Research interrupted: Improving Inuit food security through Arctic community-based research during the COVID-19 pandemic

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Abstract

This thesis addresses food security and road development in Tuktoyaktuk (population 995), a primarily Inuvialuit (Indigenous, Inuit) community in the western Canadian Arctic. Initially, I had hoped to conduct interviews in Tuktoyaktuk to better understand how the new Inuvik-to-Tuktoyaktuk Highway (ITH), opened in 2017 (the first highway to the Arctic Ocean) had affected food security in Tuktoyaktuk. This plan was interrupted.

// Interruption \\
--This thesis has been interrupted \\

What do we do when our plans are forced to change? How do we react, adapt, and overcome these changes? How do we reflect on such interruptions? These questions are the underlying essence of this thesis and they reflect my experience of engaging in Arctic community-based research during the COVID-19 pandemic. This thesis presents two articles that are a result of many interruptions.

The first (1) is an econometric evaluation of the cost of food before and after the opening of the ITH and the subsequent rescission of the Nutrition North Canada federal food subsidy program to the now road-accessible community of Tuktoyaktuk. The results suggest a significant increase in market basket prices which can be attributed to the opening of the highway and the subsidy loss (+CAD$44, SE = 16.77, p = 0.02). This research is the first to document the impacts of highway development on food prices in Arctic Indigenous communities.

The second (2) is a co-authored methods piece about friendship, reciprocity, and reconciliation between two young women; a 17 year old Inuvialuit journalist and myself, a 25 year

old Québécoise Master's student, navigating research for the first time and during the pandemic. In the process, we reflect on what reconciliation means to us and provide recommendations for Arctic community-based research in a post-pandemic world.

// Break. Break.
This thesis is an interruption \\

In form and content, this thesis offers a reflection on the process of conducting and writing about research, juxtaposing qualitative (at times creative) and quantitative methods under a community-based research framework for working with Inuit.

Ethics

Research presented in this thesis conforms to all ethical standards of work with humans. Informed consent was obtained from all participants.

A certificate of ethics approval for the *Participatory Food Costing* research project was granted by the University of Ottawa Health Sciences and Science Research Ethics Board (file number H01-14-10C).

A certificate of ethics approval for the *Learning from and enhancing Community Capacity for Climate Change and Food Security (C4FS) action in the NWT* research project and the community-based work in the Inuvialuit Settlement Region was granted by the University of Ottawa Social Sciences and Humanities Research Ethics Board (file number S-11-20-6256).

Scientific research licenses (license no. 15446) for the *Participatory Food Costing* community-based work and for the *C4FS* community-based work (license no. 16697) in the Inuvialuit Settlement Region were granted by the Aurora Research Institute (Inuvik, Northwest Territories).

A letter of support from the Tuktoyaktuk Community Corporation chairpersons was obtained for the *C4FS* research project (March 20th 2019, signed by Eddie T. Dillion) and for this thesis project (December 10th 2020, signed by Jocelyn Noksana acting for Ryan Yakeleya).

Appendix 1 – 3 contains copies of the certificate of ethics approvals (Appendix 1), scientific research licenses (Appendix 2) and letters of support (Appendix 3).

Statement of authorship & collaboration

Article 1: Food costs in Arctic Canada: The impact of the Inuvik-Tuktoyaktuk Highway.

Research priorities were identified during a regional food security workshop in the Inuvialuit Settlement Region (Northwest Territories, Canada). The Tuktoyaktuk Community Corporation and Inuvialuit Regional Corporation have collaborated on this project.

- Kim Mathieu: Conceptualization, methodology, data curation, data analysis, data visualization, writing – original draft, communication.
- Tiff-Annie Kenny: Conceptualization, intellectual support, data validation, writing – original draft, mentorship and supervision, project administration, funding acquisition.
- Sonia Wesche: Conceptualization, mentorship and supervision, project administration, funding acquisition, writing – review and editing.
- Jullian Maclean: Project administration, funding acquisition, writing – review and editing.
- Charmaine Teddy: data collection

Article 2: Our friendship is reconciliation: A pandemic silver lining in Arctic community-based research.

Research priorities were identified during a regional food security workshop in the Inuvialuit Settlement Region (Northwest Territories, Canada). The Tuktoyaktuk Community Corporation and Inuvialuit Regional Corporation have been collaborators on this project.

- Kim Mathieu: Conceptualization, lead co-researcher, writing – original draft, project administration, funding acquisition, communication.
- Mataya Gillis: Conceptualization, lead co-researcher, writing – original draft, data collection, funding acquisition, communication.
- Sonia Wesche: Intellectual support, mentorship and supervision, project administration, funding acquisition, writing – review and editing.
- Tiff-Annie Kenny: Mentorship and supervision, writing – review and editing.

Acknowledgments

This project was conducted primarily on the unceded and unsurrendered territory of the Algonquin Anishinaabe in what is now known as Ottawa, Ontario. I thank the land, the waters, the air, the animals, the trees, and all else that is natural on this territory for accompanying me, nourishing me, feeding me, and helping me process this work.

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I give thanks to the land, the rivers, the ocean, and the animals in Tuktoyaktuk for continuing to feed and to give life to people who call this place home, and who have for thousands of years past. Thank you for sustaining my friends, my collaborators, and their communities.

Thank you to my co-supervisors, Sonia Wesche and Tiff-Annie Kenny. Sonia, with your trust and flexibility, I was able to develop all the skills that I wanted to work on when I began this thesis. I am thankful for your support and for our many long conversations. Tiff-Annie, thank you for entering this process at a crucial and difficult point. You made me feel like a worthy and equal collaborator, and you engaged me in your work by being supportive and reassuring. I look forward to the day we meet in person.

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List of Figures

Figure 1.1: The Alaskan Inuit food security conceptual framework

Figure 5.1: Route of the Inuvik-Tuktoyaktuk Highway in the Inuvialuit Settlement Region, linking the community of Inuvik to the coastal hamlet of Tuktoyaktuk.

Figure 5.2: Longitudinal data for the cost of the Revised Northern Food Basket in CAD$ in the control community (Aklavik) and the treatment community (Tuktoyaktuk) from 2011-2020.

Figure 5.3: Average cost of the Revised Northern Food Basket (RNFB) in CAD$ at baseline (2017), one year after (2018), and two years after (2019) the opening of the Inuvik-Tuktoyaktuk Highway and loss of the NNC food subsidy.

Figure 7.1: The cover of the first issue of Nipatuȓuq magazine, published in October 2019.

Figure 7.2: Mataya (bottom left) and Kim (to her right) with the Students On Ice delegation at the Canadian Roots Exchange gathering in Montreal, February 2020

Figure 7.3: Mataya's professional development goals with details about how she reached them.

Figure 7.4: Box of office supplies sent to Mataya, which also included COVID-19 protective equipment like masks and disinfectant spray for surfaces, and some favourite snacks.

Figure 7.5: Kim and Mataya engaging online during weekly check-ins. They used a mix of video calls and phone calls.

Figure 7.6: Mataya and her grandmother (wearing a Nipatuȓuq sweatshirt) driving to Tuktoyaktuk to conduct interviews.

List of Tables

Table 3.1: Breakdown of the methods used to achieve the three research objectives of this thesis

Table 5.1: Average seasonal cost of the Revised Northern Food Basket (CAD$) in the six communities in the Inuvialuit Settlement Region. Missing values represent seasons then data was not collected due to logistical constraints.

Table 5.2: Comparison of the average cost of the Revised Northern Food Basket (RNFB) in CAD$

Table of contents

Abstract ii
Ethics iv
Statement of authorship & collaboration v
Acknowledgments vi
List of Figures ix
List of Tables ix
Table of contents x
1. Introduction 1
1.1. Introduction – let us try this again 3
1.2. The impact of transport infrastructure on remote Indigenous communities 5
1.2.1. Rural road development in the North American Arctic 6
1.3. Inuit food security 8
1.3.1. Food security as a social determinant of health 10
1.3.2. The cost of food in Inuit communities 10
1.4. Community-based research in the Arctic 12
1.4.1. Inuit youth engagement in community-based research 14
1.5. Research context 15
2. Research objectives 17
3. Research methods 20
3.1. Framework: Community-based research 20
3.2. Methodology: Interruptions and reflections 21
3.2.1. Creative writing 23
3.3. Design: Multi-methodological 26
3.4. Summary 26
3.5. Thesis outline 28
4. Part I: Preface 29
5. Part I: Food costs in Arctic Canada: The impact of the Inuvik-Tuktoyaktuk Highway 33
5.1. Abstract 33
5.2. Introduction 34

5.2.1. Road development: Global to Arctic ... 34
5.2.2. Food security among Inuit in the Canadian Arctic ... 36
5.2.3. The first highway to the Arctic Ocean ... 40
5.3. Research goals and objectives ... 42
5.4. Methods ... 42
5.4.1. Regional profile and the Inuvik-Tuktoyaktuk Highway ... 42
5.4.2. Tuktoyaktuk ... 43
5.4.3. Analytical framework ... 44
5.4.4. Food price data ... 45
5.4.5. The Revised Northern Food Basket (RNFB) ... 48
5.4.6. Assumptions ... 50
5.5. Results ... 51
5.6. Discussion ... 53
5.6.1. Limitations ... 56
5.6.2. Implications and significance of the study ... 57
5.6.3. Policy recommendations ... 58
5.7. Conclusion ... 60
5.8. Appendices ... 61
5.8.1. Appendix 1: Food items with weights/volumes categorized by food groups in the Revised Northern Food Basket (Government of Canada, 2007). ... 61
5.8.2. Appendix 2: Cost of the RNFB in four ISR communities for which data exist ... 63
6. Part II: Preface ... 64
7. Part II: Our friendship is reconciliation: A pandemic silver lining in community-based research ... 69
7.1. Abstract ... 69
7.2. Introduction ... 69
7.2.1. Who they are ... 73
7.3. A collaborative story on conducting research ... 74
7.3.1. Adapting to the pandemic ... 74
7.3.2. Setting up the collaboration ... 75
7.3.3. Applying for ethics ... 77
7.3.4. Conducting interviews in Tuktoyaktuk ... 79

7.3.5. Next steps ... 81
7.4. Reflections ... 82
7.5. Recommendations ... 83
7.6. Conclusion ... 85
7.7. Acknowledgements ... 86
7.8. Appendices ... 87
7.8.1. Appendix 1: Mataya's thoughts on reconciliation ... 87
7.8.2. Appendix 2: Kim's thoughts on reconciliation ... 89
8. Conclusion ... 91
8.1. Overview ... 92
8.2. Next steps ... 94
8.2.1. Part I: Food costs in Arctic Canada: the impact of the Inuvik-Tuktoyaktuk Highway94
8.2.2. Part II: Our friendship is reconciliation: a pandemic silver lining in community-based research. ... 95
8.3. Concluding thoughts on conducting research during the pandemic ... 96
8.4. Final celebrations ... 100
9. References ... 102
9.1. Thesis introduction ... 102
9.2. Research Objectives ... 111
9.3. Research methods ... 112
9.4. Preface ... 114
9.5. Food costs in Arctic Canada: The impact of the Inuvik-Tuktoyaktuk highway ... 115
9.6. Preface ... 125
9.7. Our friendship is reconciliation: A pandemic silver lining in community-based research 126
9.8. Conclusion ... 128
Appendices ... 130
Appendix 1: Ethics Certificates ... 131
Ethics Certificate for the Participatory food costing project ... 131
Ethics Certificate for the C4FS project ... 132
Appendix 2: Research Licenses ... 133
Research license for the participatory food costing project ... 133

Research license for the C4FS project 134
Appendix 3: Letters of Support 135
Letter of support for this thesis project 135
Letter of Support for the C4FS project 136
Appendix 4: Infographic of Project Objectives and Timelines (Pre-Pandemic) 138

1. Introduction

“On Tuesday December 15th 2015, Justice Murray Sinclair released the final Truth and Reconciliation of Canada report. The six-volume report, each volume weighing about 25 pounds, was more than a half-decade in the making. It is thousands of pages long, and centres on documenting and honouring statements made by more than 6,000 First Nations, Inuit, and Metis people impacted by the “physical, biological and cultural genocide . . .

Break. Break.

Did you? Did your eyes? Did your eyes? Did? Your?
Eyes? Just? Gloss?
Over?
Genocide?
Did? You? Genocide Gen(oh)cide Oh. Genocide
Genoc(i)de.
Gen. Oh. Sigh. I. Feel. I. Feel. Cide. Feel. Sick. Feel. Gen.
Oh. Sigh. Uncertain. Stopped.
Uncertain. Stop. Feel. Think. Sigh. Anew. Think.
What can I write? How can I write, right?
Write.Right.After genocide?Write right. Right.

Sigh.

Do you remember when you sighed?”

- By Sarah De Leeuw, geographer and activist (De Leeuw, 2017)

-- Interruption --
This thesis has been interrupted

Break. Break.
This thesis is an interruption

(Excuse me, sir, yes, sorry, can I please just… Yes, right here)

I tried to make sense of the world
To proclaim an ultimate ‘truth’
I tried, but I was interrupted.

Pause reflect react write try again pause write

intrusion//interruption: a never-ending stream of questions

Is research objective? Is this science? Whose land am I on? What do I do now?
What are my intentions? Whose place am I taking? Whose voice is important here?

I was interrupted by my own thoughts – really? yes. – interrupted by a pandemic – yes, yes, read that again - and by trying to make sense of myself in this world.

woman white woman of privilege settler
of privileged places France Italy

a francophone mess, also known as Québécoise.

La mélancolie survient quand on se dépayse de soi-même.

Dépaysé : Troubler quelqu'un, le désorienter en le changeant de milieu et en le mettant dans une situation qui lui donne un sentiment d'étrangeté

Synonyme: déraciner

Uprooted; to be moved from a familiar location and yet to be home and safe during a pandemic.

What privilege for the uprooting to have been only of my thoughts and not of my body. And yet, how much I wish my body could have been uprooted and carried to a far-away place with a captivating name.

Tuktoyaktuk. Tuktuuyaqtuuq.

I have written so much about you, Tuktoyaktuk, yet I don't know who you are. What do you smell like? How do you feel? What color are your waters, and what does its bounty taste like?

<u>Break. Break.</u>
This thought is an interruption.

Excuse me, ma'am, but are these questions *scientific?*

1.1. Introduction – let us try this again

This thesis addresses food security and road development in Tuktoyaktuk (population 995), a primarily Inuvialuit (Indigenous[1], Inuit) community in the western Canadian Arctic. Initially, I had hoped to conduct interviews in Tuktoyaktuk to better understand how the new Inuvik-to-Tuktoyaktuk Highway (ITH), opened in 2017 (the first highway to the Arctic Ocean) had affected food security in Tuktoyaktuk. What I had hoped to do was interrupted[2], but it was achieved nonetheless. Interviews were conducted in Tuktoyaktuk; however I did not conduct them myself. Mataya Gillis, a young Inuvialuit leader, conducted them. The work that I did (and the work that I report on in this thesis) was to adapt my research plans repeatedly (because of the COVID-19 pandemic and other interruptions) to best support her and to better understand food costs in Tuktoyaktuk. Herein lies the underlying essence of my research project: what do we do when our plans are forced to change? How do we react, adapt, and overcome these changes? How do we reflect on such interruptions?

Spoiler alert: it is messy. As I attempt to make sense of the interruptions, I find myself at risk of being interrupted again. Initially, I resisted. How dare the COVID-19 pandemic interrupt my plans! But in reading and being inspired by works in critical geography and creative research, I began embracing the interruptions, seeking them out, pausing with them, and reflecting on them.

---

[1] The term “Indigenous” was created by the American Indian Movement and the Canadian Indian Brotherhood in the 1970’s and it is the term most commonly used in a global context. The term “Indigenous” in Canada refers to all original peoples in Canada, which includes the three constitutionally-recognized groups: Inuit, First Nations and Métis. It is important to note that in other countries, there may be preference for other terms including tribes, first peoples/nations, aborigine, etc. The term “Indigenous” is used as an umbrella term in this thesis, unless when speaking of a specific group.

[2] I use the word “interrupted” with no specific connotation to a positive interruption or a negative interruption. Nothing is ever so simple, as you will see in this thesis.

I found, and as I will explain in sections 2 and 3, that embracing the interruptions aligned well with the community-based research that I was trying to conduct in the Arctic.

This thesis is multi-methodological, meaning that it presents both quantitative and qualitative community-based research. Written as an article-based thesis, the first article uses quantitative methods (e.g. econometrics, statistics), and the second uses qualitative methods (e.g. journaling, reflexivity). This thesis is also multi-methodological in its form. The first article, written as a scientific article, uses structured and expository prose. The second article is co-authored with Mataya and uses more accessible language and a narrative tone. The linking pieces between these two articles, namely this introduction and methods section, a preface to each article, and the conclusion, are also multi-methodological. In some instances, I review the literature or write using a standard academic tone, and in other instances, namely where I highlight how this thesis was interrupted, I interrupt the academic writing with creative writing. Naturally, the latter is experimental (De Leeuw, 2017).

Since this thesis remains about Inuit food security and the opening of the Inuvik-Tuktoyaktuk Highway, it is essential that I first begin by situating it within the current state of knowledge about the impact of transport infrastructure on remote Indigenous communities. Then, I position this work within the context of food security in Inuit communities. Next, I turn to the literature on Arctic community-based research, the overarching framework for this thesis. Lastly, I situate this thesis within the context of the major global events that have impacted me and that have shaped what this thesis ultimately became. Reviewing the literature and relevant gaps ultimately leads to my research objectives, where I outline how the works contained within this thesis contribute to addressing these gaps.

It is important to note that this thesis does not contain the content of the interviews that Mataya conducted. The content of the interviews will be analyzed later through the ongoing work of our research team. Within the limited timeline of this thesis, we made the joint decision to collaboratively author a methods piece which documents our lessons learned and highlights how the COVID-19 pandemic improved the relevance of our research project for Mataya and her community.

1.2. The impact of transport infrastructure on remote Indigenous communities

The role of roads as agents of development in rural regions is an active area of research within development studies. Rural road development in this context refers to the development of roads between communities that were previously not connected, and between remote communities and the continental road system. In both cases, roads have important geographic, social, and economic implications (Perz, 2014b), especially since many of these regions, such as the Arctic and the Amazon, constitute the traditional, and indeed contemporary homelands of Indigenous Peoples (recognizing that in many contexts, these territories are reduced in scale from historical land bases—notably, through colonial dispossession and/or displacement)(M. Bennett, 2018; Espinosa et al., 2014; P. Schweitzer & Povoroznyuk, 2019). Because Indigenous peoples rely on mixed and traditional food systems and economies, the impact of new roads could have an important effect on residents' livelihoods, culture, well-being, and identities (BurnSilver et al., 2016; Collings et al., 2016; Condon et al., 1995; Fauchald et al., 2017; ITK, 2019a; Kenny, Hu, et al., 2018; Kuhnlein et al., 2004; Kuokkanen, 2011). While some literature exists on the impact of rural road development within the global Indigenous context (Anderson, 1989; Cansari & Gausset, 2013; Espinosa et al., 2014; Grocke, 2016; Reyes-García et al., 2020; P. Schweitzer &

Povoroznyuk, 2019), the impact of new roads on Indigenous peoples in the Arctic, and especially Inuit, remains largely unknown.

