. Pesticide exports to the third world. *Race and Class* 34 (1): 107-14.
- Perfecto, Ivette, John Vandermeer, and Angus Wright. 2009. *Nature's Matrix: Linking Agriculture, Conservation and Food Sovereignty*. London, UK: Earthscan.
- Pike, Robin G., Katrina E. Bennett, Todd E. Redding, Arelia T. Werner, David L. Spittlehouse, R.D. (Dan) Moore, Trevor Q. Murdock, Jos Beckers, Brian D. Smerdon, Kevin D. Bladon, Vanessa N. Foord, David A. Campbell and Peter H. Tschaplinski. 2010. Climate Change Effects on Watershed Processes in British Columbia. URL: https://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh66/Lmh66_ch19.pdf Accessed June 20, 2019. Forest Science Program, Land Management Handbook. Columbia Basin Watershed Network. Add to intext citations on climate change.
- Pimbert, Michael. 2008. Towards food sovereignty: reclaiming autonomous food systems. CAFS, IIED and RCC: London. URL: pubs.iied.org/pdfs/G02268.pdf. Accessed April 28, 2019.
- Ponting, C. 2007. A new green history of the world: The environment and the collapse of great civilizations. New York: Penguin Books.
- Postel, Sandra L. and Aaron T. Wolf. 2001. Dehydrating Conflict. *Foreign Policy* 126, 60-67.
- Pottier, John. 1999. *Anthropology of Food: The Social Dynamics of Food Security*. Cambridge: Polity Press.
- Pretty, Jules. 2007. *The earth only endures*. London, UK: Earthscan.
- Pretty, Jules. 2008. Agricultural sustainability: concepts, principles and evidence. *Philosophical Transactions Royal Society B* 363: 447-65. URL: <https://royalsocietypublishing.org/doi/full/10.1098/rstb.2007.2163>. Accessed April 28, 2019.
- Price, T. Douglas, and Ofer Bar-Yosef. 2011. The origins of agriculture: New data, new ideas: An introduction to supplement 4. *Current Anthropology* 52 (S4): S163-74.
- PROOF Food Insecurity Policy Research. 2018. Household food insecurity in Canada. URL: <https://proof.utoronto.ca/food-insecurity/>. Accessed March 22, 2019.
- Provincial Agricultural Land Commission. 2018. Annual Report 2017 – 2018. URL: https://www.alc.gov.bc.ca/assets/alc/assets/library/commission-reports/annual_report_2017-2018.pdf. Access June 4, 2019.

- Qualman, Darrin. 2011. "Advancing agriculture by destroying farms? The state of agriculture in Canada." In *Food sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 20-42. Nova Scotia: Fernwood Publishing.
- Qualman, Darrin. 2019. *Civilization Critical: Energy, food, nature, and the future*. Halifax and Winnipeg: Fernwood Publishing.
- Quisumbing, Agnes R., Lynn R. Brown, Hilary Sims Feldstein, Lawrence Haddad, and Christine Pena. 1996. Women: The key to food security. *Food and Nutrition Bulletin* 17 (1): 1-2.
- Radimer, K. L., C. M. Olson, J. C. Green, C. C. Campbell and J-P Habicht. 1992. Understanding hunger and developing indicators to assess it in women and children. *Journal of Nutrition Education*. 24 (1): 36S-45S.
- Rajagopalan, K., K. J. Chinnayakanahalli, C. O. Stockle, R. I. Nelson, C. E. Kruger, M. P. Brady, et al. 2018. Impacts of near-term climate change on irrigation demands and crop yields in the Columbia River basin. *Water Resources Research* 54: 2152-82.
- Rajotte, Freda. 1998. *First Nations faith and ecology*. London: Wellington House.
- Ramankutty, N. and J.A. Foley. 1999. Estimating historical changes in global land cover: Croplands from 1700 to 1991. *Global Biogeochemical Cycles* 12:997-1027.
- Raphael, Dennis. 2004. "Introduction to the social determinants of health." In *Social Determinants of Health: Canadian Perspectives*, edited by Dennis Raphael, 1-18. Toronto: Canadian Scholars Press.
- Raphael, Dennis. 2007. *Poverty and policy in Canada: Implications for health and quality of life*. Toronto: Canadian Scholars' Press Inc.
- Raphael, Dennis. 2009. Poverty, human development, and health in Canada: Research, practice, and advocacy dilemmas. *Canadian Journal of Nursing Research* 41 (2): 7-18.
- Reading, C. and F. Wien. 2009. Health inequalities and social determinants of Aboriginal People's health. National Collaborating Centre of Aboriginal Health. URL: https://www.nccah-ccnsa.ca/495/Publication_view.nccah?id=46. Accessed April 28, 2019.
- Reed, P. 2011. REDD+ and the Indigenous question: a case study from Ecuador. *Forests* 2 (2): 525-49. URL: <https://www.mdpi.com/1999-4907/2/2/525>. Accessed April 28, 2019.
- Regional District of Central Kootenay. 2011. Agriculture Plan. Accessed July 19/2013. URL: https://rdck.ca/assets/Services/Sustainability~and~Environmental~Initiatives/Documents/2011-06-15-RDCK_AgPlan.pdf.

- Regional District of Central Kootenay Agricultural Land Use Inventory (RDCKALUI): Summer 2016. 2016. URL: https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/agricultural-land-and-environment/strengthening-farming/land-use-inventories/rdck_aluireport_may11_2017.pdf. Accessed May 2019.
- Reutter, Linda I., Gerry Veenstra, Miriam. J. Stewart, Dennis Raphael, et al. 2006. Public attributions for poverty in Canada*. *The Canadian Review of Sociology and Anthropology* 43 (1): 1-22.
- Riches, Graham. 2012. There is food poverty in Canada. *National Post*. URL: <http://ezproxy.library.ubc.ca/login?url=https://search-proquest-com.ezproxy.library.ubc.ca/docview/1015066600?accountid=14656>. Accessed August 21, 2018.
- Riches, Graham. 2018. *Food bank nations: Poverty, corporate charity and the right to food*. New York, NY: Routledge.
- Rissoli, Rafael Zanelli, Fabio Camargo Abdalla, Monica Jls Costa, Francisco Tadeu Rantin, David John McKenzie, and Ana Lucia Kalinin. 2016. Effects of glyphosate and the glyphosate based herbicides roundup original® and roundup transorb® on respiratory morphophysiology of bullfrog tadpoles *Chemosphere* 156: 37-44.
- Robin, Tabitha. 2019. Our Hands at Work: Indigenous Food Sovereignty in Western Canada. *Journal of Agriculture, Food Systems, and Community Development* 9 (B): 1-15.
- Robbins, Paul. 2004. *Political ecology: a critical introduction*. Oxford: Blackwell.
- Robidoux, M. A., Haman, F., and C. Sethna. 2009. The relationship of the burbot (Lota L.) to the reintroduction of off-the-land foods in the Sandy Lake First Nation Community. *Biodemography and social biology* 55(1), 12-29.
- Rocheleau, Dianne. 1995. Maps, numbers, text, and context: Mixing methods in feminist political ecology. *The Professional Geographer* 47: 458-66.
- Roper, Janice M. and Jill Shapira. 2000. *Ethnography in nursing research*. Thousand Oaks, CA: Sage.
- Roppel, Carla, Annette Aurélie Desmarais, Diane J. F. Martz. 2006. Farm women and Canadian agricultural Policy. Policy Status of Women Canada. *Ottawa: Status of Women Canada*. URL: <http://publications.gc.ca/site/eng/9.667445/publication.html>. Accessed April 28, 2019.
- Rosol, Renata, Catherine Huet, Michele Wood, Crystal Lennie, Geraldine Osborne, and Grace M. Egeland. 2011. Prevalence of affirmative responses to questions of food insecurity: International polar year Inuit health survey, 2007-2008. *International Journal of Circumpolar Health* 70(5): 488-97.

- Rossett, Peter M. and Maria Elena Martinez-Torres. 2012. Rural social movements and agroecology: Context, theory, and process. *Ecology and Society* 17 (3): 1-12.
- Rossett, Peter M., Raj Patel and Michael Courville. 2006. *Promised Land: Competing visions of agrarian reform*. Oakland: Food First Books.
- Roubanis, N. 2004. Biofuels, and their growing importance. Energy Statistics, Working group meeting: Special issue paper 6. Paris: OECD.
- Runka, G. Gary. 2006. B.C.'s Agricultural Land Reserve – It's historical Roots. URL: https://www.alc.gov.bc.ca/assets/alc/assets/library/archived-publications/alr-history/alr_historical_roots_-_runka_2006.pdf. Accessed June 4, 2019.
- Sachs, Carolyn. 1983. *Gendered fields: Women, agriculture and environment*. Boulder, CO: Westview Press.
- Sachs, Carolyn and Anouk Patel-Campillo. 2014. Feminist food justice: Crafting a new vision. *Feminist Studies* 40 (2): 396-410.
- Sage, Colin. 2012. *Environment and food*. New York: Routledge.
- Sage, Colin. 2014. Food security, food sovereignty and the special rapporteur: Shaping food policy discourse through realising the right to food. *Dialogues in Human Geography* 4 (2): 195-99.
- Sanderson, Chris W. 2012. "The Columbia river treaty after 2024." In *The Columbia river treaty revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Sandford, Robert, Deborah Harford, and Jon O'Riordan. 2014. *The Columbia river: A primer*. Victoria: Rocky Mountain Books.
- Saputo. 2019. Company Profile. URL: <http://www.saputo.com/en/our-company>. Accessed February 15, 2019.
- Schaeffer, Claude E. 1940. The Subsistence Quest of the Kutenai: A Study of the Interaction of Culture and Environment. *PhD Dissertation*. University of Pennsylvania.
- Schanbacher, William D. 2010. *The politics of food: The global conflict between food security and food sovereignty*. Santa Barbara, California: ABC-CLIO, LLC.
- Scherr, Sara J., Sajal Sthapit and Lisa Mastny. 2009. Mitigating climate change through food and land use. *Worldwatch Report* 179. Washington, DC: Worldwatch Institute.
- Schreier, Andrea, Olaf P. Langness, Joshua A. Israel and Erick Van Dyke. 2016. Further investigation of green sturgeon (*acipenser medirostris*) distinct population segment composition in non-natal estuaries and preliminary evidence of Columbia river spawning. *Environmental Biology of Fishes* 99 (12): 1021-32.