The expansion of rural roads on[3] Indigenous territories is often done without proper consultation and local support (Adam et al., 2012; Mendoza et al., 2007; P. Schweitzer & Povoroznyuk, 2019; Southworth et al., 2011). This often propels local communities into adopting western economic systems and values that can be at odds with subsistence economies, accelerating integration into western market systems (Anderson, 1989; Brohman, 1995; Godoy & Cárdenas, 2000; Kuokkanen, 2011). Despite this, Indigenous scholars have highlighted the resilience of subsistence economies in the face of growing capitalist/western market economies (Bunten, 2011; Champagne, 2007; Kuokkanen, 2011) and it is unclear to what degree Indigenous communities could benefit from rural road development, especially if they had more input in influencing their development. No studies were found that investigated the impacts of Indigenous-driven transport development project, such as the ITH[4], in collaboration with local Indigenous communities.

1.2.1. Rural road development in the North American Arctic

From the limited literature available, the social impacts of roads in northern Indigenous communities show mixed positive and negative outcomes for these populations. Four previous studies in North America have examined the impact of rural road construction on the livelihoods and traditional food systems of northern Indigenous people: a forestry study conducted with

[3] Most studies found via this literature search either explicitly stated that roads had been imposed on Indigenous territory or used a language that suggested that 'development' was being done "on" Indigenous people. Examples Include: (Clements et al., 2018; Espinosa et al., 2014; Ramalho et al., 2013; Riley-Powell et al., 2018; Southworth et al., 2011)

[4] A prior study of the ITH suggests that its construction was an act of self-determination where Inuvialuit lobbied the federal Government to achieve their own objectives (M. Bennett, 2018).

Algonquin residents of Kitcisakik (Adam et al., 2012), an archival visual exhibit depicting the construction of the Alaska Highway (Buchan et al., 1992), an economic comparison of household subsistence behaviors in road-accessible versus non-road-accessible Alaskan communities (Guettabi et al., 2016), and a comparative analysis of the impact of food-related activities (including road access) on food security in First Nations communities in northern Manitoba (Thompson et al., 2012). The first three studies found that the road(s) reduced subsistence behaviors associated with the consumption of country foods. The case studies of the Alaska highway and Kitcisakik also found that the road(s) broke down traditional ways and led to "individualistic behaviors" (Adam et al., 2012; Buchan et al., 1992; Guettabi et al., 2016). The Kitcisakik study concluded that "although increased mobility and access to resources were alluded to and therefore a benefit in themselves, it was the negative changes they had on relational components of access which dominated impressions" (Adam et al., 2012). Thompson (2012) found that the presence of country foods programs (such as community freezers or a butcher house) was the number one determinant of food security in communities ($\beta=20.64$, $p=0.006$), followed by accessibility by all-season roads ($\beta=7.60$, $p=0.036$). No previous research has examined the impacts of new airstrips, ports, and railroads on food costs in Inuit communities, and no Inuit communities other than Inuvik and Tuktoyaktuk are road accessible year-round. No previous research has investigated the impact of major transportation infrastructure on food costs in northern Indigenous communities more broadly.

Participation in subsistence activities and learning of traditional ways are two important determinants of food security in Inuit communities (Inuit Circumpolar Council-Alaska, 2015; ITK, 2019a; Kenny, Wesche, et al., 2018a; Nunavut Food Security Coalition, 2014). Based on the literature, these determinants of food security could be negatively impacted by the construction of

new roads to previously remote northern Indigenous communities (Adam et al., 2012; Buchan et al., 1992; Guettabi et al., 2016). In the face of current efforts to revitalize Inuit traditional activities and to teach youth traditional ways of subsistence (GNWT, 2019), it is unclear what the impacts of the Inuvik-Tuktoyaktuk Highway have been on Inuvialuit food security, health, and well-being.

1.3. Inuit food security

Inuit food security is defined by the Alaskan[5] chapter of the Inuit Circumpolar Council as, in part, "the natural right of all Inuit to be part of the ecosystem, to access food and to care-take, protect and respect all of life, land, water and air" (2015). Like definitions of food security that are not Inuit-specific (such as the definition[6] used by the FAO (1996) which includes four pillars: access, availability, stability, utilization), the ICC Alaska Inuit framework for food security also encompasses food access, availability, and stability, and add Inuit culture, decision-making power and management, and health and wellness as important "pillars" (Inuit Circumpolar Council-Alaska, 2015) (Figure 1.1).

[5] The ICC Alaska Inuit framework for food security is used in absence of a Canadian Inuit or Inuvialuit framework, though Inuvialuit were engaged in producing this framework.

[6] According to the definition of food security by the Food and Agriculture Organization of the United Nations, food security exists when "all people at all times have reliable physical and economic access to safe, sufficient, nutritious and culturally appropriate foods to meet their dietary needs and preferences" (FAO, 1996). This definition is also used by Inuit Tapiriit Kanatami (ITK), the national representational organization for Inuit in Canada (ITK, 2019a), though ITK adds Inuit-specific context to this definition without creating a new definition.

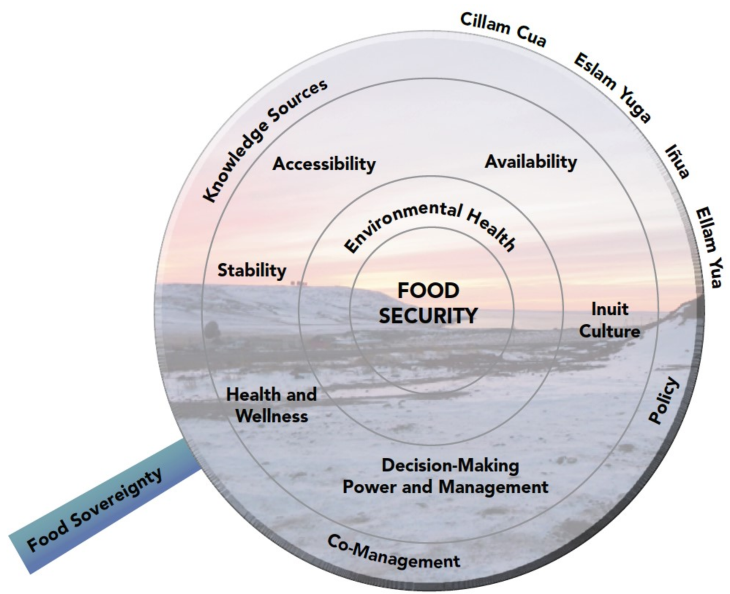

Figure 1.1: The ICC Alaska Inuit food security conceptual framework (Inuit Circumpolar Council-Alaska, 2015)

Healthy and nutrient-rich country foods (foods hunted and gathered from the land) are at the core of the Inuit food system[7]. They are essential not only to healthy diets but also to the holistic well-being of people within the Arctic ecosystem. However, the availability, accessibility, and quality of country foods, the preferred foods, are threatened by challenges such as climate change and other social, economic, cultural, and environmental stressors including a legacy of colonization (Council of Canadian Academies, 2014; ITK, 2019a; Kenny, Wesche, et al., 2018a). Paired with the relative affordability of nutrient-poor market foods, it has triggered what is called a nutrition transition (Kenny, Fillion, et al., 2018; Kuhnlein et al., 2004) that has been experienced by Inuit as a shift in diets away from the preferred country food sources to food purchased from

[7] Recently, the Arctic has also seen the introduction of locally cultivated foods (for example, cold climate greenhouses, community gardening and animal husbandry). This component of the food system plays only a minor role in Tuktoyaktuk's food system though it shows promise to increase in importance in the future (Kenny, Wesche, et al., 2018a).

stores (Damman et al., 2008). Youth are at the forefront of the nutrition transition, consuming more market foods than previous generations (Collings et al., 2016; ITK, 2019a). It is essential to understand how young people are being impacted by efforts to address the food security crisis and to better understand how young people are involved in revitalizing their traditional food systems amidst the growing importance of market food.

1.3.1. Food security as a social determinant of health

Food insecurity, which impacts up to 62% of Inuit households, is a critical social determinant of health[8] and of social equity (Council of Canadian Academies, 2014; De Schutter, 2012; Inuit Circumpolar Council-Alaska, 2015; ITK, 2014; Rosol et al., 2011). Significant inequalities exist between the material conditions of daily life in Inuit communities and those of the average Canadian household. These inequalities compound to create important health gaps between Inuit and non-Inuit. For example, Inuit experience significantly higher rates of chronic diseases, infectious diseases, and mental health issues than other Canadians (ITK, 2018a). Improving food security in Inuit communities is a public health measure that could improve people's immune systems, decrease the prevalence of malnutrition, and improve mental health (ITK, 2019a).

1.3.2. The cost of food in Inuit communities

Market foods are two to three times more expensive for Inuit than for the average Canadian, which is driven primarily by the high cost of transporting foods (primarily by plane) to the remote Arctic locations where Inuit live (Chan et al., 2006; Kenny, Fillion, et al., 2018; Pakseresht et al.,

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[8] Social determinants of health are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life (Solar & Irwin, 2007; WHO, 2011)

2014). To make market foods[9] more accessible and available in the North, the Government of Canada operates the Nutrition North Canada (NNC) program (NNC, 2020); however, this program has not addressed and is not designed to address the wide scope of factors (such as poverty, unemployment, limited infrastructure and the high cost of living) which have created and which continue to create the food security crisis in Inuit communities (Burnett et al., 2016; Galloway, 2017; Office of the Auditor General of Canada, 2014). It has been shown elsewhere that investing in all-weather highways, could help reduce food transportation costs and improve local economic and social conditions (Chapman et al., 2014; GNWT, 2010; Pollard, 2013; Thompson et al., 2012; Walrod et al., 2018). It is unclear, however, if such investments could influence food prices at the retail level and help address the food security crisis in Inuit Nunangat[10] and specifically in the Inuvialuit Settlement Region (ISR).

While food costs play an important role in food security, country food remains at the core of the Inuit food system. Previous food costing research in the provincial Canadian North only briefly touched on the importance of country food within the food cost environment and concluded, in part, that country food should be better included in future food costing research (Hammond, 2017; Veeraraghavan et al., 2016). However, quantifying country food in terms of its monetary value seldom yields an appropriate consideration of their intangible and unmeasurable importance to Inuit (Gombay, 2010). Food costing research should more holistically present the important but

[9] The new Harvesters Support Grant (launched in 2020) is designed to improve access to foods that are hunted and gathered from the land. This grant helps to reduce the high cost of harvesting, for example by subsidising harvesting equipment, food-processing equipment, temporary and permanent shelters, and relevant training and certifications.

[10] There are four Inuit regions in Canada, collectively known as Inuit Nunangat. These four regions are: Inuvialuit, Nunavut, Nunavik and Nunatsiavut. The term "Inuit Nunangat" is the term preferred by Canadian Inuit for referring to the Inuit homeland in what is now known as Canada (ITK, 2020). It is important to note that Inuit live across Canada and about 30% of Inuit live outside Inuit Nunangat, for instance in urban centers like Ottawa, Winnipeg and Montreal.

limited role of market food prices as one of many determinants of Inuit food security by using mixed and multi-method approaches.

1.4. Community-based research in the Arctic

Each year, an increasing amount of research is published about Inuit and their homeland (ITK, 2018b). Researchers, predominantly non-Indigenous and from southern Canada, have disproportionately benefited from research, publications, and funding (Castleden et al., 2012; ITK, 2018b; Pfeifer, 2018) although the growing capacity for research in the North and the increasing collaboration between researchers and Inuit have been well documented (Carter et al., 2019; Cunsolo Willox et al., 2013; Kenny et al., 2021; Pedersen et al., 2020; Tondu et al., 2014). Communities across the Northwest Territories and elsewhere across Inuit Nunangat have contributed to the development of many documents that outline their agenda, goals, and needs for research (ACUNS, 2018; ARI, n.d.; CIHR, 2014; GNWT, 2017; Ikaarvik, 2019; IRC, n.d.; ITK, 2018b). These documents add to the literature of best practices for working more broadly with Indigenous peoples in Canada (CIHR, 2014; The First Nations Information Governance Centre, 2014).

Community-based research is a framework that aligns well with Inuit-determined strategies for improving the relationship between Inuit and researchers and for enabling Inuit self-determination in research (ITK, 2018b). Community-based research relies on strong relationships, trust, and the involvement of both the researcher and the community members at all stages of the research process to respond to the practical, locally identified concerns of communities (Holkup et al., 2004). The intent is to move research into the hands of communities by building local capacity. Consequently, it is a process that takes time and that is intentionally focused not only on

research outputs (e.i. articles, publications, academic presentations) but also on outcomes that matter to the community, such as developing local capacity and using research to advance equity (ARI, n.d.; CIHR, 2014; Kovach, 2009; Pedersen et al., 2020). At its core, community-based research is about ethical and reciprocal relationships and the context within which these relationships are built and sustained.

Research methods that are part of a community-based research framework, such as building local capacity, hiring locally, and practicing reflexivity, are constantly evolving and adapting as researchers and community members work and learn together. Though more methods and tools are being developed to improve collaborations and to recognize the important value of both western and Indigenous knowledge systems in research (Bartlett et al., 2012; Dieter et al., 2018; Kovach, 2009; Pedersen et al., 2020; Smith, 2012), research continues to be conducted, in some cases, without Inuit participation. For instance, A review of over 1000 articles published in the journal *Arctic* between 1994 and 2014 reveals that the involvement of local people in research has increased "only slightly" in the last half-century (Brunet et al., 2014), whereas publications about Inuit and their homeland has more than tripled (ITK, 2018b). Both northern-based[11] and southern-based academic institutions and people bring important knowledge and expertise to research (L. Okalik, 2016), and there are opportunities to continue developing and building tools that will help researchers and communities better work together.

[11] In Canada, there are currently one northern-based University (Yukon University 2020, formerly Yukon College) and two northern-based colleges (Aurora College and Nunavut Arctic College, which also moving towards becoming polytechnic universities).

1.4.1. Inuit youth engagement in community-based research

Youth[12], both Inuit and non-Inuit, have historically been less involved in community-based research than their adult counterparts (Ford et al., 2012; Hitomi & Loring, 2018; Jacquez et al., 2013; Kim, 2016). Inuit youth, however, have made it clear that they wish to be involved in all issues that will impact their future, especially as they relate to language and cultural revitalization, mental health and wellness, education and empowerment, and reconciliation (M. Okalik, 2016). While efforts to engage[13] young people in research in Inuit Nunangat have been increasing and while there are many examples of collaborative projects with youth, it remains uncommon for research to be determined by youth, for young people to be involved as more than project participants, and for young people to publish about their experience of conducting research (Pedersen et al., 2020). For instance, a recent systematic review of 85 peer-reviewed papers (Hitomi & Loring, 2018) presenting traditional ecological knowledge of climate change in the circumpolar Arctic (not Inuit-specific in this case) identified only one paper that specifically engaged youth. Building capacity amongst young people through professional training opportunities such as research also supports community-defined health and wellness priorities (such as building capacity and professional development)(IRC, 2018). Engaging youth in research

[12] Though there are many definitions for "youth" (many of which don't involve an age range) this project defines "youth" as people between the age range of 15 - 30, following the Government of Canada's most recent definitions (Employment and Social Development Canada, 2018). It is relevant to note, however, that the United Nations uses the range of 15-24 (United Nations Youth, 2013)

[13] The term "youth engagement" is broad and leaves room for interpretation. Unfortunately, in the past, this has meant that youth were most often involved as project participants and not as equal collaborators while project leaders have claimed to have "involved/engaged youth". The popular "ladder of participation" (Hart, 1992, 2008) can serve as a preliminary framework for evaluating the level of youth engagement; ranging from tokenism, to adult-initiated and shared decision-making with youth, to youth-initiated and youth-led projects.

is an under-utilized approach that has the potential to improve their well-being and to meaningfully align community-based research frameworks with youth interests.

1.5. Research context

This research is set within the context of the ongoing COVID-19 outbreak, declared a pandemic in March 2020. As I write from my apartment in what is now known as Ottawa, the traditional and unceded territory of the Algonquin Anishinaabe, the province of Ontario is in its third province-wide lockdown and the virus is emerging in new places around the world. As vaccines are being rolled out, essential workers continue to care for COVID-19 patients and to keep essential services open in the community. The province has been in a state of emergency for over one year.

Shortly after the country-wide stay-at-home orders were announced, we also stood in solidarity with the Black Lives Matter movement, protesting the police killings of black people, systemic racism experienced by BIPOC, and protesting the murder of Breonna Taylor on March 13th 2020, and of George Floyd on May 25th 2020. This global reckoning incited action and reflection on the lingering racist and colonial structures embedded within our everyday lives and within ourselves. This is not to say that the Black Lives Matter movement (Lebron, 2017) and anti-racism work had not been ongoing, vocal, and present (it has). It is to say that the protests have brought a new wave of attention to long-documented inequalities at a time when many people were home, plugged in, and reflecting. For many of us, predominantly white and privileged researchers, we came face-to-face with our privileged experience of the pandemic and of our roles as researchers (Markham et al., 2020).

These major global events, paired with the lockdowns and stay-at-home orders, have created opportunities for more self-reflection about research, research methods, and the role of the researcher in the research process. Many researchers have engaged with creative methods (such as creative writing and poetry) to make sense of their experiences during the pandemic (Kennedy et al., 2021; Markham et al., 2020). Many recent creative pieces (Balestrucci et al., 2020; R. Bennett et al., 2021; Davis, 2020; Irwin, 2020; Markham, 2020; Thorndahl & Frandsen, 2020) have been published as part of the project called "Massive and Microscopic: Sensemaking during times of COVID-19" (Markham et al., 2020) that involved over 150 people from 26 countries. My thesis is situated within this unprecedented global surge (Kennedy et al., 2021; Markham et al., 2020) of researchers engaging creatively to document individual stories of the pandemic while reflecting on their positionality.

2. Research objectives

I began this thesis with a set of personal and professional ambitions for what I wanted to achieve. I wanted to conduct community-based research with Inuit, and I was interested in working with youth. I had a Bachelor of Science degree in my back pocket, four years of work experience in youth engagement at Parks Canada, and experience working in the Arctic as an expedition guide. I had hoped to build on these tools and to learn how to conduct research in the social sciences.

In the process of defining what my research project would be, I added a list of priorities and questions that the community of Tuktoyaktuk had identified during prior food security engagement sessions co-conducted by my supervisors and other local researchers. As I began reading more about conducting research with Indigenous peoples, I also added a set of ideals about what community-based research should look like. The cancellation of fieldwork due to the pandemic forced me to reconsider how I would achieve this long list of goals.

In the end, my project had to look a lot different than what I had envisioned it to be. As you will see in this thesis, this was both positive and negative, and not only due to the COVID-19 pandemic. Of course, the pandemic restricted my ability to conduct fieldwork and thereby shifted the objectives of my thesis. In doing so, it affected my ability to conduct research and had significant impacts on my mental health (I explore this in the conclusion). However, other interruptions, inherent to conducting community-based research (Castleden et al., 2012; Clayton, 2013; Moore, 2004; Wray et al., 2020) also steered my reflections and ultimately improved the relevance of this project for at least one community co-researcher (Mataya).

The objectives defined in this thesis respond to important gaps in the literature, to my reflections on the research process, to my personal ambitions, to the priorities and questions that

people in Tuktoyaktuk had defined, and to the global context of conducting research during the pandemic. This research achieves a dual purpose: (1) to empirically examine the cost of food in Tuktoyaktuk, and (2) to work through, document, and reflect on the research process both individually and with Mataya.

With this in mind, my objectives are:

1: to assess the Inuvik Tuktoyaktuk Highway (ITH)'s impact on market food prices in Tuktoyaktuk.

2: to conduct a participatory, qualitative examination[14] with residents of Tuktoyaktuk on the impact of the ITH on their behaviours and perceptions related to the local food system.

3: to reflect on the process of conducting Arctic community-based research during the COVID-19 pandemic.

This research is embedded in the work of two ongoing community-based projects in the Inuvialuit Settlement Region (ISR): a long-standing Participatory Food Costing research project (2014-2021) and a newer CIHR-funded project entitled 'Learning from and enhancing Community Capacity for Climate Change and Food Security (C4FS) Action in the Northwest Territories (NWT)' (2019-2024). Through support from the Participatory Food Costing project, peer-researchers in the six ISR communities (Kenny et al., 2021) have been documenting the cost of food in their respective communities since 2014. In this thesis, I build on the work of Kenny, Fillion et al. (2018), who conducted an analysis of the cost of food in the ISR using data from 2014

[14] In this thesis, I do not analyze the data related to objective 2. Instead, I focus on the process of conducting this examination during COVID-19 via a co-authored methods piece.

to 2016, and analyze the change in the cost of food before and after the opening of the ITH in 2017 using data from 2014 to 2020 (research objective 1).

All three research objectives for this thesis fall under the umbrella of the C4FS project and respond to community interests which had been identified during a recent food security engagement process in Tuktoyaktuk (conducted in 2018 in anticipation of the C4FS research project). The C4FS project engages in community-based research across six communities in the NWT to share lessons learned and to support action on food security and climate change. This thesis supports and builds on the work of a large and multidisciplinary team of researchers involved in the C4FS project, community members and partners, and decision-makers at multiple levels of government (Spring et al., 2020) to better understand food security in the NWT and to engage in community-based research.

3. Research methods

3.1. Framework: Community-based research

Building on previous work and guided by ongoing relationships between my supervisors and individuals and organizations in the ISR, this research is grounded in a community-based research framework for working in collaboration with Inuit. The two articles in this thesis approach community-based research from different angles and both respond to the calls to action made by Inuit for researchers "to engage in coordinated actions that enhance the efficacy, impact, and usefulness of Inuit Nunangat research for Inuit" (ITK, 2018b). The first article is an outcome of decade-long engagements between my supervisors, peer-researchers, people in Tuktoyaktuk, and the Inuvialuit regional government (Kenny et al., 2021; Kenny, Fillion, et al., 2018). The article itself responds to a community-defined research objective and uses a policy-oriented approach to research. Throughout this research process, I have also engaged with the Community Corporation of Tuktoyaktuk to discuss preliminary findings and will be communicating the results in an accessible and useful (to the community and policy-makers) manner following the submission of my thesis by, for instance, creating an infographic that can be distributed in the community and by collaborating with other researchers to create a policy document.

The second article is an example of what the process of engaging in Arctic community-based research with youth can look like and specifically employs many methods that can be rooted within a community-based framework. For instance, practicing reciprocity, building capacity, writing collaboratively, and hiring locally-based co-researchers are described in the article and in the preface to that article. Additionally, the data collected in the interviews that Mataya conducted will be communicated back to people in the ISR through an issue of Nipatur̂uq magazine that

Mataya will create and will serve to inform future research about food security in Tuktoyaktuk as part of the C4FS project. Instead of reporting on the content of these interviews within this thesis, a decision was made to write a piece about *how* these interviews were initiated. This decision was based on multiple factors, explained later, which were rooted in reflexive practices around conducting community-based research during COVID-19. I return to this discussion in the preface to the work with Mataya.

3.2. Methodology: Interruptions and reflections

Initially, I thought that the pandemic would be the only major interruption to my work. Over time, I found that the interruptions kept appearing in many forms. They existed as simple phrases: "this seems a little thrown together", said our community partners when we first tried to adapt our research plans after the global lockdowns, or as personal events interrupting my concentration and unrolling in parallel to my research. I came to realize that these interruptions are inherent to community-based research and qualitative research more broadly (Castleden et al., 2012; Clayton, 2013; Moore, 2004; Wray et al., 2020).

These moments have been described in many ways in the social sciences and geography. Non-exhaustively, Hunt (Kwakwaka'wakw scholar) uses the term "productive irritation" (2014), where growth arises from conflict. McCoy uses "methodology of encounters" (2012), borrowing from the French philosopher Gilles Deleuze's question "*est-ce que ca me trouble?*" (Deleuze & Parnet, 1996; in McCoy, 2012) to engage with and seek out moments that disturb, and Guillemin and Gillam (2004) have called them "ethically important moments". In this thesis, I call them *interruptions* and use these irritations/encounters/troubles/moments/interruptions as markers for

navigating tensions and advancing this thesis, reflecting on how they triggered me to think more critically and to change my course of action.

Reflexivity is essential to moving past these interruptions and towards an appropriate reaction. Reflexive practices (e.i. journaling, speaking with mentors, immersion in new environments) are well-used in social science research (Guillemin & Gillam, 2004; Meyer & Willis, 2019; Pillow, 2003; Wray et al., 2020) and involve a variety of methods that allow for the examination of the self, the recognition of the other, and the positioning of the self in relation to the other (Pillow, 2003). As reflexivity occurs, it can aid the researcher in navigating tensions that occur during the research (Clayton, 2013).

The intent of this thesis was not to practice reflexivity specifically (reflexivity is always involved, to a certain degree, in community-based research), therefore reflexive methods were not included in my research plans. Instead, like the rest of this thesis, my reflections occurred spontaneously, guided by the interruptions. They came from a place of deep anguish, a "gut feeling", an expression of the sudden and profound need to change course, to adapt, and to overcome. Reactively and sporadically, I sought mentorship and advice from people who could help me navigate ethical and personal tensions. I reached out[15] to supervisors, committee members, professors, friends, and mental health counselors[16], and spoke about these tensions with Mataya. I

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[15] The context of COVID-19 significantly affected my ability to obtain guidance by mentors, community partners and counsellors, primarily in that interactions were not in-person (limiting the efficacy of the interactions), and online meetings often had to be scheduled many weeks in advance (reducing the opportunities for spontaneous conversations around these challenges).

[16] The process of conducting community-based research and of being self-reflexive at all times can be challenging for the researchers and for the communities involved (L. Okalik, 2016; Pfeifer, 2019). It is always best to have the proper support systems in place during the research process (Sampson et al., 2008), for example by speaking with an Elder and/or a mental health counselor. While conducting this project (and especially during the COVID-19 pandemic), speaking with a counsellor was essential to engaging in deep and personal reflections in a safe way.

turned to the literature, reading works by Indigenous and feminist authors and I, for the first time, began journaling about my reflections.

I document these interruptions[17], reflections, and adaptations in the preface to each of the two articles in this thesis and summarize some key experiences in the conclusion. These sections help to answer the three questions that I wrote in the introduction, namely: what do we do when our plans are forced to change? How do we react, adapt, and overcome these changes? How do we reflect on such interruptions? The prefaces and the conclusion to this thesis are not exhaustive in answering these questions but I found it important nonetheless to explain why I conducted research this way, and to document (Markham et al., 2020) my experience of doing so during the COVID-19 pandemic.

3.2.1. Creative writing

My reflections are also apparent in the form of this thesis, where I turn to creative writing to highlight the interruptions that I experienced while conducting research. I use creative writing to interrupt the "flow" of my thesis and to reproduce the discomfort that I experienced during these interruptions. These pieces occur throughout this thesis (not in the articles, but in the introduction, prefaces, and conclusion) quite spontaneously. They arise from the same "gut feeling" that drove this research forward. In some instances, they are bothersome, pointless, and don't quite lead to a deeper reflection on the material. Those represent my sometimes dead-ended reflections during

[17] It is common practice in reflexive research to note, for example, the date at which a journal entry was made and to quote it directly (Meyer & Willis, 2019). To write this thesis, I returned to journals to help me recall the interruptions to my research but chose to re-shape my journal entries into creative writing pieces, often pulling from other memories, conversations with advisors, and from readings.

the process of conducting this research. My reflections, often personal and layered, are embedded within these creative pieces and are purposefully not obvious (Madge, 2014).

While I label my work as "creative writing"[18], I am inspired by what other scholars have called "poetry" and "geopoetry". Situated as a creative method in geography, poetry has been used for a long time by geographers to try to make sense of affective, human aspects of geography (Boyd, 2017; Cresswell, 2014; Hawkins, 2013; Madge, 2014; McCoy, 2012). Geopoetry refers specifically to "earth writing" (Magrane, 2015); to make sense of our place on the earth, and of the places on earth (Magrane et al., 2020). In my creative writing, I nod to the relatively new field of geopoetics and to the poetic style of geographer and creative writer Sarah De Leeuw to express the tension[19] that I feel about being a geographer who has never been to the places that I am studying (Tuktoyaktuk, ISR, NWT), and about writing on subjects of colonization and reconciliation as a white settler geographer working through my computer screen. Other aspects of my creative writing are primarily inspired by De Leeuw's work which also engages with questions of colonial power and violence through poetry (De Leeuw, 2017; De Leeuw & Hunt, 2018; Magrane et al., 2020). In her piece "writing as righting" (2017) (which I cited at the beginning of this thesis) De Leeuw calls on geographers to engage in poetry and in re-forming language so that we (settler researchers especially) can interrupt the structures that continue to colonize:

[18] As a researcher working and writing in my second language, I feel daunted by labelling my creative writing as "poetry", importantly because I am also unaware of the traditional conventions for poetry in English, and also have no desire to abide by them.

[19] I also navigate a thin line between my desire to know the places that I am writing about and the risk of romanticizing the North, entering in discourses of "the other" and "wilderness" (Cameron, 2015; Kobayashi et al., 2011).

> "We need new forms of stories, we need re-formed writing, writing that works to right, writing that refuses the very forms, the graphings, that have assisted in building the colonial violence pervading so many geographies, both Indigenous and non-Indigenous."

De Leeuw specifically uses poetry to interrupt colonial violence from appearing mundane in an academic text. Although my creative writing does not have the same intent (I specifically use it to highlight where my research was interrupted), many of the interruptions that I experienced during this project had to do with working with Indigenous peoples and doing so in an 'ethical way'. Disrupting the flow of the writing in these moments calls on the reader to reflect more deeply about aspects of the research process which are sometimes not written about or skimmed over quickly. For instance, by drawing attention to the words which I use to explain my positionality (white, woman, privilege), I draw attention to their meaning and interrupt the otherwise often generic "positionality" statements that preface theses and other academic works.

I also join De Leeuw and many others (Ahmed, 2014; De Leeuw, 2017; Lorde, 1984; McCoy, 2012; Todd, 2016) in reflecting on the tools that researchers use in academia (language, format, references) and their ineffectiveness in disturbing the systems that we set out to disturb when conducting community-based research and engaging with Indigenous peoples specifically. In the words of Audrey Lorde, "the master's tools will never dismantle the master's house" (1984), and the reformation of writing, of citing Indigenous authors, and of formatting words on a page to draw attention to their meaning can pave a new path for research advocacy.

3.3. Design: Multi-methodological

Within a community-based research framework, I used a multi-methodological design, juxtaposing qualitative and quantitative methods. In the first article, I used quantitative, econometric methods to analyze the change in the cost of food before and after the opening of the ITH (research objective 1). In the second article, I collaborated with Mataya and supported her in conducting interviews in Tuktoyaktuk (research objective 2). The methods for achieving research objectives 1 and 2 are further explained in their respective articles.

Using a community-based research framework requires researchers to be flexible, reflexive, and to adopt a relationships-first approach to research (Levac et al., 2018). This thesis, in its content and its form, is reflexive and critical of the process of conducting research (research objective 3). To achieve research objective 3, I specifically use reflexive and qualitative methods such as seeking mentorship from professors and other researchers, engaging with the literature, and journaling.

A multi-methodological approach is also used in the form of this thesis. The creative writing is juxtaposed with more structured and expository prose to contrast the two forms (Magrane, 2015), enacting a multi-methodological approach in my writing.

3.4. Summary

This thesis uses a wide assortment of methods, and it can be challenging to fully grasp how they fit within the typical structures that usually outline the methods section of a thesis. In a non-approachable and confusingly long sentence (which I will repeat in the conclusion); this research uses a multi-methodological, community-based reflexive approach to better understand food costs

and food security in Tuktoyaktuk and to reflect on interruptions that I experienced when conducting research during COVID-19. To break this down, I simplify and tabulate (table 3.1) my research framework (community-based research), my methodology (interruptions and reflexivity), and my research design (multi-methodological namely quantitative and qualitative) to explain how each research objective is achieved and the methods that are used to achieve it.

Table 3.1.: Breakdown of the methods used to achieve the three research objectives of this thesis.

Research Objective	Community-based research	Method (research design)	Writing form
RO1 (article 1)	- defining research objectives - ongoing engagement with peer-researchers (Kenny et al., 2021) - reporting and communicating results back to the community - policy-oriented approach	quantitative: - econometric analysis (difference-in-difference) - statistical analysis	- empirical - expository - scientific - policy-oriented - sometimes citing Indigenous authors - academic language
RO2 (article 2)	- defining research objectives - ongoing engagement with community co-researchers - collaborative writing - capacity-building - hiring locally - practicing reciprocity - relationships-first approach - reflexivity	qualitative: - conducting interviews (Mataya) - reflexivity, positionality and context	- collaborative - storytelling - advocacy - mostly citing Indigenous authors - accessible language
RO3 (Introduction, prefaces, and conclusion)	- reflexivity as central to community-based research - reflecting on the interruptions	qualitative: - seeking mentorship - engaging with the literature - journaling	- creative writing (poetry, geopoetry) - juxtaposition of qualitative and quantitative styles

3.5. Thesis outline

This thesis follows an article-based format and is divided into two articles, where the first article achieves objective 1 and the second article achieves objective 2. Objective 3 is achieved throughout the introduction, prefaces, conclusions, and is reflected in what this thesis became (especially article 2). Objective 3 is also embedded in the style of writing.

Both these pieces are individually prefaced with my reflections of conducting research during COVID-19 and the interruptions that gave rise to the articles. Finally, the thesis concludes with a broader reflection on how the interruptions affected me and this research, and with a summary of the achievements that came from this work. The conclusion summarizes my insights on these three questions: what do we do when our plans are forced to change? How do we react, adapt, and overcome these changes? How do we reflect on such interruptions?

Part I: Preface (Objective 3)

Part I: *Food costs in Arctic Canada: The impact of the Inuvik-Tuktoyaktuk Highway.* (Objective 1)

Part II: Preface (Objective 3)

Part II: *Our friendship is reconciliation: A pandemic silver lining in Arctic community-based research*. (Objective 2 and 3)

Conclusions (Objective 3)

4. Part I: Preface

Break. Break.
I care. Do you?

Intrusion: Ma'am, "you care too much"

Too much. Yes, I am.
Always, bright eyes, ready to engage, to take on the world, to see the world.

Intrusion: Ma'am, "There's a time and place to be amazed by the world". Why?

I am 17 again, in love with places I have never been to.
♡ ♡ ♡ ♡ ♡

Dear Tuktoyaktuk,

I have been thinking a lot about you, about me, about us. Are we even in a relationship? I feel so far from you, yet so close. Do you feel the same too? I guess it's… complicated.

I prepared something for you. This thesis, if you would like it, is for you. It contains information that can support you in providing food (life) for all the people, all the youth and Elders, who call you home.

With the first part, I wanted to give you something you could use, something tangible. Something as simple as "the cost of food went up". I know that you knew that already, that people who call you home have to experience it every day. But what I can offer is a clear number. $57 per family per week. I'm sorry I have to be the bearer of such bad news.

I wanted to balance it out, to give you something positive too. So I worked with a bright young leader from Inuvik, the community just south of you. You must know her name: Mataya Gillis. She and I worked to craft you a beautiful story about friendship, reconciliation, and doing research together.

I must tell you, Tuktoyaktuk, why this thesis looks this way. You see, I tried to be straightforward, but there were things I could not ignore; feelings, emotions, disruptions, intrusions, interruptions. I had to think about who I was, to think about what I was doing, and mostly I thought of you.

I'm sorry if I took a roundabout way to get here, but I really needed to do it that way. I think it will help our relationship too.

I look forward to meeting you, one day.

Xoxo,

♡ Kim

In March 2020, at the start of the COVID-19 pandemic, I chose to leave my current residence on the unceded and unsurrendered territory of the Algonquin Anishinaabe in what is now known as Ottawa, Ontario, to the relative isolation of my hometown on the unceded and unsurrendered territory of the Mohawk and Adénakis, what is now known as Saint-Jean-Sur-Richelieu, Québec. I had not lived in my family home since the first semester of my undergraduate degree, six years prior. At that time, one month after I had moved into my first apartment, my mother passed away. I had not lived in my family home since she had been gone. In the first few months of the pandemic, I grieved my mother and I faced the lockdowns, the disastrous ecological and social upheaval, the Black Lives Matter protests and the constant state of emergency. I cried and felt that the world was in crisis. I was in crisis.

The pandemic has created moments during which I have reflected more deeply about myself and my positions in this world. As my vulnerability to the political, social, health and environmental crises grew, I became more and more distraught and critical of myself and of what I was accomplishing (or not accomplishing). Somewhere within my growing vulnerability and self-critique, trauma and abuse that had been forced upon me a lifetime ago surfaced back up into my life. The pain that it brought was paralyzing, and it took control of my every thought. I spoke with friends, sought professional help, and began to reflect even more deeply on my position in this world; as a woman, a settler, a white person of privilege, as a graduate student, and, as I came to realize, as a survivor of sexual assault.

Break. Break.

I am 17 again, in love with places I have never been to.
In love.
rewind, return, recap.

Always, bright eyes, ready to engage, to take on the world, to see the world.
bright eyes, ready
ready?

//Interruption ||
flash. flash. flashback.

.

CTRL+ALT+ESC

The quantitative work became my escape. Through the spreadsheets and the methodological comfort of data analysis, I returned to the protocols that I was familiar with. Relying on my years of prior studies in the sciences, I felt accomplished in my ability to understand the data, what to do with it, how to analyze it, and how to keep track of it. I was reopening an old book, and I already knew the title of each chapter. While I was trying to cope with personal and global crises, I hunkered down, sat at my computer, and plucked at the numbers with mind-numbing madness. This data-driven work allowed me to escape my own thoughts for a few hours a day; a sadistic meditation of sorts.