- Scott, James C. 1990. *Domination and the arts of resistance: Hidden transcripts*. New Haven: Yale University Press.
- Scott, James C. 1998. *Seeing like a state: How certain schemes to improve the human condition have failed*. New Haven, CT: Yale University Press.
- Shiva, Vandana. 1989. *Staying alive: Women, ecology and development*. London: Zed Books.
- Shiva, Vandana. 1991. *The violence of the green revolution: Third World agriculture, ecology, and politics*. London: Zed Books.
- Shiva, Vandana. 1993. *Monocultures of the mind: Perspectives on biodiversity and biotechnology*. London: Zed Books.
- Shiva, Vandana. 2002a. *Water wars: Privatization, pollution and profit*. Cambridge: South End Press.
- Shiva, Vandana. 2002b. "Globalisation and food security." In *Sustainable agriculture and food security: The impact of globalization*, edited by Vandana Shiva and Gitanjali Bedi, 11-72. New Delhi: Sage publications.
- Shiva, Vandana. 2005. *Earth democracy: Justice, sustainability, and peace*. Cambridge: South End Press.
- Shiva, Vandana and Tom Crompton. 2002. "Monopoly and monoculture: Trends in the Indian seed industry." In *Sustainable agriculture and food security: The impact of globalization*, edited by Vandana Shiva and Gitanjali Bedi, 347-95. New Delhi: Sage publications.
- Shurts, John. 2012. "Rethinking the Columbia river treaty." In *The Columbia river treaty revisited: Transboundary river governance in the face of uncertainty*, edited by Barbara Cosens, 192-248. Corvallis, OR: Oregon State University Press.
- Slow Food. 2019. Seventh Slow Food International Congress. URL: <https://n4v5s9s7.stackpathcdn.com/wp-content/uploads/2017/10/04-Indigenous-People.pdf>. Accessed August 8, 2019.
- SOTW. 2011. State of the World's forests. Rome: Food and Agriculture Organization of the United Nations. URL: <http://www.fao.org/3/i2000e/i2000e00.htm>. Accessed April 28, 2019.
- Sonnino, Roberta, Ana Moragues Faus and Albino Maggio. 2014. Sustainable food security: an emerging research and policy agenda. *International Journal of Sociology of Agriculture and Food* 21 (1): 173-88.
- Sonnino, Roberta and Owain Hanmer. 2016. Beyond food provision: Understanding community growing in the context of food poverty. *Geoforum* 74: 213-21.

- Sorboe, M. M. 1967. Farming in the Creston Valley of British Columbia. *Canadian Farm Economics* 2 (4): 14-20.
- Spicer, Janet. 2018. Next round of Columbia river treaty talks set for Nelson next week. URL: <https://www.castlegarnews.com/news/next-round-of-columbia-river-treaty-talks-set-for-nelson-next-week/>. Accessed August 13, 2018.
- Spritzer, Donald E. 1979. *Waters of wealth: The story of Kootenai River and Libby Dam*. Boulder: Pruett Publishing Company.
- Stake, Robert. 1995. *The art of case study research*. Thousand Oaks, CA: Sage.
- Stake, Robert. 2005. "Qualitative case studies." In *The Sage handbook of qualitative research*, edited by N. K. Denzin and Y. S. Lincoln, 3rd ed., 443-66. Thousand Oaks, CA: Sage.
- Statistics Canada. 1987. Census, Canada 1986, agriculture. Cat. No. 96-102, December. Ottawa: Ministry of Supply and Services.
- Statistics Canada. 2007. 2006 Census of agriculture: Farm data and farm operator data. Cat. No. 95-629-XWE, May 16. URL: <http://www.statcan.gc.ca/pub/95-629-x/2007000/4123856-eng.htm>. Accessed August 17, 2018.
- Statistics Canada. 2008. Farm business characteristics. URL: <https://www150.statcan.gc.ca/NONE/pub/95-629-x/2007000/4182411-eng.htm#tgfr>. Accessed December 12, 2018.
- Statistics Canada. 2016a. Census profile, 2016 census. URL: <https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=CSD&Code1=5903010&Geo2=CD&Code2=5903&Data=Count&SearchText=Central%20Kootenay&SearchType=Begins&SearchPR=01&B1=All&TABID=1>. Accessed September 12, 2018.
- Statistics Canada. 2016b. Over a quarter of gross farm receipts from greenhouse and nursery production in British Columbia. URL: <https://www150.statcan.gc.ca/NONE/pub/95-640-x/2011001/p1/prov/prov-59-eng.htm>. Accessed September 15, 2018.
- Statistics Canada. 2016c. Canadian Community health survey (CCHS) – Annual component. URL: http://www23.statcan.gc.ca/imdb-bmdi/document/3226_D7_T9_V8-eng.htm. Accessed August 27, 2017.
- Steffen Will, Jacques Grinevald, Paul Crutzen and John McNeill. 2011. The anthropocene: conceptual and historical perspectives. *Philosophical Transactions of the Royal Society* 369: 842-67.
- Stoller, Paul. 1989. *The taste of ethnographic things: The senses in anthropology*. Philadelphia: University of Pennsylvania Press.

- Sundquist, E. and W. Broecker. 1985. *The carbon cycle and atmospheric CO₂: Natural variations archean to present*. Washington, DC: American Geophysical Union.
- Swainson, Neil. 1986. The Columbia river treaty – where do we go from here? *Natural Resources Journal* 26 (2): 243-59.
- Swanson, W.W. and P.C. Armstrong. 1930. Wheat. Toronto: The MacMillan Company of Canada Limited.
- Tarasuk, Valerie. 2016. *Food insecurity policy research, proof. Household food insecurity in Canada, 2014*. Toronto, On. CA: PROOF: Canadian Electronic Library/desLibris.
- Tarasuk, Valerie, J. Cheng, C. de Oliveira, N. Dachner, C. Gundersen, P. Kurdyak. 2015. Association between household food insecurity and annual health care costs. *Canadian Medical Association Journal* 187 (14): 429-36.
- Tarasuk, Valerie, Naomi Dachner and Rachel Loopstra. 2014. Food banks, welfare, and food insecurity in Canada. *British Food Journal* 116 (9): 1405-17.
- Tatebe, Kristi, Naomi Robert, Russel Liu, Angeli dela Rosa, Eric Wirsching and Kent Mullinix. 2018. Protection is not enough: Policy precedents to increase the agricultural use of BC's farmland. Richmond, BC: Institute for Sustainable Food Systems, Kwantlen Polytechnic University. URL: <http://www.kpu.ca/isfs>. Accessed April 28, 2019.
- Taylor, A. and R. Loopstra. 2016. Too poor to eat. Food insecurity in the UK. Food insecurity briefing, The Food Foundation. URL: www.foodfoundation.org.uk. Accessed August 23, 2018.
- Taylor, D. E. 2000. The rise of the environmental justice paradigm: injustice framing and the social construction of environmental discourses. *American Behavioral Scientist* 43 (4): 508-80.
- Taylor, Marcus. 2014. *Political ecology of climate change adaptation: livelihoods, agrarian change and the conflicts of development*. London: Routledge.
- Tesch, Renata. 1990. *Qualitative research: Analysis types and software tools*. New York: Falmer Press.
- The Columbia Basin Fish and Wildlife News Bulletin. 2017. River Ops 2017: Kootenai sturgeon respond to Libby Dam water pulses, habitat work. URL: <http://www.cbbulletin.com/439971.aspx>. Accessed April 20, 2018.
- The Columbia Basin Fish and Wildlife News Bulletin. 2018. Council symposium looks at white sturgeon survival throughout Columbia basin. URL: <file:///E:/6097640/Undelete/BackupData/Desktop%20Backup/DESKTOP->

- O4K6G8N/documents/DOCTORAL%20WORK/Chapter%207/Kootenay%20river%20sturgeon%20spawning%20unsuccessful.html. Accessed April 20, 2018.
- The Creston Museum. 2014. The Creston Valley and region: An illustrated short history. URL: <http://www.creston.museum.bc.ca/webpage/id/13>. Accessed January 5, 2013.
- The Trussell Trust. 2015. Stats. URL: <https://www.trusselltrust.org/news-and-blog/latest-stats/>. Accessed September 4, 2018.
- The United States Army Corps of Engineers (USACE). 2006. Upper Columbia alternative flood control and fish operations: Columbia river basin final environmental impact statement. URL: <http://www.usbr.gov/pn/programs/fcrps/pdf/ucaaltflood.pdf>. Accessed September 20, 2013.
- Thompson, Shirley, Asfia Gulrukh, Myrle Ballard, Byron Beardy, Durdana Islam, Vanessa Lozeznik and Kimlee Wong. 2011. Is community economic development putting healthy food on the table? Food sovereignty in northern Manitoba's aboriginal communities. *Journal of Aboriginal Economic Development* 7 (2): 14-39.
- Thompson, Lonnie, G., Ellen Mosley-Thompson, M. E. Davis, P.-N. Lin, K. Henderson, T. A. Mashiotta. 2003. Tropical glacier and ice core evidence of climate change on annual to millennial time scales. *Climate Change* 59: 137-55.
- Thorington, J. Monroe, and Eaton Cromwell. 1931. The Purcell Source of the Columbia River. *The Geographical Journal* 77 (5): 455-64.
- Todd, Zoe. 2015. "Indigenizing the Anthropocene." In *Art in the anthropocene: Encounters among aesthetics, politics, environments and epistemologies*, edited by H. Davis and E. Turpin, 241-254. London: Open Humanities Press.
- Toronto Public Health. 2006. "Chapter 1. Definitions of food security." In *Food security: Implications for the early years. Background paper*. Toronto, Ontario: Toronto Public Health. URL: http://www1.toronto.ca/city_of_toronto/toronto_public_health/healthy_public_policy/children/files/pdf/fsbp_ch_1.pdf. Accessed September 8, 2015.
- Townsend, Patricia K. 2009. *Environment anthropology: From pigs to policies*. Long Grove, Illinois: Waveland Press, Inc.
- Trauger, Amy. 2014. Toward a political geography of food sovereignty: transforming territory, exchange and power in the liberal sovereign state. *Journal of Peasant Studies* 41 (6): 1131-52.
- Truth and Reconciliation Treaty. 2015. Honouring the Truth, Reconciling for the Future. Summary of the Final Report of the Truth and Reconciliation Commission of Canada. URL: https://nctr.ca/assets/reports/Final%20Reports/Executive_Summary_English_Web.pdf. Accessed August 2017.

- Tsosie, Rebecca A. 2007. Indigenous people and environmental justice: the impact of climate change. *University of Colorado Law Review* 78: 1625-77.
- Tuhiwai Smith, Linda. 2012. *Decolonizing methodologies: Research and Indigenous people*. London, United Kingdom: Zed Books.
- Turney-High, Harry Holbert. 1941. *Ethnography of the Kutenai*. Wisconsin: the American Anthropological Association.
- UNCHR. 2004. Economic, social and cultural rights. The right to food. E/CN.4/2004/10. New York: United Nations-Commission on Human Rights (CHR). USDA ERS. 2016. Definitions of Food Security. Economic Research Service, United States Department of Agriculture. URL: <https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx>. Accessed August 23, 2018.
- UNFAO. 1996. Rome Declaration on World Food Security. World Food Summit Plan of Action November 13-17. URL: <http://www.fao.org/docrep/003/w3613e/w3613e00.HTM>. Accessed August 15, 2015.
- UNFAO. 2005. FAOSTAT Database. URL: <http://ref.data.fao.org/database?entryId=262b79ca-279c-4517-93de-ee3b7c7cb553>. Accessed on July 2, 2018.
- UNFAO. 2008a. *The State of Food Insecurity in the World 2008*. Food and Agriculture Organization of the United Nations, Rome. URL: <http://www.fao.org/newsroom/EN/news/2008/1000923/index.html>. Accessed June 18, 2018.
- UNFAO. 2008b. Briefing paper: Hunger on the rise. Rome.
- UNFAO. 2009. Declaration of the World Food Summit on Food Security, World Summit on food security, Rome, 16-18 November. URL: www.fao.org/.../Summit/.../Declaration/WSFS09_Draft_Declaration. Accessed April 27, 2019.
- UNFAO. 2012a. Contribution of agricultural growth to reduction of poverty, hunger and malnutrition: The role of agricultural growth in economic growth, and poverty and hunger reduction. URL: <http://www.fao.org/docrep/016/i3027e/i3027e00.htm>. Accessed August 17, 2013.
- UNFAO. 2012b. Social protection for the poor and vulnerable: A foundation for reducing hunger and malnutrition. URL: <http://www.fao.org/docrep/016/i3027e/i3027e05.pdf>. Accessed August 17, 2013.
- UNFAO. 2013. United Nations food and agriculture organization: High level expert forum – *How to Feed the World 2050*. Rome, Italy. URL: www.fao.org/.../expert.../How_to_Feed_the_World_in_2050.pdf. Accessed April 28, 2019.

- UNFAO. 2015. Food security statistics. UN Food and Agricultural Organization. URL: <http://www.fao.org/economic/ess/ess-fs/en/>. Accessed August 23, 2018.
- UNFAO. 2017a. The right to food around the globe, UN FAO. URL: <http://www.fao/right-to-food-around-the-globe/en/>. Accessed August 23, 2018.
- UNFAO. 2017b. Defining small-scale food producers to monitor target 2.3 of the 2030 agenda for sustainable development. URL: <http://www.fao.org/3/a-i6858e.pdf>. Accessed August 7, 2019.
- UNFAO. 2018. Poverty and hunger: Different but connected. URL: <http://www.fao.org/reduce-rural-poverty/overview/en/>. Accessed August 23, 2018.
- UNFAO. 2019. Key facts and findings: By the numbers: GHG emissions by livestock. URL: <http://www.fao.org/news/story/en/item/197623/icode/>. Accessed July 10, 2019. To include.
- UNFAO, IFAD and WFP. 2013. The State of Food Insecurity in the World 2013. The multiple dimensions of food security. Rome, FAO. URL: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=2ahUKEwjn8PW15vHhAhWZCjQIHT0tABMQFjAAegQIABAC&url=http%3A%2F%2Fwww.fao.org%2F3%2Fa-i3434e.pdf&usg=AOvVaw1w3vAKZ0l-J-TqXGgTHIU_. Accessed April 27, 2019.
- UNHRC. 2008. Promotion and protection of all human rights, civil, political, economic, social and cultural rights, including the rights to development. Report of the Special Rapporteur on the right to food. A/HRC/7/5. New York: United Nations-Human Rights Council (HRC). Accessed January 28, 2016.
- UNHRC. 2010. Preliminary study of the Human Rights Council Advisory Committee on discrimination in the context of the right to food. A/HRC/13/32. New York: United Nations-Human Rights council (HRC). Accessed January 28, 2016.
- UNHRC. 2012. Report of the Special Rapporteur on the right to Food, Olivier de Schutter: Mission to Canada (No. A/HRC/22/50/Add.1) Geneva: United Nations General Assembly.
- Union Paysanne. 2019. The organization. URL: <https://unionpaysanne.com/organisation/>. Accessed June 5, 2019.
- United Nations Department of Economic and Social Affairs (UNDESA). 2019. URL: <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>. Accessed May 27, 2019.
- United Nations Intergovernmental Panel on Climate Change (UNIPCC). 2019a. Climate Change and Land. URL: <https://www.ipcc.ch/srccl-report-download-page/>. Accessed August 13, 2019.

- United Nations Intergovernmental Panel on Climate Change (UNIPCC). 2019b. Food Security. URL: https://www.ipcc.ch/site/assets/uploads/2019/08/2f.-Chapter-5_FINAL.pdf. Accessed August 13, 2019.
- Van Maanen, J. 2011. *Tales of the field: On writing ethnography*. Chicago: University of Chicago Press.
- Vermont Sustainable Jobs Fund (VSJF). 2018. Background. URL: <http://www.vsjf.org/about-vsjf-vermont/background-history/>. Accessed September 10, 2018.
- Verner, Coolie and Dickinson, Gary. 1969. Rural people in the East Kootenay area: A summary of survey report #2 conducted under the Canada land inventory. Vancouver: The University of British Columbia.
- Vogel, Eve. 2012. "Can an international treaty strengthen a region and further social and environmental inclusion? Lessons from the Columbia River Treaty." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- Wagner, John and Joanne Taylor. 2019. La Nation du Bassin du Columbia. Un Modèle de Gouvernance de L'eau pour le XXI^e Siècle. *Anthropologie et Sociétés* 43(3).
- Wakefield, Sarah, Julie Flemming, Carla Klassen and Ana Skinner. 2012. Sweet charity revisited: organizational responses to food insecurity in Hamilton and Toronto, Canada. *Critical Social Policy* 33 (3): 427-50.
- Wallerstein, Immanuel. 2011. *The modern world-system I: Capitalist agriculture and the origins of the European world-economy in the 6teenth century, with a new prologue*. Berkeley: University of California Press.
- Walker, Ian R. and Marlow G. Pellatt. 2008. Climate change and ecosystem response in the Northern Columbia river basin: A paleoenvironmental perspective. *Environmental Reviews* 16: 113-40.
- Walker, Deward E. Jr. 1998. "Introduction." In *Handbook of North American Indians*, Vol. 12: Plateau, edited by Deward Walker. Washington: Smithsonian Institute.
- Walker, Deward E. Jr. and Roderick Sprague. 1998. "History until 1846," In *Handbook of North American Indians*, Vol. 12: Plateau, edited by Deward Walker. Washington: Smithsonian Institute.
- Wallach, Bret. 1988. A homestead in the Canadian Rockies: Between the Kootenay River and the Purcell wall. *The Geographer's Journal* (38) 3: 25-9.
- Waterfield, Donald Cresswell. 1970. *Continental waterboy: The Columbia river controversy*. Toronto: Clarke, Irwin.

- Watts, Michael J. 1983. *Silent violence: Food, famine and Peasantry in Northern Nigeria*. Berkeley, CA: University of California Press.
- Watts, Michael J. 2003. For political ecology. Unpublished manuscript. Berkeley: University of California.
- Weber, Christopheer L. and H. Scott Matthews. 2008. Food-miles and the relative climate impacts of food choices in the US. *Environmental Science and Technology* 42 (10): 3508-03.
- Weber, Max. 1946. "Bureaucracy." In *From Max Weber: Essays in Sociology*, edited by H. H. Gerth and C. Wright Mills. New York: Oxford University Press.
- Weinkauff, Ronald Albert. 1973. The Columbia Basin Project, Washington: Concept and reality, lessons for public policy. *PhD dissertation*, Oregon State University.
- Weisdorf, Jacob L. 2005. From foraging to farming: Explaining the neolithic revolution. *Journal of Economic Surveys* 19 (4): 561-86.
- Weiss, Tony. 2007. *The global food economy: The battle for the future of farming*. London: Zed Books.
- Welwood, Ron. 2003. Baillie-Grohman's diversion. *B.C. Historical News* 36 (4): 6-11.
- White, Anthony G. 2012. "The Columbia river: Operation under the 1964 Treaty." In *The Columbia River Treaty Revisited*, edited by Barbara Cosens. Corvallis, OR: Oregon State University Press.
- White, Richard. 1995. *The organic machine*. New York: Hill and Wang.
- Whyte, William F. 1989. "Doing research in Cornerville." In *In the field: Readings on the filed research experience*, edited by C.D. Smith and W. Kornblum, 69-82. New York; Praeger.
- Wiebe, Nettie and Kevin Wipf. 2011. "Nurturing food sovereignty in Canada." In *Food sovereignty in Canada: Creating just and sustainable food systems*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 1-20. Nova Scotia: Fernwood Publishing.
- Wikipedia. 2018. Creston, British Columbia. URL: https://en.wikipedia.org/wiki/Creston,_British_Columbia. Accessed September 15, 2018.
- Willows, N. D., P. Veugelers, K. Raine and S. Kuhle. 2009. Prevalence and sociodemographic risk factors related to household food security in aboriginal people in Canada. *Public Health Nutrition* 12 (8): 1150-6.
- Wilson, A., C.Z. Levkoe, P. Andree, A. Blay-Palmer, A. Boulet, M. Brockington, R. Ferguson, T. Galloway, D. Martin, H. Martorell, M. Robidoux, K. Skinner, A. Spring, S. Wesche. 2019.