The fields of economics, econometrics, and nutrition economics were all new to me. Because these disciplines sat outside of the expertise being offered in my program, I unofficially audited a graduate-level course in Nutrition Economics at Tufts University. The professor, Dr. William Masters, is one of the few researchers who has worked on food costing globally and he generously reviewed early drafts of my paper and provided feedback on my methods. In addition, I refreshed my skills in statistics by seeking employment as a teaching assistant in the faculty of

mathematics at the University of Ottawa, where I taught tutorials and graded exams for an introductory course in probability and statistics. My student's questions helped me think through my analysis.

As the work progressed from data cleaning to writing, and as I began to emerge from my meditative hibernation, I realized how powerful our results were, and how important it would be to share them. I also got to speak with one of the community co-researchers who had been involved in collecting data for the participatory food costing project (and who we also hired again to help us organize the interviews with Mataya). Seeing her dedication to this project gave me the extra motivation that I needed to finish writing this paper.

5. Part I: Food costs in Arctic Canada: The impact of the Inuvik-Tuktoyaktuk Highway

5.1. Abstract

Rural road development is often a precursor and catalyst to economic growth, with potential to support community well-being and food security. For residents of Tuktoyaktuk (population: 995), an Inuvialuit (Inuit) community nestled on the shores of Beaufort Sea (Canadian Arctic), the opening of the first all-season road in 2017 promised economic development and, amongst other benefits, lower food costs. However, the very fact of gaining road access precludes the community's eligibility for the Nutrition North Canada program, a federal food subsidy designed to make food more affordable in *isolated* (i.e. no year-round road access) northern communities.

This paper examines the impact of the Inuvik-Tuktoyaktuk Highway and the subsequent loss of the subsidy (the intervention) on market food prices in Tuktoyaktuk. Using a food basket approach, a difference-in-difference model was used to examine changes in the average market basket prices before (2017), one year after (2018), and two years after (2019) the highway opened and the subsidy was lost. The results suggest a significant increase in market basket prices attributable to the intervention two years after the opening of the highway (+CAD$44, $p = 0.02$), and a non-significant increase one year after the opening of the highway.

This research is the first to document the impacts of highway development on food prices in Arctic Indigenous communities. To support evidence-based food security and development policy, our results highlight the need for better social, economic and health impact assessments

and monitoring of major infrastructure projects, especially in remote Indigenous communities experiencing a food security crisis.

5.2. Introduction

5.2.1. Road development: Global to Arctic

Rural road development[20] is often a precursor and catalyst to economic growth and has the potential to improve living conditions, health, and food security[21] (Khandker et al., 2009; Ludwig et al., 2016; Starkey & Hine, 2014; Van de Walle, 2002). Important developments in the global road network are projected by 2050, with major extensions proposed into rural, remote, and isolated regions, including the North American Arctic (Meijer et al., 2018). This region is characterized by small, remote Indigenous[22] settlements where mixed subsistence food systems and economies are central to residents' livelihoods and identities (BurnSilver et al., 2016; Collings et al., 2016; Condon et al., 1995; Fauchald et al., 2017; ITK, 2019a; Kenny, Hu, et al., 2018; Kuhnlein et al., 2004; Kuokkanen, 2011).

The impact of road connectivity on local food systems and economies in the Arctic is poised to be significant (M. Bennett, 2018; Guettabi et al., 2016; P. P. Schweitzer, 2020; P. Schweitzer &

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[20] Rural roads development in this context refers to the development of roads between communities that were previously not connected, and between remote communities and the continental road system.

[21] Food security exists when "all people at all times have reliable physical and economic access to safe, sufficient, nutritious and culturally appropriate foods to meet their dietary needs and preferences" (FAO, 1996). This comprises the four 'pillars' of food security: access, availability, stability, and utilization (FAO, 1996; Nunavut Food Security Coalition, 2014).

[22] The term "Indigenous" was created by the American Indian Movement and the Canadian Indian Brotherhood in the 1970's and it is the term most commonly used in a global context. The term "Indigenous" in Canada refers to all original peoples in Canada, which includes the three constitutionally-recognized groups: Inuit, First Nations and Métis. It is important to note that in other countries, there may be preference for other terms including tribes, first peoples/nations, aborigine, etc. The term "Indigenous" is used as an umbrella term in this paper, unless when speaking of a specific group.

Povoroznyuk, 2019) and has the potential to positively impact the local retail food supply (lower prices, improve the quality and availability/selection of foods) by, for example, introducing more affordable and reliable food shipping options (Prentice & Adaman, 2015) or improving accessibility to hunting and fishing grounds. To date however, only a few studies have investigated the impact of road development on the market food supply and on food security more broadly in Inuit and other northern Indigenous communities (Adam et al., 2012; Buchan et al., 1992; Guettabi et al., 2016; Thompson et al., 2012). These studies have not investigated the impact of new roads on food costs, making our study the first to do so in a remote, northern Indigenous community.

5.2.1.1. Roads for development

The role of roads as agents of development in rural regions is an active area of research within development studies. One particularly active area of academic debate focuses on contrasting the benefits of rural road projects at a regional scale to the benefits of rural road projects at a national or global scale. When the benefits of a rural road project are assessed at the global and national level, research suggests that the investment in transportation infrastructure decreases trade costs which results in national economic growth and development (Ansar et al., 2016; Donaldson, 2018; Perz, 2014a; Srinivasu & Rao, 2013). In contrast, when the benefits of a rural road project are assessed at the regional level, case studies show the uniquely local ways in which the roads often reinforce structural issues such as income inequality and fail to improve the local economy over the long term (Ansar et al., 2016; Demenge, 2015; Ramalho et al., 2013; Southworth et al., 2011; Van de Walle, 2002). For example, in a study of rural Ethiopian, Zambian and Vietnamese villages, only the villagers who could afford vehicles enjoyed the economic opportunities that new highways offered (Bryceson et al., 2008). Contrasting the impacts of rural road projects at different

scales is a precursor to positioning the lived experience of Indigenous communities within the broader discussion on rural road development.

5.2.1.2. Roads and Indigenous self-determination

The expansion of rural roads in Indigenous territories has often been initiated by colonial and nation-state sovereignty and development interests, often without proper consultation and local support. These roads are most often built to facilitate resource extraction in remote regions of the world, such as the Amazon and the Arctic (Adam et al., 2012; Angell & Parkins, 2011; Meijer et al., 2018; Southworth et al., 2011; Stienstra et al., 2019). Studies found via this literature search either explicitly stated that roads had been imposed on Indigenous territory or used a language that suggests that 'development' was being done "on" Indigenous people rather than "with" or in "collaboration" with Indigenous people (Clements et al., 2018; Espinosa et al., 2014; Ramalho et al., 2013; Riley-Powell et al., 2018; P. Schweitzer & Povoroznyuk, 2019; Southworth et al., 2011). It is unclear to what degree Indigenous communities benefit from rural road development, including where such developments are driven by local leadership, but it is clear that self-determination in choosing whether to and how to build major transport infrastructure is crucial to the well-being of Indigenous communities (M. Bennett, 2018; P. Schweitzer & Povoroznyuk, 2019). In addition to making important contributions to the literature about the impact of road development on food costs, our study investigates the impacts of Indigenous-driven transport development projects in a participatory way with local Indigenous communities.

5.2.2. Food security among Inuit in the Canadian Arctic

Inuit experience the highest documented rate of food insecurity among Indigenous populations that live in a developed country (Council of Canadian Academies, 2014; De Schutter,

2012). Food insecurity, which impacts up to 62% of Inuit households, is a critical social determinant of health and of social equity (Council of Canadian Academies, 2014; De Schutter, 2012; Inuit Circumpolar Council-Alaska, 2015; ITK, 2014; Rosol et al., 2011). Improving food security is a public health measure that could contribute to "closing the (health) gap" (Browne et al., 2014) between Indigenous and non-Indigenous peoples. Significant inequalities exist between the material conditions of daily life in Inuit communities and those of the average Canadian household. These inequalities compound to create important health gaps between Inuit and non-Inuit. For example, Inuit experience significantly higher rates of chronic diseases, infectious diseases, and mental health challenges than other Canadians (ITK, 2018a).

The food security crisis as experienced by Inuit must be contextualized within the historical and colonial context of Canada's influence on Inuit food systems. The legacy of colonization impacts Inuit rights to food, their right to self-determine local food systems and economies (Council of Canadian Academies, 2014; GNWT, 2019; Watt-Cloutier, 2015), and their sovereignty over their local food systems (Grey & Patel, 2015; Watt-Cloutier, 2015). Deliberate acts of colonialism have attempted to estrange Inuit from their traditional food systems, shifting Inuit diets away from the preferred country food sources (foods hunted and gathered from the land) to food purchased from stores (Damman et al., 2008; Galloway, 2017; ITK, 2019a). Despite this nutrition transition, healthy and nutrient-rich country foods (foods hunted and gathered from the land) remain at the core of the Inuit food system[23] (ITK, 2019a), and Inuit today generally consume a mix of both country foods and market foods. While the importance of country foods is central to

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[23] Recently, the Arctic has also seen the introduction of locally cultivated foods (for example, cold climate greenhouses, community gardening and animal husbandry). This component of the food system plays only a minor role in Tuktoyaktuk's food system though it shows promise to increase in importance in the future (Kenny, Wesche, et al., 2018a).

the Inuit food system, this study specifically focuses on the impact of the highway on market food prices; further research will be needed to better understand its impact on the county food system.

Market food prices in Inuit communities are extremely high (Chan et al., 2006; Council of Canadian Academies, 2014; Egeland, 2010; Lambden et al., 2006). In this context, Inuit pay two to three times more than the average Canadian for their groceries (Chan et al., 2006; Kenny, Fillion, et al., 2018; Pakseresht et al., 2014) and average Inuit household incomes are 30% lower than the median Canadian household income (ITK, 2018a)**.** The high cost of food in Inuit communities appears to be driven primarily by the high cost of transporting foods to the remote locations where Inuit live[24], but could also be due to limited competition among retailers in those locations (Chan et al., 2006; Kenny, Wesche, et al., 2018b; Naylor et al., 2020; Pakseresht et al., 2014). Addressing the significant infrastructure deficits in the North has the potential to improve livelihoods and reduce food prices (Chan et al., 2006; ITK, 2019a; Niqittiavak Committee, 2015; Amanda Wilson et al., 2020).

5.2.2.1. Federal food subsidy: Nutrition North Canada Program

In recognition of challenges to healthful market food access and affordability, the Government of Canada operates the Nutrition North Canada (NNC) program, a retail-based food-subsidy program designed to reduce the cost of transporting nutritious food (and some essential items like toiletries and personal care products) to remote (i.e. which lack year-round road access[25])

[24] While food costs are a major problem, food quality and availability are also of concern. For example, perishable items often arrive in poor quality due to long travel-related delays, poor storage infrastructure and variable temperatures during transport. Access to communities is also not guaranteed. Poor weather can delay food shipments for weeks at a time.
[25] This excludes communities that experience seasonal isolation caused by river freeze-up and break-up, which normally lasts less than four weeks at a time.

northern communities (NNC, 2020). The program seeks to improve food access and affordability; however, factors outside the scope of the NNC program - including poverty, unemployment, limited infrastructure, and the high cost of living (Office of the Auditor General of Canada, 2014) - limit the ability of consumers to make economically realistic and healthy food choices (Kenny, Fillion, et al., 2018; Pakseresht et al., 2014). The NNC program was not designed to address other determinants of food security.

In light of its scope, the NNC program has been scrutinized and deemed insufficient by Inuit leadership organizations (ITK, 2019b; Niqittiavak Committee, 2015) and academic researchers (Burnett et al., 2016; Fafard-St-Germain et al., 2019; Galloway, 2017; Leblanc-Laurendeau, 2019) for improving food access and availability. The program has been critiqued for its ongoing colonial structure, for neglecting to subsidize items that are essential to the provision of country foods[26], for lacking in program accountability and transparency, and for a variety of issues concerning subsidy rates, types of items subsidized, food quality and food availability (Burnett et al., 2015, 2016; Fitzgerald & Hill, 2017; Galloway, 2017; ITK, 2019a; Leblanc-Laurendeau, 2019; Rall et al., 2020; Amanda Wilson et al., 2020). The NNC program operates within the context of major food insecurity and overlapping economic, social, and political tensions regarding the role of government programs in Indigenous communities, making it a challenging but important program to evaluate.

[26] The new Harvesters Support Grant (launched in 2020) is designed to improve access to foods that are hunted and gathered from the land. This grant helps to reduce the high cost of harvesting, for example by subsidising harvesting equipment, food-processing equipment, temporary and permanent shelters, and relevant training and certifications.

5.2.3. The first highway to the Arctic Ocean

In the fall of 2017, the Government of Canada and the Government of the Northwest Territories announced the official opening of the first highway to the Arctic Ocean, the Inuvik-Tuktoyaktuk Highway (ITH). Constructed using cutting-edge technology in one of the world's most remote and climatically challenging regions, this endeavor came with an expensive price tag: CAD$299 million to build the road, with annual repair costs estimated at CAD$1.9 million (GNWT, 2010). The ITH begins where the Dempster highway ends in the regional center of Inuvik, and extends 138 km north to Tuktoyaktuk, an Inuvialuit community of 982 residents on the Arctic coast (Figure 5.1).

For local communities, the highway promised new jobs, improved connectivity, new economic opportunities, improved access to basic services, and reduced costs of housing, food, gas and other living expenses (Donaldson, 2018; Howe & Richards, 1984; Southworth et al., 2011; Srinivasu & Rao, 2013). However, soliciting the federal and territorial governments with social and local economic interests did not yield much success for Inuvialuit communities, and the project took decades to get off the ground (Bennett, 2018). At the turn of the 21st century, a warming and increasingly accessible Arctic began attracting global interest. Sensing the opportunity, Inuvialuit leaders "advanced discourses that resounded with myths about the Canadian nation-state – namely beliefs in a northern destiny and northern sovereignty – instead of focusing on the road's ability to create local jobs and stimulate regional development" (Bennett, 2018). Announced by the Canadian government as a nation-building project, constructed by Indigenous-owned companies and praised by Inuvialuit for the much-anticipated positive impacts it would have, this road captured imaginations locally, nationally, and globally (M. Bennett, 2018; Lamontagne-Cumiford,

2020). It remains unclear if the road has yielded the social and economic impacts that were promised and offers the opportunity to disentangle myth from reality in the road-building narrative.

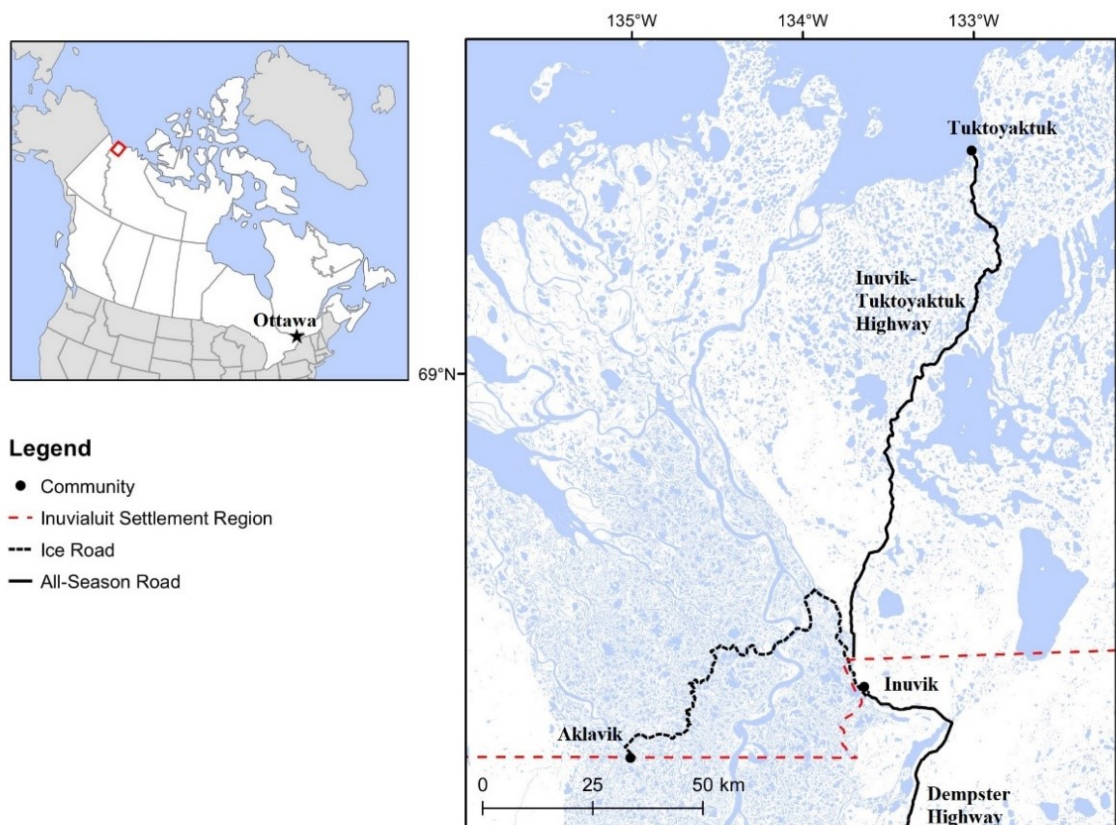


Figure 5.1: Route of the Inuvik-Tuktoyaktuk Highway in the Inuvialuit Settlement Region, linking the community of Inuvik to the coastal hamlet of Tuktoyaktuk

5.3. Research goals and objectives

Four years after the opening of the Inuvik-Tuktoyaktuk Highway, it remains unclear how the highway has impacted the community of Tuktoyaktuk, and specifically if it has improved food access. With the opening of the highway, the community's eligibility for the NNC subsidy was rescinded, as the community was no longer considered "remote" by the federal government. Using a difference-in-difference approach, this study empirically examines the impact of major road infrastructure development (the ITH) and food security policy change (the removal of the NNC subsidy) on an important dimension of the market food environment (food prices) within a remote Indigenous context (Tuktoyaktuk, NWT). In addition to the research gaps outlined above, the need for this research was identified by community members in Tuktoyaktuk during a community food security engagement process in 2018 and is part of a broader participatory food security project in the Inuvialuit Settlement Region (Kenny et al., 2021; Amanda Wilson et al., 2020).

5.4. Methods

5.4.1. Regional profile and the Inuvik-Tuktoyaktuk Highway

This research is set in the Inuvialuit Settlement Region (ISR), western Canadian Arctic, the homeland of the Inuvialuit (Arctic Indigenous/Inuit) people. Six communities and a total of 6,880 people[27] inhabit the region's 1,172,749 square kilometers (Indian and Northern Affairs Canada, 1984; NWT Bureau of Statistics, 2019). This includes Inuvik (population 3,536), the administrative centre for the western Arctic, which has been road accessible year-round (except

[27] Approximately 80% of residents in the ISR are Indigenous (and primarily but not exclusively Inuvialuit), and that proportion increases for small communities like Tuktoyaktuk.

for annual thawing and freezing periods) since the construction of the Dempster highway in 1979; Tuktoyaktuk (population 995), the focal community in this study, which gained year-round road access for the first time in 2017; and Aklavik (population 622), which serves as the referent/control community in this study, given similar sociodemographic and logistical characteristics (e.g., seasonal ice road, no year-round road-access) to Tuktoyaktuk.