- Cultivating Food Sovereignty and Sustainable Food Systems in the North: A Review and Recommendations. Montreal, Quebec: Food Secure Canada.
- Wilson, Patrick. I. 2016. The Columbia River treaty: The politics and possibilities for change. *Water Policy* 18 (4): 892-902.
- Wilson, Shawn. 2008. *Research is ceremony: Indigenous research methods*. Black Point, NS: Fernwood.
- Windfuhr, M. and J. Jonsen. 2005. *Food sovereignty: Towards democracy in localized food systems*. Warwickshire: ITDG/FIAN 70.
- Wittfogel, K. 1957. *Oriental despotism*. New Haven, Conn.: Yale University Press.
- Wittfogel, K. 1971. "Developmental aspects of hydraulic societies." In *Pre-historic agriculture*, edited by S. Struever, 557-71. Garden City, N.Y.L The Natural History Press.
- Wittman, Hannah. 2009a. *Community farms in BC: Building local food systems for sustainable communities: Community farms survey report*. The Land Conservancy of British Columbia.
- Wittman, Hannah. 2009b. Reworking the metabolic rift: La Vía Campesina, agrarian citizenship, and food sovereignty. *The Journal of Peasant Studies* 36 (4): 805-26.
- Wittman, Hannah, Annette Aurélie Desmarais and Nettie Wiebe. 2010. *Food sovereignty: Reconnecting food, nature and community*. Halifax: Fernwood Publishing.
- Wittman, Hannah. 2011a. Food sovereignty: A new rights framework for food and nature? *Environment and Society: Advances in Research* 2 (2011): 87-105.
- Wittman, Hannah. 2011b. "Reconnection agriculture and the environment: Food sovereignty and the agrarian basis of ecological citizenship." In *Food sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 91-105. Nova Scotia: Fernwood Publishing.
- Wittman, Hannah and Herb Barbolet. 2011a. "Super, natural": The potential for food sovereignty in British Columbia." In *Food Sovereignty in Canada*, edited by Hannah Wittman, Annette Aurélie Desmarais and Nettie Wiebe, 190-211. Nova Scotia: Fernwood Publishing.
- Wittman, Hannah, Annette Aurélie Desmarais and Nettie Wiebe. 2011b. *Food sovereignty in Canada: creating just and sustainable food systems*. Halifax: Fernwood Publishing.
- Wittman, Hannah, and Jennifer Blesh. 2017. Food sovereignty and *Fome Zero*: Connecting public food procurement programmes to sustainable rural development in Brazil. *Journal of Agrarian Change* 17: 81-105.

Wittman, Hannah, Jessica Dennis and Heather Pritchard. 2017. Beyond the market? New agrarianism and cooperative farmland access in North America. *Journal of Rural Studies* 53: 303-16.

World Bank. 1986. *Poverty and hunger: Issues and options for food security in developing countries*. Washington, DC: World Bank.

World Food Conference General Assembly. 1974. Universal Declaration on the Eradication of Hunger and Malnutrition. United Nations. URL: <https://www.ohchr.org/EN/ProfessionalInterest/Pages/EradicationOfHungerAndMalnutrition.aspx>. Retrieved August 28, 2015.

World Health Organization (WHO). 2014. Nutrition: Micronutrient deficiencies. URL: <http://www.who.int/nutrition/topics/vad/en/>. Accessed January 4th, 2016.

World Health Organization (WHO). Global hunger continues to rise, new UN report says. 2018. URL: <https://www.who.int/news-room/detail/11-09-2018-global-hunger-continues-to-rise---new-un-report-says>. Accessed July 1, 2019.

Worster, Donald. 1985. *Rivers of empire: water, aridity, and the growth of the American West*. New York: Pantheon Books.

Worster, Donald. 1993. *The wealth of nature: environmental history and the ecological imagination*. New York, NY: Oxford University Press.

Wright, Mat. 2017. Weaver introduces bill to protect agricultural land from speculation. February 16, 2017. URL: https://www.bcgreens.ca/weaver_introduces_bill_to_protect_agricultural_land_from_speculation. Accessed May 4, 2019.

yaqan nu?kiy Lower Kootenay Band. 2019. Our history. URL: <http://lowerkootenay.com/our-community/our-history/>. Accessed November 12, 2012.

Yeshewalul, Ayele. 1982. Agricultural extension agent roles in Canada and the United States. *PhD dissertation*, University of British Columbia. URL: <https://open.library.ubc.ca/cIRcle/collections/ubctheses/831/items/1.0055869>. Accessed April 25, 2018.

Yin, Robert K. 2003. *Case study research: Design and method*. Thousand Oaks, CA: Sage.

Appendices

Appendix A

Food security and food sovereignty in the Creston Valley of BC

Principal Investigator: John Wagner
PhD Candidate Researcher: Joanne Taylor
2016

Interview Questions – Farmers

Personal Background

1. Where were you born and in what year?
2. Where did you grow up? (one place or several)
3. How long have you lived in the community where you live now?
4. Are you currently married, and do you have any children? Age and gender of each child?
5. Do any of your children make their livings in agriculture?

Family History

1. Did (or do) your father or mother make their livings in agriculture?
2. If no, how did they make their livings? Where?
3. How did your spouse's parents make their livings? Where?
4. Do any of your brothers or sisters or their spouses make their livings in agriculture?
5. Do any other immediate family relatives make their livings in agriculture?

Educational history

1. Did you complete high school? In what year?
2. Have you attended any post-secondary institutions (colleges, universities, etc.)? If so, what is the highest degree or certificate obtained?
3. Have you taken any other training or professional development programs or courses?
Completion dates?

Cultural/Religious Background (for Mennonites, Mormons, Doukhobors only)

1. Does being a member of a [Mennonite, Mormon, and Doukhobor] affect your approach to farming? If so, please explain (land ownership, crops grown, technology, labour, etc.)

Agricultural Operations

1. Have you made your living in another trade or profession other than agriculture? If so for how long and where?
2. When did you first begin to make your living in agriculture?
3. Do you own the land you are farming? If so for how long?
4. How much land do you currently farm (acreage and location)?
5. What crops/varieties/livestock do you raise? Fruit?

6. What types of soil amendments do you use on your crops?
7. What types of chemicals do you use on your crops?
8. Do you consider your farm to be organic or certified organic?
9. Why have you chosen this method of growing food?
10. How do you market your produce (or livestock)?
11. Do you know where the food you grow ends up eventually (regions or countries)?
12. How many employees do you hire at different times of the year?
13. Which of your crops/livestock operations do you consider to be the most profitable?
14. Would you be willing to share with me some details concerning your agricultural income? (Gross and/or net farming income and expenses; breakdown by crop and livestock sector).
15. Are you covered by Farm Income Assurance? If so, how often over the past ten years have you been eligible to collect income assurance. How significant are these payments to your ability to make a living as a farmer?
16. What is your attitude towards land being taken out of the ALC?

Irrigation Water

1. Which of your crops or livestock operations require irrigation water?
2. What is the source of your irrigation water? Your drinking water?
3. Do you obtain water from a public or private water utility? Which one?
4. Do you have a private water license for agricultural use?
5. Have you ever obtained your water from another source?
6. Do you have any concerns with the quality of water you receive for irrigation purposes? For drinking purposes?
7. What type(s) of irrigation equipment do you use?
8. What do you believe to be the most important water management issues and challenges facing your region/community (i.e. water shortages, water quality, flooding)?
9. Are you satisfied, overall, with the way in which water is managed by your utility? In your community and region? If not, do you have any specific suggestions for improvements?

Personal and Family Food Consumption

1. Do you grow a garden for personal consumption?
2. How much of the food you eat comes from your garden and farming operation?
3. Do you hunt? Fish? Gather any wild plant foods (e.g. asparagus, mushrooms, berries)?
4. Do you engage in any other methods for obtaining food such as gathering wild medicinal herbs?
5. If so, what types of plants do you gather?

Columbia River Treaty

1. Are you familiar with the general terms of the Columbia River Treaty between Canada and the United States? *(if necessary, explain the treaty in sufficient detail to continue with the following questions).*
2. Is your irrigation water source dependent in any way on the water storage capacity of the Libby Dam?
3. Do you depend on the Kootenay River dykes to protect your land from flooding?
4. Has your land ever been flooded? If so, when? How severe was the flooding? Can you estimate the cost of this flooding to your farm operation?

5. Have you experienced irrigation water shortages at any time in the past or presently?
6. Do you expect shortages to be more likely in the future?
7. Does the operation of the Libby Dam have any direct impact on any other aspect of your farming operation?
8. Do you have any opinion on whether or not the treaty should be retained, terminated, or revised?
9. Are you a member of any organization that is advocating for changes to the treaty (e.g. a water utility or agricultural association)?
10. Are you satisfied with the consultation process undertaken by the BC government in respect to the Columbia River Treaty?
11. Do you believe that the interests of farmers will have any influence on the position taken by the governments of BC or Canada towards the future of the treaty?

The Future of Agriculture in the Creston Valley

1. How important is agriculture to the economy and culture of the Creston Valley?
2. What are the most significant challenges facing farmers in the Creston Valley today (market prices, land prices, labor, equipment costs, etc?)
3. Are you optimistic about the future of agriculture in the Creston Valley?
4. Do you feel that agriculture receives adequate support from government? If not, please explain what you would like to see change.
5. Do you feel that climate change is an important issue facing agriculture in this area?
6. Why or why not?
7. Do you think that future issues such as flooding or drought, will have an impact on the way food is grown in the Creston Valley?
8. How will it impact food procurement?
9. Will this affect the way in which farmers grow food? What are the implications for food security and sovereignty in the Creston Valley?