5.4.2. Tuktoyaktuk

Prior to the opening of the ITH, food could be transported to Tuktoyaktuk by barge (or "sealift") via the Mackenzie River in the summer (approximately June-September) and by ice road in the winter (approximately December-April), with important weather-related inconsistencies in access (Town of Inuvik, n.d.). When weather permitted, the community was also accessible year-round by air, which was often the only way to access the community during freezing and thawing periods in October, November, and May. The community is experiencing climate change head-on, including direct consequences of sea-level rise, thawing permafrost, changes in sea and air temperature, increasing storm intensity during open-water seasons, and changing timings of sea-ice freeze-up and break-up (Berner et al., 2005; Kwok & Cunningham, 2010; Manson & Solomon, 2007). These changes cause significant impacts on infrastructure, livelihoods, local economies, health, and wellbeing (Andrachuk & Smit, 2012).

For many residents of Tuktoyaktuk, economic access to food is a serious challenge; 43.8% of residents in a 2017 survey were concerned about having sufficient resources to purchase food (NWT Bureau of Statistics, 2019). There are two grocery stores in Tuktoyaktuk, including *Stantons* (S*tantons Group Ltd,* incorporated by the Inuvialuit Development Corporation) and *Northern* (*North West Company*). Many residents of Tuktoyaktuk shop for the best value between

the two local stores and/or travel to Inuvik (where prices are approximately 10% lower) (GNWT, 2010), or beyond (to Whitehorse, Yukon) to purchase food.

5.4.3. Analytical framework

To examine the impact of the highway and the loss of the subsidy on market food prices in Tuktoyaktuk we employed a difference-in-difference (DiD) analysis (Angrist & Pischke, 2008; Gertler et al., 2016). DiD is a quasi-experimental econometric technique that is often used to study causal relationships between an intervention and an outcome. DiD is the most common study design included in Cochrane Reviews, for instance, to study the effectiveness of new medical development, and is widely used in branches of economics and development to test the effectiveness of an intervention or a policy (Babu et al., 2017; Columbia Mailman School of Public Health, 2013; Ijaz et al., 2014; Otten et al., 2017; Spey et al., 2019). DiD is also the most common study design used to conduct impact assessments of rural roads (Howe & Richards, 1984; Ludwig et al., 2016) and has been used to examine changes in food basket prices resulting from policy changes in other contexts (Otten et al., 2017).

DiD captures the difference in outcome or trends over the treatment and control groups as they occur before and after the intervention. Inflation and other market forces are accounted for with the control group. It can also capture effects at more than one time period after the intervention. In this study, the intervention is the paired effect of the opening of the highway and the rescission of the subsidy. The pre-intervention period is the year 2017 (March 2017 – February 2018), and the post-intervention periods are *post1* in 2018 (March 2018 – February 2019), and *post2* in 2019 (March 2019 – March 2020).

The DiD estimators (δ_1 and δ_2) are implemented in a regression equation and estimate the change in the food basket price that could be attributable to the intervention:

$$Price_{it} = \alpha + \beta_i Tuk_i + \gamma_1 post1_t + \gamma_2 post2_t + \delta_1 Tuk_i * post1_t + \delta_2 Tuk_i * post2_t + \varepsilon_{it}$$

where

$Price_{it}$ is the estimated mean price for the food basket in community *i* (i.e., affected (Tuktoyaktuk) or unaffected (Aklavik) community), at time *t*. α controls for the price of the basket in Aklavik prior to the intervention. Tuk_i is a dummy variable that equals one for Tuktoyaktuk basket prices and zero for Aklavik basket prices, and β_i captures the differences in mean prices between the two communities. $Post1_t$ and $Post2_t$ are dummy variables that equal one for prices measured in the first and second follow-up periods, respectively, and γ_1 and γ_2 capture differences in mean prices across time relative to the baseline period. ε_{it} is the random error term. The DiD estimators δ_1 and δ_2 are the coefficients of the interaction between Tuk_i and the intervention period ($post1_t$ *or* $post2_t$). This interaction term is a dummy variable that takes a value equal to one if a basket price is both from Tuktoyaktuk and after the intervention ($post1_t$ *or* $post2_t$ respectively), and zero otherwise. The DiD estimators capture the change in food prices in Tuktoyaktuk that cannot be attributed to the community and time effect (which control for inflation and other market forces), and therefore could be attributed to the opening of the highway and the loss of subsidy. The analysis was conducted using StataIC 16 (StataCorp, 2019). An α level of 0.05 was used to determine statistical significance.

5.4.4. Food price data

Data regarding the cost of food in remote northern communities is challenging to access as store-level data is often considered confidential business data (Sarasin, 2019; Skinner et al., 2016).

Limitations of existing food price data in such contexts have been discussed elsewhere, see (Burnett et al., 2015; Galloway, 2017; Government of Canada, 2007; Kenny, Fillion, et al., 2018; Naylor et al., 2020). There is a general lack of transparency, and data gaps exist regarding the actual costs that consumers are paying, how these costs are calculated, and how these costs fluctuate.

Since 2011, northern retailers receiving the federal NNC subsidy have been required to submit detailed reports on the cost of some specific food items. The NNC program uses this store-level data for monitoring program performance, but only publishes quarterly data from store managers for specific food items and only in NNC-eligible communities (Galloway, 2017). NNC collects, computes, and publishes quarterly and annual fiscal year reports for the cost of a food basket in most eligible communities (NNC, 2020). The food basket is calculated by multiplying each food item's cost in CAD$/g by a pre-established quantity (in grams). The total cost of all the items in the food basket are then summed, and 5% of the total cost is added to cover the purchase of any miscellaneous food items (Government of Canada, 2007). We downloaded and used the final per-community cost of the food basket for our study period, as published on the Nutrition North Canada website (NNC, 2020).

Critically, the cost of the food basket is not recorded in Tuktoyaktuk after March 2018 as NNC only reports these data for NNC eligible communities. To overcome the gap in data after the highways opened and the subsidy was lost, we augmented Nutrition North's dataset with community-owned data that was collected through an existing participatory food costing study (Kenny, Fillion, et al., 2018; Kenny et al., 2021; Amanda Wilson et al., 2020).

5.4.4.1. Participatory Food Costing (PFC) data

Participatory food costing is a community-engaged method that employs local community researchers to collect data on the cost of food at their local grocery stores. This method has been used previously in the Canadian provincial North and maritime region (Veeraraghavan et al., 2016; P. Williams et al., 2012). Kenny, Fillion et al. (2018) began data collection for this study in the ISR in 2014, and have since published about the study design and analysis using the 2014-2016 data. Since then, data collection has been ongoing opportunistically, i.e. when funding was available to support research activities. The results of the participatory food costing study (2014 - 2020) are summarized in Table 5.1 for the cost of the food basket in each of the six ISR communities.

The local researchers' costing sheets for 2017 – 2020 were double entered in Excel by two independent researchers at the University of Ottawa. An error rate of 1.25% was found and fixed between the first and second entries. Missing data, such as where an item was unavailable or where the local researchers' notes were illegible, were imputed by averaging the price of the item in the previous and following season. When the price was missing for more than four seasons before and after the missing data point, a regional average was used. Of the items in the food basket in Tuktoyaktuk, there were a total of 64 (16%) missing items out of 402 items in the first follow-up period, and 50 (15%) missing items out of 335 items in the second follow-up period. A mix of outlier detection techniques and researcher judgment was used to detect outliers. In cases where significant outlier values could not be explained after further examination, they were removed from the dataset and imputed as missing values. There was one significant outlier in Tuktoyaktuk

during the study period (1/737, 0.1%) and 13 significant outliers in the regional dataset (13/5243, 0.25%).

Table 5.1.: Average seasonal cost of the Revised Northern Food Basket (CAD$) in the six communities in the Inuvialuit Settlement Region. Missing values represent seasons then data was not collected due to logistical constraints.

Season	**Community***					
	Tuktoyaktuk	*Com. B*	*Com. C*	*Com. D*	*Com. E*	*Com. F*
Fall14	$359.64	$440.39	$432.15	$475.03		$473.98
Win14	$416.56		$493.91	$500.72	$448.92	$523.95
Sum15	$407.13	$403.91	$468.95	$528.40	$465.92	$461.07
Win15	$423.40		$516.94	$470.87		$441.52
Fall17	$457.28	$505.23				
Spr18	$445.96	$435.23				
Sum18	$454.36	$463.39				
Fall18	$449.96	$481.35				
Spr19	$487.83	$477.81				
Fall19	$477.25		$516.59	$530.62	$528.27	
Win19	$484.67	$432.83		$543.40	$527.61	$464.26
N†	16	12	6	6	4	5
Average	$449.13	$458.26	$490.63	$508.17	$492.68	$472.94

* Community names have been coded to ensure the privacy of retailer market prices. Tuktoyaktuk, the community of study, is not coded.

† In communities where there are two stores, data was sometimes obtained in more than one store per season. For privacy reasons, only the average of both stores, when applicable, is shown in this table. The N displayed here counts all the data points available by community.

5.4.5. The Revised Northern Food Basket (RNFB)

The sum cost of the RNFB was then calculated as described by Nutrition North Canada (Government of Canada, 2007). The Canadian government uses the National Nutritious Food Basket (NNFB) to monitor the minimum cost of healthy eating according to the Health Canada food guide and to track inflation as a component of the Consumer Price Index. In the northern context, the Revised Northern Food Basket (RNFB) offers a more realistic measure of available and affordable food items that are stocked on grocery store shelves year-round. For instance, the

northern basket replaces many of the fresh fruits and vegetables listed in the national basket with canned or frozen alternatives that can be stocked throughout the year in the north.

The RNFB was created by Indigenous and Northern Affairs Canada in collaboration with Health Canada. It consists of 67 food items that are designed to reflect the purchasing patterns of a family of four (1 man and 1 woman aged 25-49 years, 1 boy aged 15-13 years, and 1 girl aged 7-9 years, for one week). The list of items in the RNFB and their quantities is included in Appendix 1. Most (about 85%) of the foods in the RNFB are subsidized by Nutrition North Canada, and some subsidized foods are not included in the basket.

This basket is not intended as a nutrition guideline, does not meet all of the recommended nutrient intakes of the Canadian Food Guide, and may not be representative of actual food consumption habits or expenditures in the populations concerned (Burnett et al., 2015; Enrg Research Group, 2015; Galloway, 2017; Kenny, Fillion, et al., 2018). Likewise, the family of four represented by this basket does not reflect typical family and household structures in Inuit communities (ITK, 2018a; Pauktuutit Inuit Women of Canada, 2006). Nevertheless, the use of a food basket approach to food and nutrition economics is common (Chapman et al., 2014; Drewnowski et al., 2016; Monsivais & Drewnowski, 2009; Otten et al., 2017; P. L. Williams et al., 2006) and because of the data sources used for this study (namely NNC data), the RNFB was chosen despite it being far from an ideal metric to gauge the actual cost of food in the North.

5.4.6. Assumptions

DiD analyses rely on the assumption that the price of the food basket in both Aklavik (the control) and Tuktoyaktuk would continue to follow the same trend if it weren't for the intervention in Tuktoyaktuk. Testing this assumption, known as the "parallel trend assumption", requires longitudinal data and visual assessment (Columbia Mailman School of Public Health, 2013; McKenzie, 2020). In our case, the parallel trend assumption holds upon visual inspection of the 2011 - 2017 Nutrition North Canada data on the cost of the Revised Northern Food Basket, as presented in Figure 5.2. The data on the food basket prices in Tuktoyaktuk (n=29 time points) and in Aklavik (n=29 time points) between 2011 – 2018 are similar in trend, level and in functional form (moving in unison, for instance, when basket prices dropped between 2011 – 2012, and then raising together afterward), improving the plausibility of the DiD results (McKenzie, 2020). We also assume that the participatory food costing data (PFC) is exchangeable to the Nutrition North Canada (NNC) data (Figure 5.2).

We assume that Aklavik is a suitable control community for this analysis. Aklavik was selected as a control community in this study given similar sociodemographic and logistical characteristics (e.g., seasonal ice road, no year-round road-access) to Tuktoyaktuk. Of the four ISR communities for which Nutrition North has been collecting data on the price of the food basket, the price of food in Aklavik most closely followed the price of food in Tuktoyaktuk between 2011-2018, improving the quality of Aklavik as a control. Appendix 2 shows the data for the other communities which were not chosen as controls. We also assume that the price of the food basket in Aklavik was not affected by the new highway to Tuktoyaktuk.

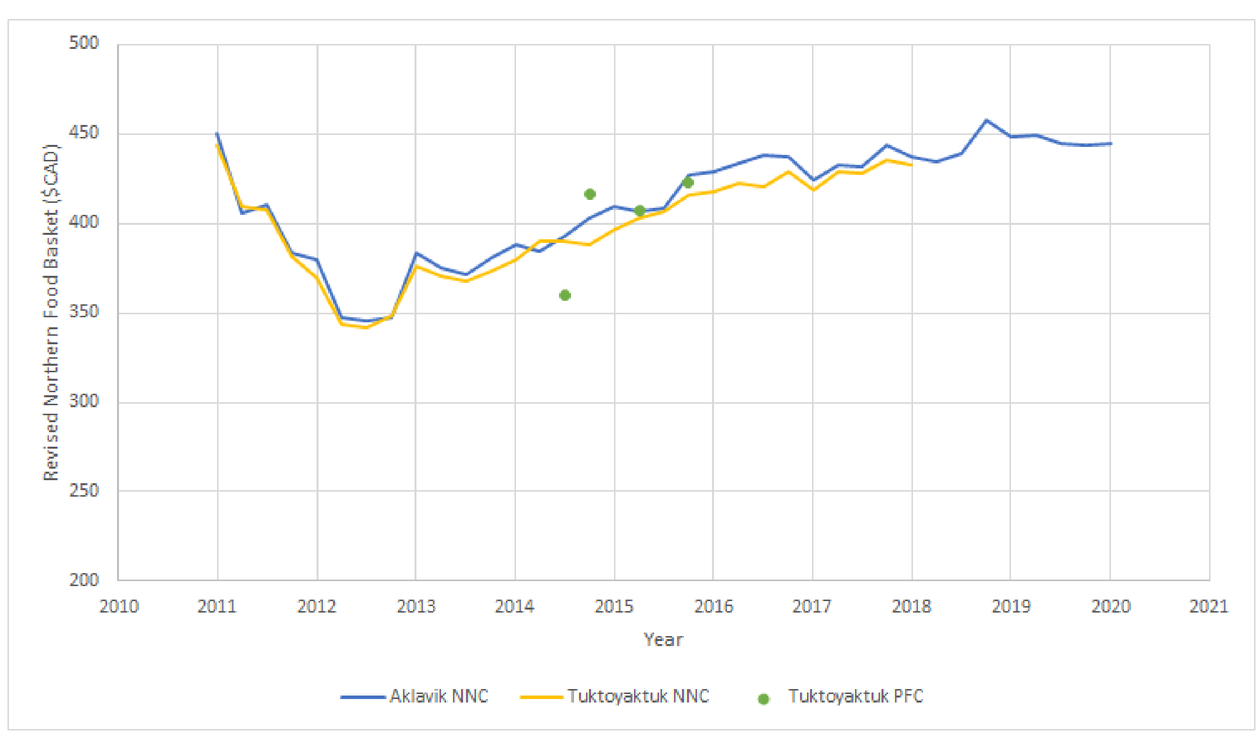


Figure 5.2: Longitudinal data for the cost of the Revised Northern Food Basket in CAD$ in the control community (Aklavik) and the treatment community (Tuktoyaktuk) from 2011-2020. NNC = Nutrition North Canada (NNC, 2020), PFC= Participatory food costing data

5.5. Results

Table 5.2. summarizes the cost of the Revised Northern Food Basket when stratified by community and study period: *baseline* in 2017, *post1* in 2018 and *post2* in 2019. According to the results from 2019, the cost of feeding a family of four in Tuktoyaktuk without meeting nutritional adequacy was CAD$1,937 per month (CAD$23,253 per year, or approximately 30% of household income).

Table 5.2.: Comparison of the average cost of the Revised Northern Food Basket (RNFB) in CAD$ at *baseline*, *post 1* and *post 2*.

Community	**Average CAD$ RNFB (n)**			**Δ**		
	Baseline [2017]	***Post 1*** [2018]	***Post 2*** [2019]	2017-18	2017-19	2018-19
Tuktoyaktuk	$427.48* (4)	$449.98† (6)	$484.44† (5)	↑ $22.50	↑ $56.96	↑ $34.46
Aklavik	$433.30* (4)	$442.19* (4)	$446.21* (5)	↑ $8.88	↑ $12.90	↑ $4.02
DiD	-$5.82	$7.79	$38.22	↑ $13.62 ($p$=0.278)	↑ $44.05 ($p$=0.020)	↑ $30.43 ($p$=0.100)

* Average food basket cost obtained from Nutrition North Canada
† Average food basket cost obtained from the participatory food costing study.

At the baseline, the cost of the food basket in Aklavik was CAD$433.30 whereas the cost of the basket in Tuktoyaktuk was CAD$5.82 lower, at CAD$427.81. In the first year after the highway was built and the subsidy was lost (2018), the cost of the food basket in Tuktoyaktuk rose by CAD$22.50 to CAD$449.98, raising above the cost in Aklavik by CAD$7.79. In the second year after the intervention (2019), the basket in Tuktoyaktuk cost CAD$484.44, whereas the one in Aklavik cost CAD$446.21, indicating a CAD$38.22 difference between both communities.

The difference-in-difference analysis is represented in Figure 5.3. Between 2017 and 2019, the cost of the food basket in Tuktoyaktuk went from CAD$427.48 to CAD$484.44, representing a net increase of CAD$56.96 per week for an average family of four. In Aklavik, the cost of the food basket rose by CAD$12.90 over the same timeframe. Assuming that the cost of the food basket in Tuktoyaktuk would have also risen by CAD$12.90 due to inflation and other market forces, this means that an increase of CAD$44.05 can be attributed to the opening of the highway and the loss of the Nutrition North Canada subsidy. The difference-in-difference regression indicates that the increase in the cost of the food basket in Tuktoyaktuk two years after the

intervention is statistically significant (CAD$44.05, SE=16.77, p=0.020). At an α level of 0.05, there was no significant difference between the cost of the food basket between 2017 and 2018 (CAD$13.62, SE=12.06, p=0.278) and between 2018 and 2019 (CAD$30.43, SE=17.46, p=0.100).