Appendix B

Food security and food sovereignty in the Creston Valley of BC

Principal Investigator: John Wagner
PhD Student Researcher: Joanne Taylor
2016
Ktunaxa Interview Questions

Personal Background

1. Where were you born and in what year?
2. Where did you grow up? (one place or several)
3. How long have you lived in the community where you live now?
4. Is this considered to be on reserve or off reserve?
5. Are you currently married, and do you have any children? Age and gender of each child?

Family History

1. What are the names of your parents? Grandparents? Your siblings?
2. Where were they born and in what years?
3. Where do they live now?

Educational history

1. Did you complete high school? In what year?
2. Have you attended any post-secondary institutions (colleges, universities, etc.)? If so, what is the highest degree or certificate obtained?
3. Have you taken any other training or professional development programs or courses?
Completion dates?
4. How do you make your living? For how long and where?
5. How does your spouse make her living and where? Grandparents? Children?

Food Procurement

1. What is the main food source for you and your family?
2. Do you or any of your family members hunt? Fish? Gather wild foods? Use wild foods for medicines or to make things?
3. How much do you depend on fish or other types of foods for your diet? Wild game? Wild Berries? Other medicinal plants?
4. What other foods do you procure and how?
5. Which foods do you procure by yourself? With other family members or relatives and which ones? Neighbours?
6. During which seasons do you procure the types of foods that you have mentioned above?
7. Where do you procure these foods? Specific locations?
8. Which foods do you consider to be more traditional rather than mainstream foods?
9. Do you grow any food for yourself and your family?
10. Do you grow any food for commercial purposes?

11. Do you find it more or less easy or difficult to find the foods that you prefer?

Food Security and Food Sovereignty

1. What are the most significant food procurement challenges facing First Nations in the Creston Valley today?
2. How important is agriculture and food procurement to the economy and culture of the Ktunaxa First Nation?
3. What is your perception of, and how do you define food security? Food sovereignty?
4. How do you believe the Ktunaxa can realize food security? Food sovereignty?
5. Are you familiar with the Fish Revitalization projects going on in the Columbia River Basin?
6. Do these initiatives help or hinder access to fish for you or your family?
7. Has it become more difficult or easier for you to access fish in this area as a result of these initiatives?
8. Do you think that a total revitalization of fish in the Columbia River Basin would contribute to realizing food security and food sovereignty for the Ktunaxa?
9. Are you optimistic about the future of food security and food sovereignty for the Ktunaxa in the Creston Valley?
10. Do you feel that the First Nations receive adequate support from government for food procurement and fish revitalization? If not, please explain what you would like to see change.
11. Could an adoption or adaptation of Indigenous food procuring principals benefit all food growers in the Creston Valley? How?

Climate Change

1. Do you feel that climate change is an important issue facing food and water security and sovereignty in this area?
2. Why or why not?
3. Do you think that future water issues, flooding, or drought, will have an impact on the way that First Nations procure food in the Creston Valley?
4. What are the implications for food security and food sovereignty for the First Nations in the Creston Valley during climate change?

Columbia River Treaty

1. Are you familiar with the general terms of the Columbia River Treaty between Canada and the United States? *(If necessary, explain the treaty in sufficient detail to continue with the following questions).*
2. Is your irrigation water source dependent in any way on the water storage capacity of the Libby Dam?
3. Do you depend on the Kootenay River dikes to protect your land from flooding?
4. Has your land ever been flooded? If so, when? How severe was the flooding?
5. Has this flooding affected any of the foods that you procure? Fish? Wild game?
6. Are you a member of any organization that is advocating for changes to the treaty?
7. Are you satisfied with the consultation process undertaken by the BC government in respect to the Columbia River Treaty for the Ktunaxa?
8. Do you believe that the interests of First Nations will have any influence on the position taken by the governments of BC or Canada towards the future of the treaty?
9. Do you have any opinion on whether or not the treaty should be retained, terminated, or revised?

REQUEST FOR DECISION (RFD)

Town of Creston



Action Date: October 27, 2020

File: 5280-02

SUBJECT: Regional District of Central Kootenay Woodstove Exchange Program

RECOMMENDATION: THAT the Request for Decision from the Director of Community Services, regarding the Woodstove Exchange Program 2021, BE RECEIVED; AND FURTHER, THAT Council COMMITS to participate in the Woodstove Exchange Program for 2021 with the Regional District of Central Kootenay, to provide a \$100 per stove rebate for Town of Creston residents or property owners, to a maximum of twenty stoves.

CAO COMMENTS:

RECOMMENDATION

Report / Document:

Attached ☐

Available ☐

Nil ☐

KEY ISSUE(S) / CONCEPTS DEFINED: The Woodstove Exchange program is an initiative of the provincial government, the Lung Association of BC, the Regional District of Central Kootenay and local municipalities. In 2021 the Regional District of Central Kootenay (RDCK) will, once again, coordinate a regional Woodstove Exchange program, offering residents of the RDCK and local municipalities a \$350 incentive to replace their old, inefficient wood stove with a new, cleaner-burning heating appliance. For the Town of Creston to participate, this initiative would involve a maximum of 20 - \$100 rebates to residents of Creston. The remainder of the \$350.00 incentive comes from the RDCK. The RDCK has requested a Council resolution to indicate their interest in participating in the program for 2021.

RELEVANT POLICY: Official Community Plan, Section VI. Energy & Greenhouse Gas Emissions Goal 1.8

STRATEGIC RELEVANCE: N/A

DESIRED OUTCOME(S): Continued participation in the Woodstove Exchange Program.

RESPONSE OPTIONS: Possible ways to achieve the main result with analysis highlights

1.	Council commits to participate in the Woodstove Exchange Program for 2021
2.	Council declines to participate in the Woodstove Exchange Program for 2021
3.	Other as per Council Direction

PREFERRED STRATEGY: Option 1

IMPLICATIONS OF RECOMMENDATION:

GENERAL: Supports the reduction of greenhouse gas emissions and improves air quality for Creston residents

ORGANIZATIONAL: N/A

FINANCIAL: A maximum of 20 - \$100 rebates to residents of Creston

FOLLOW UP ACTION: Respond to the RDCK to indicate interest in participating in the program

COMMUNICATION: N/A

OTHER COMMENTS: By others reviewing this RFD

Submitted by:

Ross Beddoes, DCS

Endorsed by: Other

Reviewed by: CAO

Reviewers



Box 590, 202 Lakeside Drive, Nelson, BC V1L 5R4
Telephone: (250) 352-6665
BC Toll Free: 1-800-268-7325

Web: www.rdck.ca
Email: info@rdck.bc.ca
Fax: (250) 352-9300

September 28, 2020

Town of Creston
PO Box 1339
238-10th Ave N
Creston, BC
V0B 1G0

Attn: Ross Beddoes

by email: ross.beddoes@creston.ca

Dear Ross:

The Woodstove Exchange Program is an initiative of the provincial government and the Lung Association of BC. The primary goal of the program is to improve air quality and reduce health problems attributable to wood burning. The program provides a financial incentive for residents to replace old, inefficient woodstoves with new, efficient, EPA-certified heating appliances. An education campaign is also part of the program.

The provincial grants allocated will be \$250 grants for the replacement of a non-EPA certified stove or insert with an EPA certified wood stove and \$400 if the appliance replacing the non-EPA/CSA wood burning stove is a cleaner burning appliance such as a pellet stove, an electric heat pump or a gas or propane stove.

RDCK is now asking if you would like to continue participating in the program throughout 2021:

As a participant in the program, the municipality will be required to do the following:

- Advertise the program on the municipal website;
- Contribute a \$100 rebate for each stove exchanged within your municipality (*Note – your Council may specify a maximum number of rebates for 2021*); and
- Disburse rebate cheques to successful program applicants (*Note – for each exchange, the RDCK will disburse the provincial rebate and then send payment details and a copy of the successful application to the relevant municipality*).

To confirm that your municipality intends to participate, we require a Council resolution or a letter from your CAO/CFO. Please send this information for my attention by or before October 23, 2020.

extension until Oct. 28,
2020

Sincerely:

Abby Fedorak
Administration Assistant Environmental Services
afedorak@rdck.bc.ca
250-352-8161



TOWN OF CRESTON**BYLAW NO. 1916**

A bylaw to amend Zoning Bylaw No. 1123, 1989.

WHEREAS Council has enacted a Zoning Bylaw;

AND WHEREAS Council deems it necessary and in the public interest to amend Zoning Bylaw No. 1123, 1989;

NOW THEREFORE the Council of the Town of Creston, in open meeting assembled, acts as follows:

Part 1 Citation

1.1 This bylaw may be cited as “Zoning Amendment Bylaw No. 1916, 2020”.

Part 2 Severability

2.1 If a portion of this bylaw is held invalid by a Court of competent jurisdiction, then the invalid portion must be severed and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

Part 3 Amendments

3.1 Schedule “A”, being the Zoning Map of Zoning Bylaw No. 1123, 1989, is amended by rezoning the property legally described as:

Lot 5, District Lot 891, Kootenay District, Plan EPP85933, PID: 030-594-511
(1516 Hillside Street)

from “Single Family Residential (R-1) Zone” to “Zero Lot Line Residential (R-2) Zone”, as shown on Schedule “A”, which is attached to and forms a part of this bylaw.

Part 4 Effective Date

4.1 This bylaw shall come into full force and effect upon adoption.

READ A FIRST TIME by content and SECOND TIME by title this 29th day of September, 2020.

PUBLIC HEARING was held this 13th day of October, 2020.