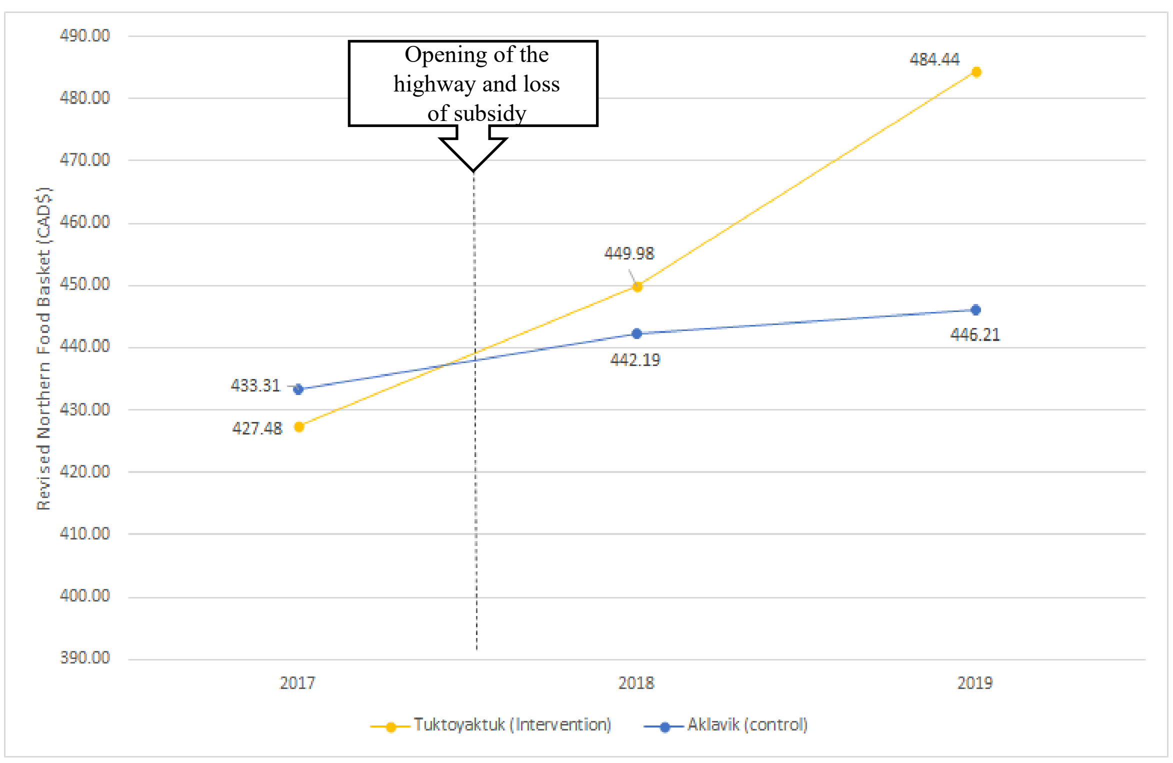


Figure 5.3: Average cost of the Revised Northern Food Basket (RNFB) in CAD$ at baseline (2017), one year after (2018), and two years after (2019) the opening of the Inuvik-Tuktoyaktuk Highway and loss of the NNC food subsidy

5.6. Discussion

Results from our previous food costing study in the ISR show that the cost of food in the region was more than twice that of other Canadian cities (Kenny, Fillion, et al., 2018). As results from this study demonstrate, more than four years later, important inequalities in the cost of food remain. The cost of a theoretical food basket to feed a family of four in Tuktoyaktuk in 2019 (without meeting nutritional adequacy) was CAD$1,937 per month (CAD$23,253 per year, or

30% of household income). In Ottawa, Canada's capital city, the cost of feeding a family of four while meeting nutritional adequacy was CAD$901 per month (CAD$10,812 per year, or 10% of household income) (Public Health Ottawa, 2019) during this same period. We also found that the overall cost of the revised northern food basket in Tuktoyaktuk rose by CAD$57 (representing a 13% increase) between 2017 and 2019, or an equivalent of CAD$2,964 per year for a family of four. In the rest of Canada, food costs increased by approximately 4.8% between 2017-2019 (Charlebois et al., 2017, 2019). The exceptional increase in food prices in Tuktoyaktuk has significant implications for the health and well-being of a community that was already experiencing a food security crisis.

By examining changes in food prices in the region over time, and between communities with similar sociodemographic and logistical dimensions of food retailing, this study provides insights into the impact of the Inuvik-Tuktoyaktuk Highway and the subsequent loss of the Nutrition North Canada subsidy on the cost of the Revised Northern Food Basket. We found a significant increase in the cost of the Revised Northern Food Basket (CAD$44 between 2017 and 2019) that is attributable to the opening of the highway and the loss of subsidy.

It was not possible to empirically disentangle the effect of the highway from the removal of the subsidy within the present analyses. However, previous literature has shown positive economic outcomes of highway development (Egan et al., 2003; Howe & Richards, 1984; Ludwig et al., 2016; Perz, 2014a; Rosenbloom, 2012) and impact assessments in the Canadian North also anticipate economic benefits from road construction (Conference Board of Canada, 2014; Fellows & Tombe, 2018; GNWT, 2010; MacDonald, 2014). It is reasonable to assume that the opening of the road has likely introduced more affordable transportation options (Prentice & Adaman, 2015), and we can also assume that, in principle, these would have been passed down to consumers

through lower food costs (Naylor et al., 2020). It seems as though the discount offered by the cheaper transportation option did not compensate for the rescission of the NNC food subsidy. In other words, despite the opening of the highway, the removal of the Nutrition North subsidy may have led to a significant increase in food prices in Tuktoyaktuk.

In the 2017-2018 fiscal year, the last year of the program in Tuktoyaktuk, NNC subsidized a total of CAD$305,237 (Nutrition North Canada, 2019) to food retailers in Tuktoyaktuk. At this time the population of Tuktoyaktuk was 995 (NWT Bureau of Statistics, 2019). Therefore, the per capita distribution of the NNC program in the community represents just over CAD$300 per person per year, or CAD$1200 for a family of four per year. Even with the implementation of the road, our results indicate that without the subsidy, families in Tuktoyaktuk are now confronted with a CAD$57 increase in the weekly cost of an indicator food basket (CAD$2964 per year for four people). The total burden of this financial increase for the community represents CAD$741,000, almost two and a half times (2.4 times) the total cost of the subsidy in 2018. Due to the complex structure of the NNC program, varying subsidy levels for different food items, the complex interplay between subsidized and unsubsidized foods and the imperfect application of a "family of four" unit, we would need further information to understand how the rescission of the subsidy (separate from the effect of the highway) has affected food costs.

In the balance of cost-increasing versus cost-reducing factors, there are other considerations to add to the impact of the highway and the rescission of NNC subsidies, notably, consumer purchasing behavior and the impact of the highway on the country food system. To our knowledge, no studies presently exist on the impact of the highway on food purchasing patterns in Tuktoyaktuk, or in other Northern communities. It will be essential to conduct more research and to better understand how the highway affected people's behaviors (e.g. travel to Inuvik, consuming

more fresh foods) and what the secondary impacts have been (e.g. more competitive food prices, better food availability) especially as they relate to country food harvesting.

5.6.1. Limitations

Several important limitations warrant discussion. First, as described in other sections, the RNFB is an imperfect tool to measure the cost of food in the North, and our results must be interpreted within the important limitations of the RNFB.

Second, our analysis did not account for missing items and for items that were of poor quality. These concerns are important in the Arctic where food availability can be an issue due to the long distances between food distribution centers and remote communities (Kenny, Wesche, et al., 2018b). For instance, canceled flights or barges due to harsh weather or ice conditions can add significant delays in food distribution and can leave communities without a resupply of market foods for many days or weeks. While peer-researchers sometimes noted expiry dates or the quality of the foods for which they were gathering data, we were not able to integrate this level of detail within our results. As represented by an approximately 15% rate of missing items, not all items in the RNFB were present at all times, and further analysis would be needed to account for the impact of the ITH on food quality and availability.

Third, there are additional methodological limitations to the design of the participatory food costing study that have been outlined elsewhere (Kenny, Fillion, et al., 2018) and which affects this research.

Lastly, our results do not account for the important role of country foods within the Inuit food system and for Inuit health and wellbeing. Future research should better integrate country foods and market foods in impact assessment.

While this is not a limitation to our current study, it is worth noting that our study period ended before the start of the COVID-19 pandemic. In response to the pandemic, government aid programs in Canada have increased and additional funds have been allocated to tackling immediate action on food security, particularly in the North. For instance, the Quyallidauyuot Emergency Food Bank in Tuktoyaktuk was allocated $17,890.00 in emergency response funds (CBC News, 2020). Although temporary hunger-relief programs such as food banks are no substitute for sustainable long-term self-determined actions on food security, this initiative could have increased access to market food in the community and improved food security.

5.6.2. Implications and significance of the study

Despite these limitations, this study benefits from several methodological strengths (importantly; the strength in our assumptions, our longitudinal datasets, and the community-determined and co-produced approach). Our results have important implications for addressing gaps in the literature and for future infrastructure development projects.

This study addresses important gaps in the literature regarding the impact of road development in Indigenous communities worldwide. To our knowledge, this study is the only study to use a participatory food costing approach to document the cost of food before and after a major intervention in a remote Indigenous community. This project was made possible because of the ongoing involvement of the research team with the community of Tuktoyaktuk and with Inuit peer-researchers who documented the cost of food in their own communities (Kenny et al., 2021). This case study has important implications for development researchers wanting to support Indigenous communities in self-determining research methods and objectives.

We have found no other study in the global Arctic that has evaluated changes in the cost of market foods after the construction of a major infrastructure project. This project highlights the importance of ongoing monitoring of key food security/environment metrics such as food costs before, during, and after the implementation of major transportation development projects.

In the Canadian north, we have found no study, impact assessment, or economic analysis that retrospectively considered the impact of a major transportation infrastructure project on food costs. Despite the lack of literature, the Government of Canada has recently announced a CAD$400 million investment for new remote and northern transport infrastructure projects (Government of Canada, 2019). In the NWT, two new highways have been proposed (NWT Tłı̨chǫ All-season Road (expected to open in Fall 2021), the NWT Mackenzie Valley Highway (in consultation)), in addition to the discussion about the potential Canadian Northern Corridor (Fellows & Tombe, 2018; Sulzenko & Fellows, 2016). These projects would connect Indigenous communities that are currently not accessible by road year-round to Canada's road network, and our results can help inform policy-makers and reviewers at all levels of government of the potential impact of both new highways (and more broadly major infrastructure projects), and the NNC subsidy rescission. An Inuit-determined, co-conducted, evidence-based, and decision-useful approach is needed to help improve food security in the North.

5.6.3. Policy recommendations

The Government of Canada has promised to take action on addressing the food security crisis in Indigenous communities in Canada (Governor General of Canada, 2020). However, amidst this crisis, a program that is meant to improve food access and availability was rescinded from a community that had been experiencing food insecurity in part due to the extremely high

cost of food. NCC subsidy critiques have already raised concerns about the community eligibility criteria (Fitzgerald & Hill, 2017; Galloway, 2017; Office of the Auditor General of Canada, 2014). While the budget for the program was expanded in 2016 to add 25 new communities and to increase the subsidy level of 12 communities (mostly in Ontario and Manitoba) (Galloway, 2017), the non-eligibility of northern communities that have year-round or seasonal road access but that are located many days of driving away from other food distribution centers remains a major impediment to reducing food costs across the North (Thompson et al., 2012). We recommend that Nutrition North Canada predicate decisions on program eligibility through evidence-based affordability metrics, rather than assumed relationships between road structure availability and food costs.

Since its implementation in 2011, the NNC program has subsidized on average CAD$327,000 per year to food retailers in Tuktoyaktuk. In the 2017-2018 fiscal year, the last year of the program in Tuktoyaktuk, NNC subsidized CAD$305,237 to food retailers in Tuktoyaktuk. There was no program phase-out and NNC thereafter stopped monitoring food costs in Tuktoyaktuk. Because of the participatory food costing study which had been established years prior to the opening of the highway, we were able to quantitatively document the change in the cost of food in Tuktoyaktuk. We would advise that food prices be documented prior to, during, and following any interventions that include policy changes, especially when these policies affect a major determinant of health. In the case of policy or subsidy rescission, we advised a gradual phase-out approach, if the rescission is inevitable.

5.7. Conclusion

The new Inuvik-Tuktoyaktuk Highway had been much anticipated by residents of Tuktoyaktuk and represented a major investment by the Federal Government. For residents, it promised reduced food costs, new economic opportunities (e.g. tourism, shipping), and improved access to services (e.g. more reliable health care). Prior to the opening of the ITH, it was estimated that the cost of food would drop, in part because the value of the NNC subsidies ($456,000 at the time, CAD$305,237 in 2017) would be experienced as savings in the community. Our results indicate that these savings have not come to pass in Tuktoyaktuk and that the cost of the RNFB increased by CAD$57 between 2017 - 2019, of which CAD$44 can be attributed to the ITH and the loss of NNC subsidies. In the case of a food insecurity crisis in Inuit communities, we call attention to the important role of the NNC program and of infrastructure development projects that respond to Inuit needs and self-defined interests while improving food security and well-being.

5.8. Appendices

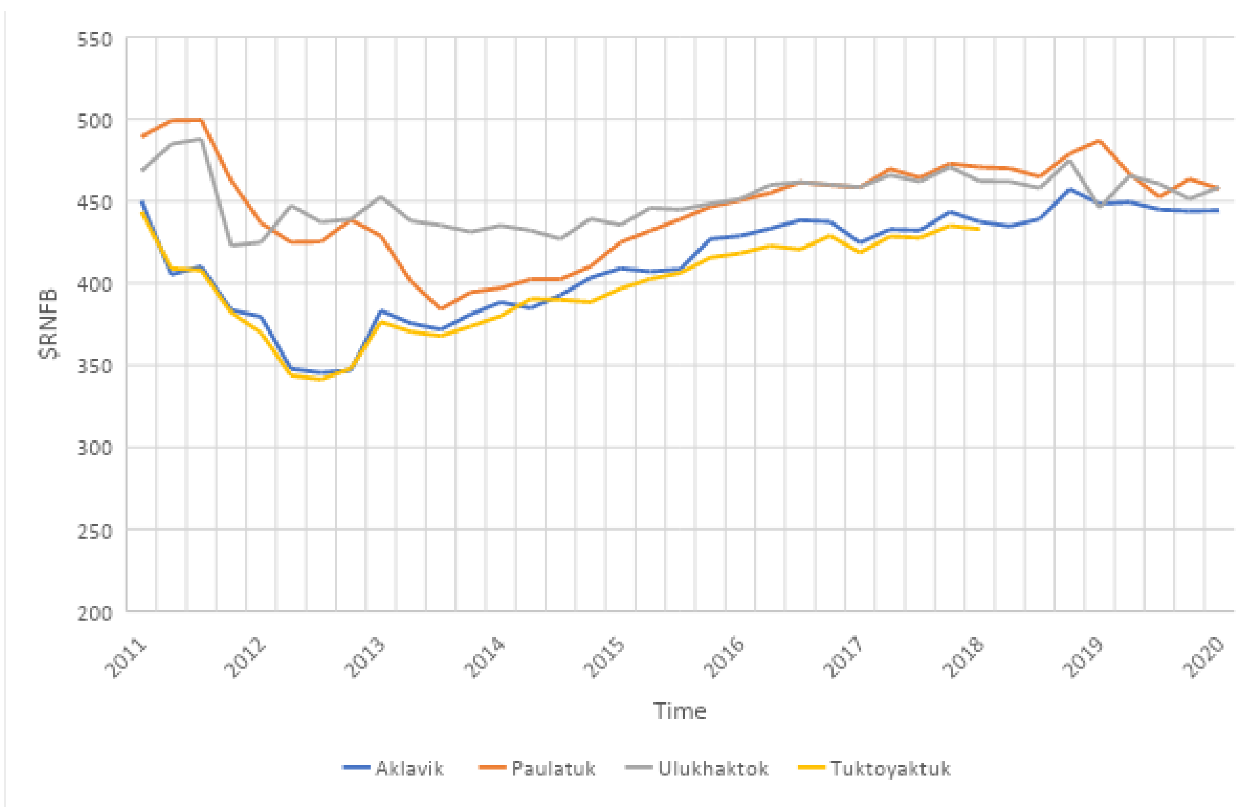
5.8.1. Appendix 1: Food items with weights/volumes categorized by food groups in the Revised Northern Food Basket (Government of Canada, 2007).

Food Group	Items in the Revised Northern Food Basket	Amount	Unit
Dairy	Milk (fluid), partly skimmed, 2% M.F.	4760	ml
	Cheese, processed slices (cheddar)	385	g
	Cheese, mozzarella block (not slices)	485	g
	Yogourt, fruit bottom, 1% to 2% M.F.	1670	g
	Evaporated milk (canned), 2%	1580	ml
	Skim milk powder	90	g
Fats	Margarine (tub), composite, non-hydrogenated	715	g
	Butter, salted	65	g
	Canola oil (or canola oil blend), not olive oil	185	g
	Lard (Pork)	105	g
Proteins (meats and alternatives)	Large eggs	8	eggs
	Chicken legs (i.e. drumsticks)	2680	g
	Pork loin, center-cut chops, bone-in	1210	g
	Ground beef, lean	1340	g
	Beef steak, inside round	470	g
	Sliced ham, pre-packaged, regular (not low fat)	135	g
	Sliced Bologna, pre-packaged, regular (not lower fat)	60	g
	Wieners (beef and pork)	100	g
	Luncheon Meat (canned), pork	50	g
	Corned Beef (Canned)	40	g
	Canned ham	200	g
	Frozen fish sticks, breaded	135	g
	Pink Salmon, canned	270	g
	Canned sardines in soya oil	270	g
	Peanut butter, smooth type, fat, sugar and salt added	90	g
Grains	Bread, enriched white, sliced	660	g
	Bread, 100% whole wheat	660	g
	Pilot biscuits	275	g
	White flour, wheat enriched, all purpose	1920	g
	Pasta (dry), spaghetti or macaroni, enriched	385	g
	White rice (dry), long-grain, parboiled	330	g
	Macaroni and cheese dinner	550	g
	Rolled oats, quick cooking (not instant)	275	g
	Cereal, corn flakes	440	g

Appendix 5.8.1 (Continued)

Food Group	Items in the Revised Northern Food Basket[*]	Amount	Unit
Fruits and vegetables	Apples	4380	g
	Oranges	1230	g
	Bananas	3580	g
	Grapes (red or green)	500	g
	Carrots	2000	g
	Cabbage	520	g
	Rutabaga (turnip), raw	350	g
	Fresh potatoes, white	3000	g
	Onions	695	g
Frozen and canned	Frozen mixed vegetables	1740	g
	Frozen carrots	260	g
	Frozen Broccoli	695	g
	Frozen corn	260	g
	Frozen French fries	480	g
	Instant potato flakes	220	g
	Canned mixed vegetables (2014-2016)	545	ml
	Canned green peas	900	ml
	Canned Green Beans (2017-2020)	315	ml
	Canned carrots	325	ml
	Canned kernel corn	1090	ml
	Canned whole tomatoes	215	ml
	Canned tomato sauce	300	ml
	Canned fruit cocktail in juice	855	ml
	Canned pineapple in juice - changed to canned mandarin	285	ml
	Canned peaches in juice	285	ml
Juice	Apple juice, frozen concentrate	33	ml
	Orange juice, frozen concentrate, unsweetened	282	ml
	Apple juice, canned or bottled, added vitamin C	880	ml
	Orange juice, chilled, added vitamin C	375	ml
Prepared	Canned beans with pork	290	ml
	Canned beef stew	180	g
	Canned spaghetti sauce with meat	155	ml
Other	Sugar, white, granulated	600	g

5.8.2. Appendix 2: Cost of the RNFB in four ISR communities for which data exist



Cost of the RNFB in four ISR communities for which data exist, from 2011-2020, quarterly (data from NNC, 2020)

6. Part II: Preface

I am extremely proud of the work that I accomplished with the food costing paper, and while I dove in head-first into that analysis, I still felt that I was not fulfilling what I had set out to learn with this graduate degree program. I had wanted to conduct community-based research however the ongoing global lockdowns and travel restrictions forced me to think more critically about how I would be able to achieve it. It also forced me to reckon with if I would be able to achieve it. I was exhausted, battling for my mental health, and I knew that I could not take this project on lightly. I feared that I would do more harm than good, to myself and to the communities that I wanted to work with.

Break. Break.

This seems a little thrown together

walls up

I'm trying!

\- - - - - - - - - - - -

deconstruct: do better, try harder

I knew from previously published literature that conducting community-based research could be an arduous and challenging process for both the community members involved and for university-based researchers (Castleden et al., 2012; Moore, 2004). Researchers engaging in community-based work, and especially in working with Indigenous peoples, often struggle to build and maintain meaningful relationships while meeting the demands of the institution (Castleden et

al., 2012), which can lead to tensions and unmet expectations on both ends. Indigenous scholars and researchers are not immune to this challenge. I cite Zoe Todd (Métis/otipemisiw from Amiskwaciwâskahikan/Edmonton) as one of the many Indigenous scholars who has informed my reflections, and who has written about the challenges of trying to achieve real change while working within the confines of the institution. Although Todd reflects from her field in anthropology, I believe the same concepts apply to geography:

> "At the moment, it is by-and-large the academy that creates, legitimizes and reproduces anthropology. However, for Indigenous academics like me, it is also the structures of the academy that prevent the discipline from realizing its loftiest, most transformative goals. The academy is anthropology's 'human error': the white supremacist, Imperial human dimensions of the academy itself prevent the re-imagining of disciplines like anthropology." (Todd, 2016)

What I read in Todd's words is what I hear in Audrey Lorde's "the master's tools will never dismantle the master's house" (Lorde, 1984), in that despite the researcher's best efforts to be reflexive and self-critical, the methods we use to do so, such as those labeled as community-based approaches or the tools we use to write with, inherently limit our ability to do what we set out to do (De Leeuw, 2017).

Mataya and I were on a video call when I first showed her the outline that I had preliminarily written for this next piece. She had been excited to co-author, but upon seeing my "professional sentences and fancy grammar" (as she told me) and the many academic references that dotted the end of my sentences, I immediately saw her pull back from this work.

Break. Break.
Interruption. What have I done?

"I don't want to do that"
That? what? yes, THAT

:To do, check!, done.
Intrusion: I'm just doing what they are doing (ref). I'm not the bad guy here

"have you used references before?"
pull back. pull away. used.

Who's used?
I won't. no, I can't

Break. Break.

I had wanted to prove my own abilities, to prove that I knew how to reference and how to situate our story, and I had unintentionally pushed her aside in doing so. I reflected: whose voice is most needed here? I found myself thinking of Gerald Vizinor's (Minnesota Chippewa Tribe, White Earth Reservation) theory on "survivance"; that the presence of Indigenous peoples, "unmistakable in native stories, natural reason, remembrance, traditions, and clearly observed in spirited resistance and individual attributes, such as the native tease, vital irony, cast of mind, and moral imagination and courage" (Vizenor, 2015) was in itself an act of survivance.

Survivance.

Not be be confused with resistance

What do you resist? The colonial state.

De-center the colonial state. *Survivance, you are here.* But,

"In order to survive institutions, we need to transform them.
But we still need to survive the institutions we are trying to transform."
(feminist killjoy (Ahmed), 2020)

My role with Mataya, as I saw it, was to participate in creating a space that was welcoming and engaging, and to engage her in the writing process. De Leeuw and Hunt (2018) position collaborative writing as decolonizing; a way to "disrupt normative power dynamics in the very spaces in which geography reproduces itself". Our choice to write collaboratively (not just in our final piece, but also in the ethics application, for funding applications, for conferences and in a school newsletter) was not meant to disrupt. The intention to disrupt/to resist again centers the colonial institution (Vizenor, 2015). We practiced collaborative writing because the process of writing together was part of our community-based research methods, and because doing so helped Mataya develop her writing skills. We chose to value outputs other than writing academically (for instance by using less references and by sharing a story) and to write together about our work rather than to not engage together on this step of the research. We also made the joint decision to write about our collaboration rather than to report on the content of the interviews in this article. The content of the interviews can and will be analyzed later whereas we had a lot to say *right now* about our collaboration during COVID-19.

With the ongoing global chaos, we chose to write collaboratively and to contribute to the literature on methods for conducting community-based research. We wrote a piece that was short enough and written in plain language so that we could both contribute and interact with it, edit it and review it together, and reach a wider audience that could include community members. We hope that it will encourage other researchers to reflect more deeply on the community-based research methods they employ.

//Interruption

Intrusion: ma'am, with all due respect, what makes *your* story any more special?

Do more. Write more. Cite more. Publish more. Talk more.
2 projects, extra courses, extra jobs, conferences, community work, advocacy

Write it, say it, scream it!

WHY IS MY FONT SO SMALL? I NEED TO SHOUT SO YOU CAN SEE ME!

Label: Grad student and a 17yr old. Women. No-names.
Citescore: 2

Dismiss\\.

We hope that you enjoy our pandemic *pièce de resistance*.

7. Part II: Our friendship is reconciliation: A pandemic silver lining in community-based research

7.1. Abstract

The COVID-19 pandemic has forced many research projects across the global Arctic to a standstill. The exception is to projects that had significant and long-term relationships with community co-researchers prior to the pandemic, and projects that did not require any fieldwork by non-resident researchers. Researchers who were able to continue research activities in collaboration with communities have been vocal about the importance of these collaborations. Adding to these reflections, this project contributes a collaboratively-authored methods piece about friendship, reciprocity, and reconciliation between two young women, a 17 year old Inuvialuit (Indigenous, Inuit in the Canadian Arctic) journalist and a 25 year old Québécoise (French Canadian) Master's student navigating research for the first time and during the COVID-19 pandemic. In the process, they reflect on what reconciliation means to them and provide recommendations for Arctic community-based research.

7.2. Introduction

The COVID-19 pandemic has significantly impacted research and researchers' ability to conduct research. Researchers have been directly involved in addressing the pandemic, for instance by developing the vaccines, studying the efficacy of public health regulations, reporting on transmission rates, and for health messaging. And yet, by reducing access to university spaces (ex: laboratories, libraries) and access to the "field", the COVID-19 pandemic has also affected university-based researcher's ability to conduct research. Nowhere is this perhaps more true than

in the Arctic, where full and ongoing travel restrictions (including travel for most research-related purposes) were implemented to reduce the risk[28] of bringing COVID-19 to these regions. Because of these restrictions and of strong public health monitoring programs, the North stayed relatively free of COVID-19.

For anyone within these northern regions, wearing masks and physically distancing was recommended, but life was able to continue relatively normally. Concurrently, researchers who had planned for a season of fieldwork[29] saw their plans disrupted. As a result, most research projects across the global Arctic have been at a standstill and have lost a season of data collection[30]. The exception is to projects that had significant and long-term relationships with community co-researchers prior to the pandemic, and projects that did not require any fieldwork by non-resident researchers (ex: using satellite imagery or drones, or local researchers collecting data). Researchers who were able to continue research activities in collaboration with communities have been vocal about the importance of these collaborations, for example by co-presenting at Arctic-related conferences such as ArcticNet[31].

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[28] The impacts of past pandemics on Indigenous peoples is still very present today (Hotıì ts'eeda, 2020), and the ongoing gap in health services, infrastructure, food security and housing between Indigenous and non-Indigenous peoples (Inuit Circumpolar Council, 2020) meant that important precautions needed to be taken.

[29] We recognize that the term "fieldwork" can invoke the sense of "discovery" and "exploring". We use this term to be consistent with the literature, and because we do not currently know of a better term to use.

[30] Simon Stephenson, Section Head of the Arctic Sciences Section in the Office of Polar Programs (OPP) at the National Science Foundation reported that approximately 90% of the 150 polar science projects funded under the OPP mandate did not conduct any field-related activities in summer 2020. Further discussions on the panel add that "it will take years, if not decades, to address a gap of the magnitude of this one" (2:31:00). This update was shared during the Wilson Center Virtual Conference on the impact of Covid-19 in the Arctic (Foy et al., 2020).

[31] These observations are based on the 2020 ArcticNet Covid-19 update presentation (Burke, 2020), and from news articles published in Nunatsiaq News (George, 2020); Canadian Geographic (Haggert, 2020); and by the Arctic Institute (Uryupova, 2021).

The pandemic has exposed and widened many cracks in our current systems and institutions. For research, and especially research in Inuit Nunangat[32], it has brought to light the many ways in which embedded colonial structures still marginalize Inuit and limit Inuit research sovereignty (ITK, 2018b). While the ongoing partnerships between Inuit and southern-based researchers have been well-documented (Carter et al., 2019; Cunsolo Willox et al., 2013; Kenny et al., 2021; Pedersen et al., 2020), these tend to be sporadic at best (ITK, 2018b). For the most part, and as highlighted by the lockdowns and restrictions on south-to-north travel, research is largely still in the hands of southern-based researchers despite Inuit calling for more self-determination in research (ITK, 2018b).

There is an opportunity to increase research sovereignty in the North, by the North (ITK, 2018b), especially as research capacity in the North continues to develop. Northern colleges in what is now known as Canada have been building research capacity in the North for decades, for instance with the opening of the Aurora College in the Northwest Territories (opened in 1995), Nunavut Arctic College (also opened in 1995), and Yukon College (opened in 1983) which transitioned to Yukon University in 2020. Both Aurora College and Nunavut Arctic College are also moving towards becoming polytechnic universities. These institutions will continue to improve the ability of northerners to build, manage and conduct research projects. There is important knowledge and expertise that comes from both northern-based and southern-based academic institutions and people, and there are opportunities for strong collaborations and reciprocal relationships to emerge as restrictions to fieldwork are lifted.

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[32] The term “Inuit Nunangat” is the term preferred by Canadian Inuit for referring to the Inuit homeland in what is now known as Canada.

When envisioning and proposing a vision for research in the future, young people must be involved, alongside researchers and community members, in shaping what that vision looks like. Inuit youth have made it clear that they wish to be involved in all issues that will impact their future, especially as they relate to language and cultural revitalization, mental health and wellness, education and empowerment, and reconciliation (M. Okalik, 2016). However, while efforts to engage young people in research in Inuit Nunangat have been increasing and while there are many examples of collaborative projects with youth, it remains uncommon for research to be determined by youth, for young people to be involved as more than project participants, and for young people to publish about their experience of conducting research (Pedersen et al., 2020). Since much of the discourse about research is housed within academic journals, Inuit youth have systematically been excluded from these conversations.

The story below is a co-authored piece between two young women, a 17 year old Inuvialuit high school student and a 25 year old Québécoise master's student, as they navigated and conducted Arctic community-based research for the first time and during the COVID-19 pandemic. They offer an alternative reality to research; a "feel-good" story about how the pandemic has brought them together and how they developed a friendship rooted in reciprocity and mutual support. They don't offer themselves as a perfect example – far from it, but they do want to use this opportunity to help shape what research will look like in the future.

In the reflection, they situate their experience within the context of the Final Report of the Truth and Reconciliation Commission of Canada (Truth and Reconciliation Commission of Canada, 2016) and return to a question that they had asked each other when they first met: what does reconciliation mean to you? They conclude with a set of recommendations for adapting

research to unforeseen circumstances, building reciprocal and mutually beneficial relationships, engaging young people in research, navigating institutional ethics, and allocating research budgets.

7.2.1. Who they are

Mataya Gillis is an active and engaged 17 year old from Inuvik, Northwest Territories. She is the editor-in-chief and co-founder of the Inuvialuit youth magazine Nipatuȓuq (figure 7.1), which means "to have a loud voice" in Uummarmuitun, her regional Inuktitut dialect. She is an all-star curling athlete, a senior in high school, and an active youth representative on numerous community committees. Kim, at 25 years old, is Québécoise from what is now known as Saint-Jean-Sur-Richelieu, the unceded and unsurrendered territory of the Mohawk and Adénakis. She is a Master's student in Geography at the University of Ottawa and a tour boat expedition guide who has significant experience visiting and working in the polar regions since 2016.

Kim and Mataya met at the Canadian Roots Exchange youth gathering in Montreal in February 2020, just before the start of the pandemic. The gathering engaged Indigenous and non-Indigenous youth in dialogues on the significance of solidarity and reconciliation. They were both part of the Students on Ice delegation (figure 7.2), made up of Indigenous and non-Indigenous youth who had participated in Students on Ice educational expeditions to the Arctic. At the time, Kim was finalizing her research proposal.

Figure 7.1: The cover of the first issue of Nipatuȓuq magazine, published in October 2019. Figure 7.2: Mataya (bottom left) and Kim (to her right) with the Students On Ice delegation at the Canadian Roots Exchange gathering in Montreal, February 2020

7.3. A collaborative story on conducting research

7.3.1. Adapting to the pandemic

Before the pandemic, Kim's plans for research involved spending many weeks in Tuktoyaktuk, an Inuvialuit community just north of Mataya's hometown, and conducting interviews to understand how the new Inuvik to Tuktoyaktuk highway that opened in 2017, the first highway to the Arctic Ocean, was affecting food security in that small coastal community. This project is part of a 4-year CIHR-funded project to understand the impacts of climate change on food security, and the community identified a need to better understand the highway's impact as a research priority.

Just after the Canadian Roots Exchange gathering and after Kim submitted her research plans in March 2020, COVID-19 was declared a pandemic, and travel restrictions were put in place. As many researchers also experienced, Kim struggled to adapt her research plans to the new restrictions. In the months following the government announcements, graduate students like herself grieved the lost opportunities and the loss of a full season of fieldwork: these experiences are often the highlight of their academic programs. Considering the short 2-year timespan of a master's thesis, the pandemic seriously affected Kim's ability to carry out community-based research.

7.3.2. Setting up the collaboration

After meeting in Montreal, Mataya and Kim had cultivated a friendship by staying in touch through social media and when Kim reached out a few months after the start of the pandemic to ask if she wanted to collaborate on a research project, Mataya was excited by this new opportunity. Since Mataya had already anticipated conducting "interviews" (to her they had always just been conversations) for Nipatuȓuq, they agreed to work together so that the interviews would inform both a Nipatuȓuq issue on food security and Kim's research. It was a win-win solution.

Mataya had become interested in this project for many reasons. She saw it as an opportunity to grow her personal networks in her community and beyond, and to gain experience conducting interviews and presenting at conferences with Kim. She also wanted to develop resources for her magazine (like consent forms and interview guides) which she or someone else could use as a template in the future, especially since she was looking to pass on the magazine to other youth after her graduation. Discussing these interests at the outset of the project enabled Kim and Mataya to build a professional development plan that fit Mataya's personal goals (figure 7.3) and to register

Mataya's research work for high school credits. With supervisor and committee member support, a research budget was allocated to provide Mataya with a salary and office supplies to help mitigate the cost of her conducting this work from her home (figure 7.4), and they arranged a guest account for Mataya to access library resources at the University of Ottawa.

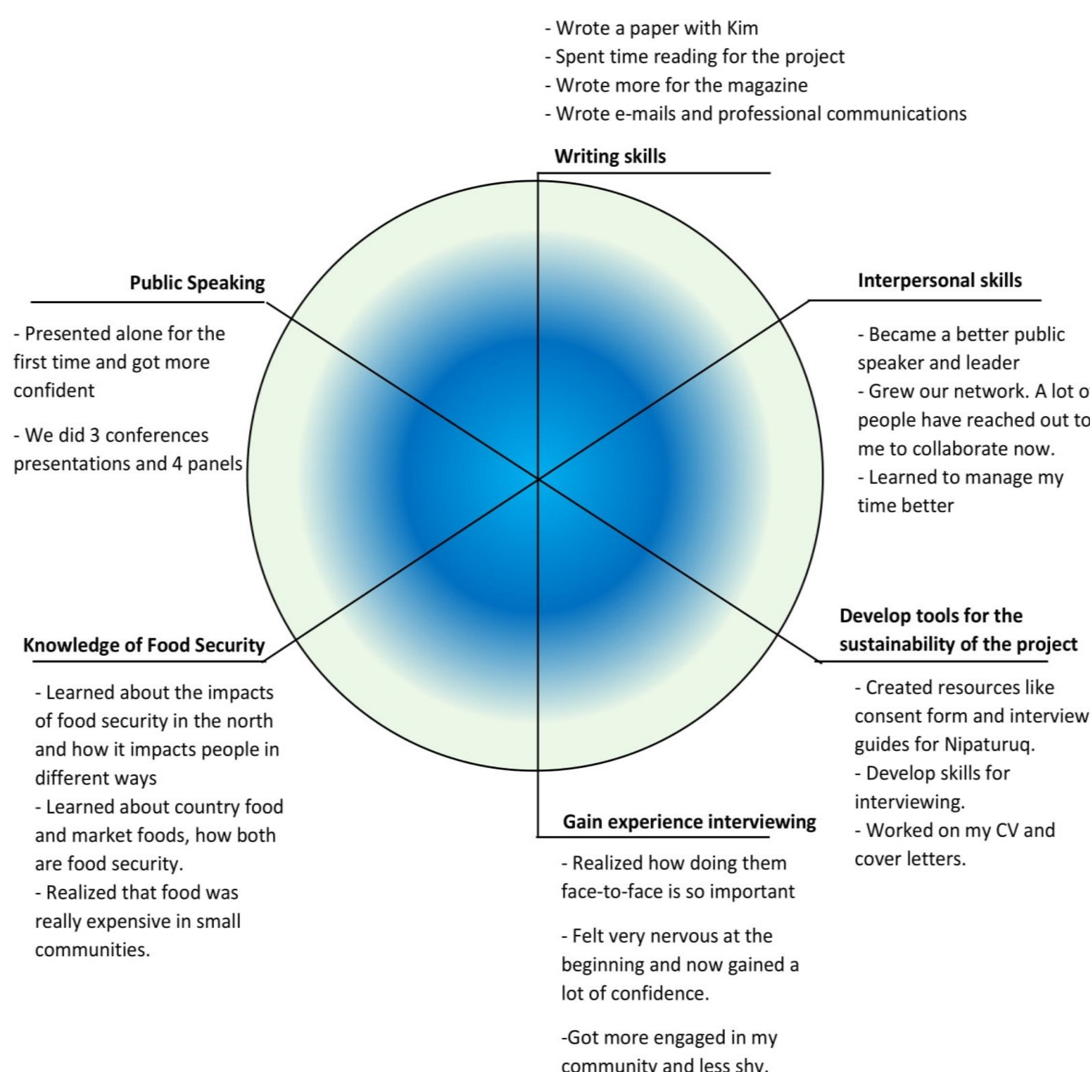

Figure 7.3: Mataya's professional development goals with details about how she reached them

Figure 7.4: Box of office supplies sent to Mataya, which also included COVID-19 protective equipment like masks and disinfectant spray for surfaces, and some favourite snacks.