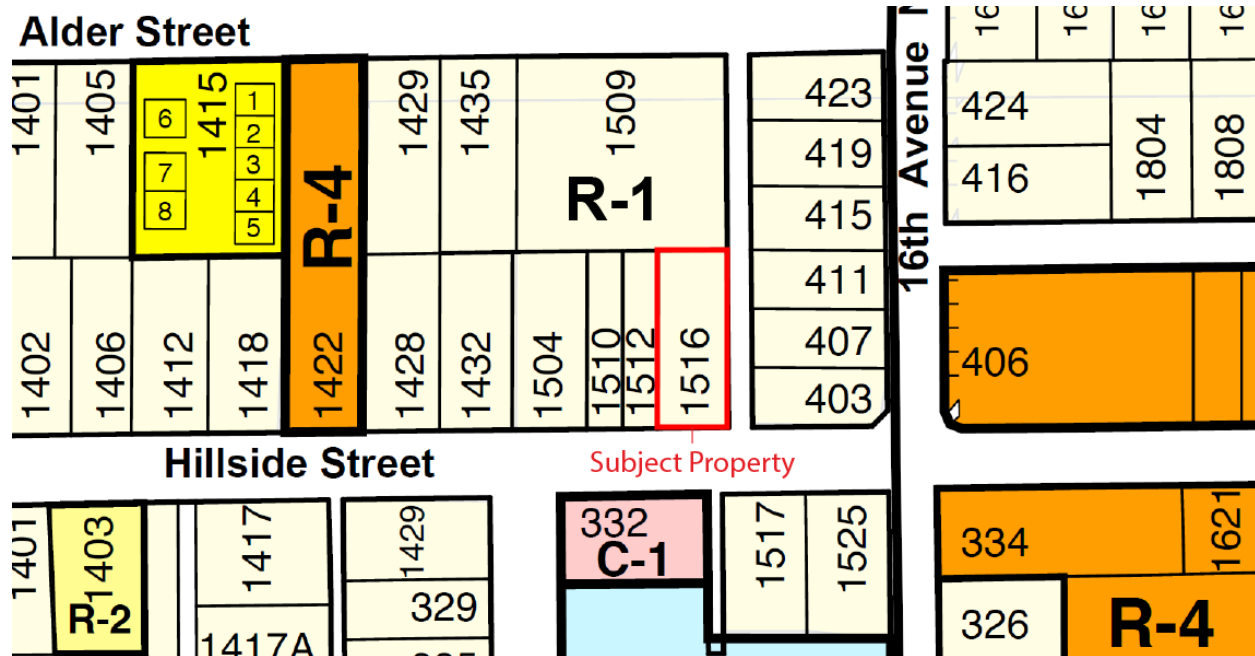
READ A THIRD TIME by title this 13th day of October, 2020.

ADOPTED this day of , 2020.

Mayor Ron Toyota

Bev Caldwell , Corporate Officer

SCHEDULE "A"
ZONING BYLAW NO. 1123, 1989



LEGAL: Lot 5, District Lot 891, Kootenay District, Plan EPP85933 (PID: 030-594-511)

CIVIC: 1516 Hillside Street

FROM: “Single Family Residential (R-1) Zone”

TO: “Zero Lot Line Residential (R-2) Zone”

TOWN OF CRESTON

BYLAW NO. 1917

A Bylaw to amend "2020, 2021 and 2022 Permissive Tax Exemption Bylaw No. 1898, 2019".

WHEREAS the *Community Charter* provides that Council may, by a bylaw adopted prior to October 31st in any year, exempt from taxation for a period not to exceed ten years, certain lands and improvements;

AND WHEREAS Council deems it to be in the public interest to exempt from taxation for the years 2020, 2021 and 2022, those properties set out herein;

NOW THEREFORE the Council of the Town of Creston, in open meeting assembled, enacts as follows:

1. This bylaw may be cited as "2020, 2021 and 2022 Permissive Tax Exemption Amendment Bylaw No. 1917, 2020".
2. "2020, 2021 and 2022 Permissive Tax Exemption Bylaw No. 1898, 2019" is amended by adding a new Section 3.5, as follows:

3.5 Pursuant to Section 224(2)(a) of the *Community Charter*, the land and improvements, described as follows, will be 95% exempt from property taxation for the years 2021 and 2022:

Creston Valley (Pacific No. 29) Branch of the Royal Canadian Legion	137 - 11 th Avenue North	413.00544.000	Lots 8 and 9, Block 1, District Lot 891, Kootenay District, Plan NEP893 PID: 013-446-738 and 013-446-711
--	--	---------------	--

3. This bylaw shall come into full force and effect as of January 1, 2021.

PUBLIC NOTICE, pursuant to Sections 94 and 227 of the *Community Charter*, was given the 1st and 8th day of October, 2020.

READ A FIRST TIME by title and SECOND TIME by content this 13th day of October, 2020.

READ A THIRD TIME by title this 13th day of October, 2020.

ADOPTED this day of October, 2020.

Mayor Ron Toyota

Bev Caldwell, Corporate Officer

TOWN OF CRESTON**BYLAW NO. 1918****A Bylaw to establish a Revitalization Tax Exemption Program.**

WHEREAS under Section 226 of the *Community Charter*, Council may provide a Revitalization Tax Exemption Program for land or improvements or both that is applicable to designated kinds of property, or related activities or circumstances;

WHEREAS Council wishes to establish a Revitalization Tax Exemption Program for the Eligible Improvements defined in Section 2 i) of this Bylaw;

WHEREAS Council is of the opinion that the development of new commercial businesses, or the redevelopment of existing commercial businesses, which encourage investment and employment, is a critical component of the economic revitalization and growth of the Town of Creston's Commercial Areas;

WHEREAS in accordance with Section 165 of the *Community Charter*, the Town has set out the objectives and policies in relation to the use of revitalization tax exemptions in the Five Year Financial Plan (2020-2024) Bylaw No. 1899, 2020 and this Bylaw is consistent with those objectives and policies;

WHEREAS the purpose of this Bylaw is to encourage the economic revitalization and economic growth of the Town of Creston by means of the development of new commercial businesses within the Designated Revitalization Area;

WHEREAS Council's reasons for creating the Revitalization Tax Exemption Program are as follows:

- a) Council recognizes that a critical component of the continued economic revitalization and growth of the Town is to build upon the success of its prior initiatives by encouraging the development of new commercial businesses, or the redevelopment of existing commercial businesses in the Town's zones that permit commercial uses, which will stimulate investment in the Town and provide new employment opportunities and commercial services for its existing and future residents, thereby attracting further economic growth and increasing the Town's tax base;
- b) the Town of Creston's Official Community Plan identifies the commercial objective of creating a strong and vibrant commercial economy in the Town of Creston; and,
- c) the Town of Creston's 2018-2019 Corporate Strategic Plan identifies economic development as a corporate priority;

WHEREAS the objectives of the Revitalization Tax Exemption Program are to:

- a) encourage new commercial businesses in new and renovated buildings in the Town's zones that permit commercial uses and thereby establish the commercial services and the investment and employment opportunities that will attract additional investment and economic growth to the Town of Creston; and
- b) reinforce the municipality's "open for business" approach and attract redevelopment and new development of commercial businesses within the municipality;

AND WHEREAS notice of this Bylaw has been given in accordance with Sections 94 and 227 of the *Community Charter*;

NOW THEREFORE the Council of the Town of Creston, in open meeting assembled, enacts as follows:

1. This Bylaw may be cited as "Revitalization Tax Exemption Bylaw No. 1918, 2020".
2. In this Bylaw:
 - a) "Appropriately Zoned Land" means Parcels that are zoned and licensed as described in Section 4 of this Bylaw;
 - c) "Assessed Value" means the value of land and improvements in a specified year, as determined by the Assessment Authority in the assessment region of the Province of British Columbia in which the land and improvements are located;
 - d) "Calendar Year" and "Year" means all months inclusive from January to December;
 - e) "Chief Building Official" means the person appointed by Council to that position or a person authorized by the Chief Building Official to perform his/her duties under this Bylaw;
 - f) "Council" means the Council of the Town of Creston;
 - g) "Designated Revitalization Area" means the area designated as such under Section 3 of this Bylaw;
 - h) "Director of Finance and Corporate Services" means the person appointed by the Council to that position or other Corporate Officer of the Town of Creston;
 - i) "Eligible Improvement" means:
 - .i an existing building, used only for an Eligible Use, on Appropriately Zoned Land and having a renovation project value of \$50,000.00 or greater as determined by the Town's Chief Building Official and for which a valid Building Permit has been issued by the Town after the adoption of this Bylaw or within 180 days prior to adoption of this Bylaw;
 - .ii a new building, used only for an Eligible Use, that is constructed on Appropriately Zoned Land and having a construction project value of \$150,000.00 or greater as determined by the Town's Chief Building Official and for which a valid Building Permit has been issued by the Town after the adoption of this Bylaw or within 180 days prior to adoption of this Bylaw.
 - j) "Eligible Land" means the area of a Parcel occupied by the footprint of the Eligible Improvements on the land to be detailed in the Revitalization Tax Exemption Agreement;
 - k) "Eligible Use" means a Principal Eligible Use;
 - l) "Municipal Property Taxes" means the municipal portion of taxes imposed on the land and improvements by the Town under Section 197(1)(a) of the *Community Charter*;
 - m) "Owner" means the registered Owner of the Eligible Improvement;
 - n) "Parcel" means a parcel upon which one or more improvements are to be constructed that may qualify the land or improvements, or both, for a tax exemption under this Bylaw;
 - o) "Principal Eligible Use" means a commercial use permitted on Appropriately Zoned Land as defined under Section 4 of this Bylaw;
 - p) "Recapture Amount" means the amount an Owner is required to pay to the Town under Section 8 of this Bylaw;

- q) "Revitalization Tax Exemption Agreement" or "Agreement" means an Agreement between the Owner of the Eligible Improvements and the Town of Creston that is substantially in the form attached to this Bylaw as Schedule "A";
- r) "Revitalization Tax Exemption Certificate" means a Revitalization Tax Exemption Certificate issued by the Town of Creston pursuant to this Bylaw and pursuant to the provisions of Section 226 of the *Community Charter*, substantially in the form attached to this Bylaw as Schedule "B";
- s) "Term" means the number of years for which a tax exemption is granted under Section 9 of this Bylaw;
- t) "Town" means the Town of Creston.

3. DESIGNATED REVITALIZATION AREA

- 3.1 The Designated Revitalization Area consists of all properties within the Town of Creston that are located in a commercial zone under the Town's Zoning Bylaw No. 1123, 1989 as defined in Section 4 of this Bylaw, that permits *commercial uses*.

4. APPROPRIATELY ZONED LAND

- 4.1 To qualify as an Eligible Improvement, an improvement must be located on a Parcel that is zoned *General Commercial C-1, Local Commercial C-2, Tourist Commercial C-3, Licensed Premises Commercial C-4, Mixed Use Commercial C-5, Highway Service Commercial HSC, Highway Service Commercial – Hotel/Convention Centre HSC-H, or Highway Service Commercial – Light Manufacturing HSC-M* as detailed in Schedule "A" of Zoning Bylaw No. 1123, 1989; and, have a valid Building Permit issued by the Town of Creston for the construction of a Principle Eligible Improvement.

5. REQUIRED CONSTRUCTION VALUE

- 5.1 Revitalization Tax Exemptions will apply only to:
 - a) a redevelopment or alteration of an existing Eligible Improvement that has a construction value in excess of \$50,000.00; or
 - b) construction of a new Eligible Improvement, under this Bylaw, with a construction value in excess of \$150,000.00;

both values are to be determined by the Chief Building Official whose decision shall be final.

6. APPLICATION FOR EXEMPTION CERTIFICATE

- 6.1 An application for a Revitalization Tax Exemption Certificate must be made to the Town's Director of Finance and Corporate Services on or before August 31 in the year prior to the first year in respect of which a tax exemption is sought and be accompanied by an Occupancy Permit for the Eligible Improvement issued by the Town.

- 6.2 The application must include sufficient information, as required by the Director of Finance and Corporate Services, to verify that the proposed development is an Eligible Improvement.
- 6.3 The Town of Creston will accept applications for a Revitalization Tax Exemption only in the years 2021, 2022 and 2023, and no applications will be accepted after August 31, 2023.
- 6.4 After obtaining a Building Permit from the Town for the construction of an Eligible Improvement, the Applicant may submit a Revitalization Tax Exemption Application in the form provided by the Town, but the Revitalization Tax Exemption Certificate must not be issued until the requirements and conditions for a Revitalization Tax Exemption Certificate prescribed in this Bylaw, the Agreement and the form of the Revitalization Tax Exemption Certificate in Schedule B to this Bylaw, together with any additional requirements and conditions required by the Town, have been met by the Applicant.
- 6.5 If construction commenced prior to the time limit in subsection 2(i) of the definition of Eligible Improvement in this Bylaw, the Revitalization Tax Exemption Application will not be eligible for consideration under this Bylaw.

7. REVITALIZATION TAX EXEMPTION CERTIFICATE

- 7.1 Once all conditions and requirements prescribed in this Bylaw and the Agreement as prerequisites for the issuance of a Revitalization Tax Exemption Certificate have been met, the Town's Director of Finance and Corporate Services must issue a Revitalization Tax Exemption Certificate for the property that is the subject of the Agreement.
- 7.2 If the Revitalization Tax Exemption Certificate is issued on or before October 31, the tax exemption takes effect in the following Calendar Year.
- 7.3 A Revitalization Tax Exemption Certificate must be issued for the Eligible Improvements in the form attached as Schedule "B" and must include the conditions set out in that form.

8. CANCELLATION OF CERTIFICATE

- 8.1 A Revitalization Tax Exemption Certificate issued for Eligible Improvements is subject to the requirement that all of the conditions set out in the Revitalization Tax Exemption Agreement continue to be met during the Term established in Section 9 of this Bylaw.
- 8.2 Council may cancel a Revitalization Tax Exemption Certificate if any one or more of the conditions or requirements set out in the Revitalization Tax Exemption Agreement are breached, and the cancellation will be effective as of the date of the breach.
- 8.3 If the Revitalization Tax Exemption Certificate is cancelled during a year in which the Owner of Eligible Improvements has received an exemption from municipal taxes, a Recapture Amount representing the amount of the Revitalization Tax Exemption granted to the Owner from the date of the breach of the condition or requirement, as applicable, is payable to the Town by the Owner.
- 8.4 If the breach occurred during the Calendar Year, the Recapture Amount will be the portion of the annual tax exemption for the balance of the taxation year remaining from the effective date of cancellation of the Certificate.

9. TERM AND EXEMPTION AMOUNT

- 9.1 The maximum Term of an exemption under this Program is five (5) years commencing on January 1 of the first Calendar Year after the year in which the Revitalization Tax Exemption Certificate is issued as long as it is issued prior to October 31.
- 9.2 100% percent of the Amount calculated in accordance with Section 9.3 of this Bylaw will be exempted in each year of the five (5) year Term:
- 9.3 The amount of the Revitalization Tax Exemption (the "Amount") is the increase in the general municipal property tax levied on the difference in the assessed value of improvements on the Parcel between the year prior to the commencement of construction of the Eligible Improvements and the year following the issuance of the Revitalization Tax Exemption Certificate, that is, the difference in assessed value attributed to the Eligible Improvements.
- 9.4 The assessed value of the improvement as determined by the BC Assessment Authority will determine the value of the Revitalization Tax Exemption. The value of construction, as determined by the Chief Building Official for the purpose of establishing Program eligibility, may not necessarily reflect the value of the improvement as determined by the BC Assessment Authority.
- 9.5 The maximum Revitalization Tax Exemption under this Bylaw must not exceed the increase in the assessed value of improvements on the property in the Calendar Year before the new construction or alteration began and the Calendar Year in which the new construction or alteration is completed.
- 9.6 Tax rate increases will still apply on the non-exempted assessment.
- 9.7 An exemption under this Program does not affect the Owner's liability for municipal utility user fees or parcel taxes, or taxation imposed by or on behalf of other government or public bodies.
- 9.8 The Schedules to this Bylaw form a part of and are enforceable in the same manner as this Bylaw.
- 9.9 If a Schedule is referred to or mentioned in this Bylaw without identifying its location as being in another bylaw or enactment, it is a reference to a Schedule attached to this Bylaw.

READ A FIRST and SECOND TIME this 29th day of September 2020.

PUBLIC NOTICE, pursuant to Sections 94 and 227 of the *Community Charter*, was given October 15th and 21st, 2020

READ A THIRD TIME this day of, 2020.

ADOPTED this day of , 2020.

Ron Toyota, Mayor

Bev Caldwell, Corporate Officer

SCHEDULE "A"
Town of Creston
Revitalization Tax Exemption Bylaw No. 1918, 2020

REVITALIZATION TAX EXEMPTION AGREEMENT

This Agreement dated for reference the _____ day of _____, 20____ is

BETWEEN:

(the "Owner")

AND:

The Town of Creston,
 238 – 10th Avenue North
 PO Box 1339
 Creston, British Columbia
 V0B 1G0

(the "Town")

Whereas:

- A. The Owner is the registered Owner in fee simple of lands in the Town of Creston at **[civic address]** legally described as **[legal description]** (the "Parcel");
- B. Under Bylaw No.1918, 2020 (the "Bylaw"), the Town established a Revitalization Tax Exemption Program (the "Program") for all properties within the Town of Creston that are located in a commercial zone under the Town's Zoning Bylaw No. 1123,1989, that permits commercial use(s) as a principal use. To be considered as an Eligible Improvement under the Program, the Owner's Parcel must:
 - a) be zoned *General Commercial C-1, Local Commercial C-2, Tourist Commercial C-3, Licensed Premises Commercial C-4, Mixed Use Commercial C-5, Highway Service Commercial HSC, Highway Service Commercial – Hotel/Convention Centre HSC-H, or Highway Service Commercial – Light Manufacturing HSC-M* as detailed in Schedule "A" of Zoning Bylaw No. 1123; 1989, have a renovation project value of \$50,000.00 or greater as determined by the Town's Chief Building Official; and, have a valid Building Permit issued by the Town of Creston for the renovation of an existing building on the Parcel for use as a Principle Eligible Improvement; or
 - b) be zoned *General Commercial C-1, Local Commercial C-2, Tourist Commercial C-3, Licensed Premises Commercial C-4, Mixed Use Commercial C-5, Highway Service Commercial HSC, Highway Service Commercial – Hotel/Convention Centre HSC-H, or Highway Service Commercial – Light Manufacturing HSC-M* as detailed in Schedule "A" of Zoning Bylaw No. 1123;1989, provide a new construction project of a commercial use; have a construction project value of \$150,000.00 or greater as determined by the Town's Chief Building Official; and, have a valid Building Permit issued by the Town for the construction of a new building on the Parcel to be used as a Principle Eligible Improvement.

- C. The objectives of the Revitalization Tax Exemption Program are to:
- a) encourage new commercial businesses in new and renovated buildings in the Town's zones that permit commercial uses and thereby establish the commercial services and the investment and employment opportunities that will attract additional investment and economic growth to the Town of Creston; and
 - b) reinforce the municipality's "open for business" approach and to attract new and improved commercial development to the municipality;
- D. The Owner proposes to construct new improvements, or alter existing improvements (the "Project"), on the Parcel and has applied to the Town for a tax exemption under the Revitalization Tax Exemption Program in respect of the Project and the Town has agreed to grant the exemption for the Project.

THIS AGREEMENT is evidence that in consideration of the following conditions and requirements, the Owner and the Town covenant and hereby agree that:

1.0 Eligibility

A Revitalization Tax Exemption will only be granted for the Parcel if the Project meets the requirements for an Eligible Improvement as set out in the Bylaw and Recital B on page 1 of this Agreement.

2.0 The Project

The Owner must ensure that the Project is constructed, maintained, operated and used for the purposes of a Principle Eligible Improvement, as defined in the Bylaw, throughout the Term of the Tax Exemption in a fashion that will be consistent with and will foster the objectives of the Revitalization Tax Exemption Program as set out in the Bylaw.

3.0 Operation and Maintenance of Project

Throughout the Term of the Tax Exemption, the Owner must operate, repair and maintain the Project and keep the Project in a state of good repair, as a prudent Owner would do.

4.0 Revitalization Tax Exemption

Subject to fulfillment of the conditions and requirements for issuance set out in this Agreement and in the Bylaw, the Town will issue a Revitalization Tax Exemption Certificate (the "Certificate") to the Owner and provide the relevant assessor of BC Assessment with a copy of the Certificate entitling the Owner to a municipal property tax exemption in respect of the Parcel (the "Tax Exemption") for the Calendar Years set out in this Agreement.

5.0 Conditions

The following conditions must be met before the Town will issue a Certificate to the Owner:

- 5.1 The Owner must make application for a Building Permit from the Town on or after the adoption of this Bylaw or within 180 days prior to adoption of this Bylaw, and prior to August 31, 2023 for the Project;
- 5.2 The Owner must complete, or cause to be completed, construction of the Project in conformance with the conditions of the Building Permit(s) issued for the Parcel and in compliance with all laws, statutes, regulations and orders of any authority having jurisdiction, including bylaws of the Town, that are applicable to the Project, and obtain an Occupancy Permit for the Eligible Improvement and submit that permit with the application for the Certificate; and,

5.3 The Owner must use the Eligible Improvement for the Principle Eligible Use.

6.0 Calculation of Revitalization Tax Exemption

The amount of the annual Tax Exemption shall be equal to the municipal property tax on the increase in the assessed value of improvements on the Parcel, attributable to the construction of the Eligible Improvements, between the year before the commencement of construction of the Project and the year immediately after the year in which the Tax Exemption Certificate is issued if issued prior to October 31.

7.0 Term of Revitalization Tax Exemption

The maximum Term of an exemption under the Program is five (5) years commencing on January 1 of the first Calendar Year after the year in which the Revitalization Tax Exemption Certificate is issued, as long as it is issued prior to October 31 in the previous year.

8.0 Cancellation

The Town may cancel the Certificate if the Owner requests cancellation in writing or fails to meet any of the conditions and requirements specified in the Bylaw, this Agreement or Certificate as conditions on which the Tax Exemption was provided.

9.0 Recapture

If pursuant to the terms and conditions specified in this Agreement or the Revitalization Tax Exemption Certificate, the Certificate is cancelled, the Owner will remit to the Town, no later than 30 days after receiving notice from the Town of the cancellation and the amount owing, the Recapture Amount prescribed in this Bylaw.

10.0 No Refund

For greater certainty, under no circumstances will the Owner be entitled, under this Agreement, the Bylaw, the Certificate or the Town's Revitalization Tax Exemption Program, to any cash credit, any carry forward tax exemption credit or any refund for any property taxes paid.

11.0 Enurement

This Agreement shall enure to the benefit of and is binding on the parties and their respective heirs, executors, administrators, successors and assigns.

12.0 Notices

Any notice or other communication required or contemplated to be given or made by any provision of this Agreement shall be given or made in writing and delivered personally (and if so shall be deemed received when delivered) or mailed by prepaid registered mail in any Canada Post Office (and if so shall be deemed delivered on the sixth business day following such mailing except that, in the event of interruption of mail service notice shall be deemed to be delivered only when actually received by the party to whom it is addressed), so long as the notice is addressed as follows:

To the Owner at:

And to the Town at:

The Town of Creston
PO Box 1339
238 – 10th Avenue North
Creston, British Columbia, V0B 1G0

or to such other address to which a party hereto from time to time notifies the other parties in writing.

13.0 No Assignment

The Owner may not assign its interest in this Agreement except to a subsequent Owner in fee simple of the Parcel.

14.0 Severance

If any portion of this Agreement is held to be invalid by a court of competent jurisdiction, the invalid portion shall be severed and the decision that it is invalid shall not affect the validity of the remainder of this Agreement.

15.0 Interpretation

Wherever the singular or masculine is used in this Agreement, the same shall be construed as meaning the plural, the feminine or body corporate where the context or the parties thereto so require.

16.0 Further Assurances

The parties hereto shall execute and do all such further deeds, acts, things and assurances that may be reasonably required to carry out the intent of this Agreement.

17.0 References

A reference in this Agreement to the Town or the Owner includes their permitted assigns, heirs, successors, officers, employees and agents.

18.0 Effective Date

This Agreement shall be effective from and after the reference date in this Agreement, but only if this Agreement has been duly executed and delivered by the Owner to the Town and duly executed by the Town.

19.0 Expense

Unless otherwise expressly provided in this Agreement, the expense of performing the obligations and commitments of the Owner contained in this Agreement, and of all matters incidental to those obligations and commitments is solely at the expense of the Owner

20.0 Owner's Representations

The Owner represents and warrants to the Town that:

- a) all necessary corporate actions and proceedings have been taken by the Owner to authorize its entry into and performance of this Agreement;
- b) upon execution and delivery on behalf of the Owner, this Agreement constitutes a valid and legally binding contractual obligation of the Owner;
- c) neither the execution and delivery, nor the performance, of this Agreement shall breach any other agreement or obligation respecting the Lands; and
- d) the Owner has the corporate capacity and authority to enter into and perform this Agreement.

Approval of this Agreement by Resolution No. _____ of the Council of the Town of Creston was given on the _____ day of _____, 20____.

IN WITNESS WHEREOF the parties hereto have executed this Agreement as of the day and year first above written.

THE TOWN OF CRESTON

by its authorized signatories:

Mayor

Corporate Officer

(Insert name of Owner, if a corporation or
corporate body) by its authorized signatories:

Name and title

Name and title

Name of Owner, if an individual

Name of Witness

Address of Witness

SCHEDULE "B"
Town of Creston
Revitalization Tax Exemption Bylaw No. 1918, 2020
REVITALIZATION TAX EXEMPTION CERTIFICATE

SECTION 226 OF THE COMMUNITY CHARTER

In accordance with the Town of Creston's Downtown Revitalization Tax Exemption Bylaw No. 1918, 2020 and in accordance with the Revitalization Tax Exemption Agreement dated for reference the _____ day of _____, 20____ (the "Agreement") entered into between the Town of Creston (the "Town") and _____ (the "Owner"), the registered Owner(s) of the parcel described below:

This **Certificate** certifies that the Parcel is subject to a Revitalization Tax Exemption in an amount equal to the tax on the increase in the assessed value of the Parcel, after the Eligible Improvements have been completed on the Parcel, between the year before the commencement of construction of the Project, and the year immediately after the Tax Exemption Certificate is issued.

The Parcel to which the tax exemption applies is located in the Town of Creston and is described as follows:

Civic Address:

PID:

Legal Description:

The Tax Exemption is for the Calendar Years commencing with the year _____ and ending with the year _____.

The Tax Exemption is provided on the following conditions:

1. The Owner does not breach any covenant or condition in the Agreement and performs all obligations to be performed by the Owner as set out in the Agreement.
2. The Owner has not sold all or any portion of his or her equitable or legal fee simple interest in the Parcel without the transferee taking an assignment of the Agreement, and agreeing to be bound by it.
3. The Owner, or a successor in title to the Owner, has not allowed the property taxes for the Parcel to go into arrears or to become delinquent.
4. The Owner, or a successor in title to the Owner, does not apply to amend the Town of Creston's Zoning Bylaw No. 1123, 1989 as amended, consolidated or replaced from time to time, to rezone the parcel from the zoning in effect at the time the Certificate was issued.
5. The Parcel is not put to a use other than those uses permitted in the applicable Commercial Zone as detailed in Zoning Bylaw No. 1123, 1989 and amendments thereto.
6. The Principal Use of the Parcel remains a Principal Eligible Use throughout the Term of the Tax Exemption.

7. As a condition of the issuance of this **Certificate**, the Owner must obtain an Occupancy Permit from the Town for the Eligible Improvement and submit it with the Owner's application for this **Certificate**.

If any of these conditions are not met then the Council of the Town of Creston may cancel this Revitalization Tax Exemption Certificate. If such cancellation occurs, the Owner of the property for which the Certificate was issued will remit to the Town the Recapture Amount calculated in accordance with Bylaw 1918, 2020 within the notice period specified in the Agreement.

Director of Finance & Corporate Services
Town of Creston

Date

TOWN OF CRESTON**BYLAW NO. 1919**

A Bylaw to expend funds from the Property Purchase Reserve Fund.

WHEREAS Section 189(1) of the *Community Charter* and Property Purchase Reserve Fund Establishment Bylaw No. 1504 allows Council by bylaw, adopted by at least two thirds of it's members, to expend funds from the Property Purchase Reserve Fund;

AND WHEREAS there is an unappropriated balance of \$136,070 in the Property Purchase Reserve Fund as of November 10, 2020, calculated as follows:

Balance in Reserve Fund, December 31, 2019	\$134,910
Interest earned in 2020.....	\$ 1,160
Balance in Reserve Fund, November 10, 2020	<u>\$136,070</u>

AND WHEREAS the fund commitment per this Bylaw, is as follows:

Lot A, District Lot 891, Kootenay District, Plan EPP916611	
Total Expenditure	\$393,806
Commitment maximum is the Balance in Reserve Fund.....	<u>\$136,070</u>

AND WHEREAS, following the adoption of this Bylaw, the balance in the Property Reserve Fund will be depleted and have a zero balance \$ 0

NOW THEREFORE, the Council of the Town of Creston in open meeting assembled, enacts as follows:

1. This Bylaw may be cited as "Property Purchase Reserve Fund Expenditure Bylaw No. 1919, 2020".
2. The sum of One Hundred Thirty-Six Thousand Seventy (\$136,070) Dollars is hereby appropriated from the Property Purchase Reserve Fund, to be expended in the purchase of land located at 1505 Cook Street, Creston, BC, and as described above.
3. This Bylaw shall come into full force and effect upon adoption.

READ A FIRST TIME by title and SECOND TIME by content this day of , 2020.

READ A THIRD TIME by title this day of , 2020.

ADOPTED this day of , 2020.

Mayor Ron Toyota

Bev Caldwell, Corporate Officer