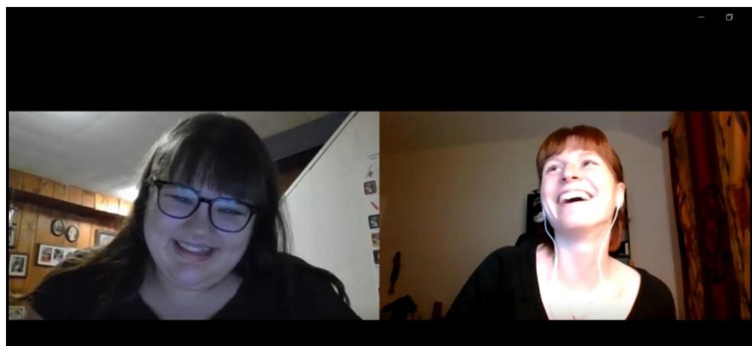

Figure 7.5: Kim and Mataya engaging online during weekly check-ins. They used a mix of video calls and phone calls.

7.3.3. Applying for ethics

The big difference between the work that Mataya would have undertaken for the magazine and the work that Kim and Mataya were doing from a research perspective was that they had to follow the university's protocols for research and apply for an ethics certificate. This worried Mataya because she didn't quite understand what "ethics" meant and what the criteria were. While she had in the past asked Elders for help and guidance, she imagined institutional ethics as being a board of white men sitting high up all around her in a dimly lit room and judging her project.

To complete the application, Kim and Mataya had many phone conversations (Figure 7.5) where Kim would read out the questions, they would discuss them, and then write an answer on the application form. One specific question that stuck out was about the recruitment of participants. The question asked if there were any supervisory or trust-based relationships between the persons conducting the research and the participants and if so, how the researchers would "ensure that there is no coercion or undue influence". While this question is meant to protect participants from dynamics of power, it is unadapted to community-based research and research in the context of small Indigenous communities where family and kinship ties are inherent and are an asset to the community and the research.

This question was off-putting because their entire project was based on the relationship and trust that Mataya and Kim had built between each other, and the relationship that Mataya had with her community. It made Mataya feel like she was an annoyance to the project, or like it was almost more trouble having her conduct the research. She knew that what she was doing would make more of an impact than if Kim were to do it, but she felt like it was viewed negatively by the university. This put her under a lot of pressure because she saw that this was not normally the way that things were done in research, and she wanted to prove that having an Inuvialuit researcher interview other Inuvialuit was beneficial to both her and her community.

One other aspect of the ethics application that stuck out to them was the consent forms. Every research project has to have them, and it is also a standard practice in journalism since it helps ensure that people know what the project is and how their information will be protected. Creating these forms helped Mataya create resources for the magazine which could then be used in the future as a template for conducting other interviews. However, writing the consent forms

for both the magazine and the research at the same time was difficult because the ethics application process was not designed for projects like theirs. For example, the initial plan was for Nipatuȓuq to lead these interviews so the consent forms were written to represent the magazine's collaboration with the researchers at the university. Over multiple rounds of revisions, Kim and Mataya were asked (by the Ethics board) to change them so that it was the researchers who were collaborating with the magazine. It made a difference because initially, it was clear to both of them that Nipatuȓuq was leading the project but over time it changed so it looked (on consent forms and in the application) like it was the university-based research team that was leading it. Although Mataya still feels like she was able to keep control over what the project looked like, this contributed to making their collaboration more of the university-based researcher's project than initially intended.

7.3.4. Conducting interviews in Tuktoyaktuk

On a sunny morning during her senior year's March break, Mataya and her grandmother drove 138 kilometers north on the new Inuvik-Tuktoyaktuk Highway and arrived in Tuktoyaktuk (population 995) by the early afternoon (figure 7.6). Since her grandmother is originally from Tuktoyaktuk, their first trip to the grocery store was more of a reunion than it was just a shopping trip. Within hours of their arrival in town, it seemed like everyone knew Mataya, who she was, and what she was doing there. That afternoon, Mataya also checked in with a local co-researcher who had set up the ten interviews with youth and Elders[33] for her. This co-researcher had been involved in various projects with the research team over the last decade and had agreed to work with them to help them organize the logistics and to be there to support Mataya if she needed help.

[33] The team at Nipatuȓuq usually try to interview youth and Elders and to share their stories side-by-side in the pages of the magazine. The goal is to connect the youth back to their culture by connecting them to their Elders.

With the co-researcher's help, the team was able to rent the youth center which provided a comfortable, quiet and safe space for Mataya to conduct the interviews. Mataya was also following local health guidelines, which included disinfecting surfaces between interviews, staying two meters apart, and wearing a mask.

Figure 7.6: Mataya and her grandmother (wearing a Nipatur̂uq sweatshirt) driving to Tuktoyaktuk to conduct interviews.

Kim's role in supporting Mataya from a distance became especially important when Mataya reached out to her with a pressing concern. After starting the interviews, Mataya began feeling uncomfortable with the honoraria that were initially decided upon. She felt that in the context of speaking about food security in a community where the cost of food was extremely expensive, the compensation being provided would not go very far in terms of food purchases. After discussion[34], Kim and her supervisors doubled the initial honoraria, and with funding from

[34] On Kim's side, there were concerns about research budgets, about being consistent with the rates that other researchers usually provided, and about the potential ethical considerations of raising the honorariums. These factors, however, did not outweigh the importance of remedying Mataya's concerns since she was the one who was on the ground and facing interview participants.

Nipatuȓuq, Mataya gifted an additional food basket to all the participants[35].

In the end, Mataya learned a lot during these interviews and she felt like people in Tuktoyaktuk were very happy to see that Inuvialuit were doing this work and getting a job out of it. Having her grandmother there, just being around her and cooking food with her, kept Mataya's mind occupied so she wasn't thinking too much about the status of food insecurity in Tuktoyaktuk and so they could speak about it in the evenings. Her grandmother is also very knowledgeable and has conducted and participated in many interviews, so she was aware of how hard they could be for both the participants and for the interviewer. Mataya shares her grandmother's words: "when you do stuff like this, you need to have support, and having an Elder support you who has the knowledge, who's lived this life and who's had these experiences, that always helps".

7.3.5. Next steps

In August of 2021, Mataya and her team at Nipatuȓuq will publish their magazine issue on food security, using content from the interviews, and also using content from other people's submissions for the magazine. The interviews will also help to inform future research about food security and will add to a quantitative analysis that Kim has been doing about the impact of the Inuvik-Tuktoyaktuk Highway on food costs in Tuktoyaktuk. In part because of her experience on this project, Mataya has decided to apply to university.

[35] Mataya and her grandmother purchased food baskets for every participant using money from a grant that Nipatuȓuq had received. Each basket contained: 1L of milk, 12 eggs, 1lb butter, 1 bag of sugar (medium size), 15-20 clementine oranges, and a palm-size portion of frozen ground beef; the cost totalled $49.37 per basket. The same items purchased in Ottawa cost $25.00.

7.4. Reflections

When they met at the Canadian Roots Exchange gathering in Montreal, Mataya and Kim were both part of a day-long workshop where they explored the broad theme of reconciliation and discussed the question: "what does reconciliation mean to you?". The Truth and Reconciliation Commission of Canada defines reconciliation in the following way:

> "Reconciliation is an ongoing individual and collective process, and will require commitment from all those affected including First Nations, Inuit and Métis former Indian Residential School students, their families, communities, religious entities, former school employees, government and the people of Canada. Reconciliation may occur between any of the above groups." (2016)

This project guided them towards having deep conversations about systemic racism in research and about the way research is currently done in the Arctic. In reflecting on this work and their friendship, reconciliation was a word that came to mind. While they have reflected on the process of conducting research together and have shared their story with a unified voice, they found that their individual reflections about reconciliation could not be unified. Their perspectives are inherently reflective of their positionality, and they found it important to write them using the first person "I". They each share a short excerpt from their reflections which can be found in the appendix.

Mataya (excerpt from appendix 1):

> "When I look at our project and ask 'what role did reconciliation play in this?', I think of the connection that Kim and I made; teaching each other, learning from each other, and supporting each other. I think about me being an Inuvialuit youth getting to experience this whole other side of university that I did not really know about. I think about the doors that have been opened for me because of this project. These are such great things, and I see them as a form of reconciliation."

Kim (excerpt from appendix 2):

> "I cherish my memory of logging onto our video call the day after Mataya got her traditional Inuit tattoos and when she generously shared their meaning with me. I cherish my memory of her reading me a poem about how she had been experiencing racism. I cherish my memory of ranting to her about being a graduate student during the pandemic. For me, reconciliation exists in those moments of friendship, the mundane interactions that are neither about our work nor about research. We were simply two young women learning from each other and being present in each other's day-to-day lives."

7.5. Recommendations

Though there are many more recommendations for community-based research (ACUNS, 2018; ARI, n.d.; ITK, 2018b; Pedersen et al., 2020), the ones presented below are a short selection that directly relate to Kim and Mataya's experience and shared story. These should not be used as "checkboxes" for research and might not represent everyone's views. They simply outline what they learned, as two young researchers and friends attempting this process for the first time.

Adapting to the pandemic

1. Listen to what the communities advise, and be willing to suggest critical and creative research methods. There are many ways to meet everyone's needs even when things do not go as planned.

Setting up the collaboration

2. Look for opportunities to get involved with the communities you would like to conduct research with, beyond your work as a researcher. Go to conferences that are not just about research, or volunteer with an organization where you live.

3. Be adaptable to new ways of engaging and communicating, for instance by

welcoming online platforms to connect and to do research, especially when working with youth. If you do so, make sure you can help provide access to technology (computers, hard drives, etc).

4. Try to find creative ways to meet the needs of the people you work with, beyond financial compensation (high school credits, office supplies, etc.). There are many ways in which community members like Mataya can benefit from being involved in research.

Applying for ethics

5. Look for opportunities to collaborate at all levels of the research, even during the university ethics application process, and especially if collaborators are interested in learning about that process.

6. Think about how your work can help build capacity locally, even in the mundane parts of your jobs. Writing a consent form? Share it with a local start-up that might need a template. Taking good photos? Share them so other people can use them too.

7. Remember that there are many advantages to community members conducting research within their own communities. When possible, structure research projects in a way that can help people learn from each other.

Conducting interviews in communities

8. Know that young people are extremely capable of conducting research, but as with any researcher, they also require a strong support system that includes Elders and other community co-researchers.

9. Be willing to share power and decision-making with the community. This means

transparency and mutual control of the research budget and orientation of research activities.

Research budgets

10. Plan for a larger part of the research budgets to be used for honoraria. Consider that the cost of living where you are doing research might not be the same as where you are from, account for the actual purchasing power of the amount you chose to provide, and know that young people should be compensated equally to their adult counterparts (not compensated less because they are young).

7.6. Conclusion

As two newcomers to research in unprecedented times, we have noticed how research can improve and how we can improve as researchers. We believe that the recommendations we have written are important now more than ever as we begin thinking about what research will look like after the pandemic and as researchers reflect on how their projects can be more sustainable and community-owned. We also know that the northern colleges and universities will continue to strengthen Inuit research sovereignty, and believe that collaborations between Inuit and non-Inuit (or northern and southern) researchers can advance mutual goals. There are many bright leaders waiting for the opportunity to be involved in research, and we hope that our recommendations and our story will help make their work easier and that it will help make research in the Arctic more ethical in a post-COVID world.

7.7. Acknowledgements

Our project does not stand alone: it is supported by decades of work by Indigenous organizations, Inuit governments, non-governmental organizations, and researchers pushing towards better community-based research. Our work would also not have been possible without the prior and long-term engagement of our supervisors with the community of Tuktoyaktuk. Therefore, we offer many thanks to Sonia Wesche and Tiff-Annie Kenny, the board members at the Tuktoyaktuk Community Corporation, Charmaine Teddy, Mataya's grandmother Topsy Cockney, Students on Ice, Canadian Roots Exchange, the team at Nipatuȓuq, Jason Lau at the Inuvialuit Communications Society, and to all of the interview participants for generously sharing their stories. We thank CIHR for funding the C4FS project, and the Jane Goodall Institute for awarding our project Roots and Shoots funds for working towards Sustainable Development Goal 13 (climate action) and Goal 15 (life on land).

7.8. Appendices

7.8.1. Appendix 1: Mataya's thoughts on reconciliation

Reconciliation. What is it? I think that it can be many different things to different people. It can be connecting back to culture, learning your native language, even just sharing knowledge about your culture. Personally, I have no idea what it means (well, that is a lie, I might know), but I am at a point in my life where I'm still learning what it means to me. Sometimes the meaning changes, and that is okay too.

When I look at our project and ask "what role did reconciliation play in this?", I think of the connection that Kim and I made; teaching each other, learning from each other, and supporting each other. I think about me being an Inuvialuit youth getting to experience this whole other side of university that I did not really know about. I think about the doors that have been opened for me because of this project. These are such great things, and I see them as a form of reconciliation.

From the past months of learning and doing academic research in a small indigenous community (also being from a small indigenous community) I can wholeheartedly say that it has many flaws. The system expects everyone to fit into their boxes, mother (the caretaker), father (the provider), children (dependent on parents). In some cases, this might work, but not all. When it comes to honoraria, they use these boxes to determine the amount you get, but what they do not know is that sometimes it's the children providing for their households, sometimes the person is a single mom of three kids, and these boxes don't work. This needs to change, and as a youth I am tired of being underpaid for my knowledge. I am worth more.

I also tend to look at the impact that the research is making within the community/communities. From my experience growing up around a lot of researchers, I see them come into these communities, get the knowledge and information that they need, and then they are gone. Yes, the research will someday hopefully improve things in that community or region, but we see nothing else. I hope to one day see or even be the person who will make impacts instantly. This can be something as small as talking in the schools, getting the youth involved with research, creating a program that will run and benefit people as you do your research, creating employment opportunities for people, and even just being a part of the community (by this I mean getting out and getting to know people, or partaking in community events).

In the end I think reconciliation plays a role in everything we do.

7.8.2. Appendix 2: Kim's thoughts on reconciliation

The friendship that developed between Mataya and I, its perseverance despite the institutional chasm that threatened to keep us apart, is what I have come to reflect on as a step towards reconciliation. However, as a researcher, I think it is important for me to also add nuance to this statement. I do not suggest that our friendship was perfect and that we "overcame" anything (reconciliation is much more complex than a single friendship). Our friendship was also embedded, as our project was, within the colonial and power-laden structure of mentor/mentee, researcher/researched, Indigenous/non-Indigenous relationships. I concur with scholar Sarah Ahmed in that: "friendships and alliances [between white women and Aboriginal women] will always take place in situations of asymmetry of power. The denial of the existence of power relations is, after all, a means by which power relations are kept in place" (Ahmed, 2000). But I also take note of the ways in which friendships can be decolonizing (De Leeuw et al., 2012), and that friendships between Indigenous and non-Indigenous peoples can also act as a form of accountability. It is with these nuances in mind that I elaborate on what reconciliation means to me.

Engaging with Mataya throughout this project has taught me more than any prior education I had ever received on Indigenous/non-Indigenous relations. I cherish my memory of logging onto our video call the day after Mataya got her traditional Inuit tattoos and when she generously shared their meaning with me. I cherish my memory of her reading me a poem about how she had been experiencing racism. I cherish my memory of ranting to her about being a graduate student during the pandemic. For me, reconciliation exists in those moments of friendship, the mundane interactions that are neither about our work nor research. We were simply two young women learning from each other and being present in each other's day-to-day lives

I also cherish moments when we did speak about our work together because it gave us a platform to have difficult conversations. I remember my complete innocence in asking her about how we would mitigate the conflicts of interest involved in her doing interviews in her community. I remember her silence, her inability to understand me, and my inability to understand her. I also remember the sense of duty that I felt when she called me from Tuktoyaktuk, having faced her anxiety and shyness to conduct her first interview, only to feel completely let down by the honoraria we had decided on. I remember speaking about it with my non-Indigenous friends, inviting them into my internal turmoil, and how we began having conversations about our role, as settlers, in doing this work.

Reconciliation is personal and begins with each of us, and this project has been a personally challenging and important way to learn more about my role and responsibilities as a settler in what is now known as Canada.

8. Conclusion

<u>Break. Break.</u>

~~**November 10th 2020:**~~

~~I am learning not to praise something by boxing it into what I know. Let is shine on its own.~~
~~P.s. this does not quite make sense to me right now, but I'm working on figuring it out.~~

//pull it together\\//you're the expert\\//make it clear\\//master your topic\\

raised hand (ignored, know-it-all)
S'cuse me, sir, but what if my topic is ~*emotional*~
What if it is transient?
What if it's about a place that I have never been to?

'A view from nowhere', a beautiful view, a mirage.
to be nowhere but everywhere

a screen away
a midnight sun, blinding.
power off. Sunken eyes.
No. no. say it. NO. (own that word)

Re-adjust, reframe, blink, you can see now.
the darkness is not so dark,
in fact it's not darkness at all.

the winds are stronger, waves are longer
sunset colors, everlasting glow
the light is warm inside.

Spray me with your ocean breeze, salt my frozen fingers and stiffen up my clothes
make me blush, cheeks reddened by your slashing winds

I am alive, I am here.
I am exactly where I need to be.

((be kind to yourself)) ((you know enough)) ((nothing is clear)) ((take it easy))

Interruption\\conclusion

This thesis concludes as it began: with questions, ideas, new directions, and a vision for what research should look like. Unlike the introduction, however, it also reports on what was accomplished, what gaps in the literature were filled, and what lessons were learned. In this conclusion, I also elaborate on the next steps for both the first article and the second article to this thesis, separating this section between the next steps for Part I and the next steps for Part II. Then, I conclude with final thoughts about conducting research during the COVID-19 pandemic, adding my story to the work of other researchers who have documented their experiences (Markham et al., 2020). Lastly, I celebrate the accomplishments that came from this project and invite you to celebrate with me.

8.1. Overview

This research used a multi-methodological, community-based reflexive approach to better understanding food costs and food security in Tuktoyaktuk and to reflect on interruptions that I experienced when conducting research during COVID-19. The first article achieved research objective 1: to assess the Inuvik Tuktoyaktuk Highway's impact on market food prices in Tuktoyaktuk and shared the outcome of an ongoing research project in the ISR. The second article achieved research objective 2: to conduct a participatory, qualitative examination with residents of Tuktoyaktuk on the impact of the ITH on their behaviours and perceptions related to the local food system. The second article, in addition to the prefaces and to this conclusion, also contributed to achieving research objective 3: to reflect on the process of conducting Arctic community-based research during the COVID-19 pandemic.

This project contributed to filling gaps in the literature on the impact of a new transport infrastructure project in the Arctic, on food security in Inuit communities, and on advancing

research methods for youth-engaged community-based research. This project provides an evidence base that may inform research and monitoring on infrastructure development in other northern communities (some of which may soon be connected by road to the continental road network), especially as it relates to food costs and food security more broadly. Our work also has important implications for the future monitoring of food prices in the Arctic, for instance by demonstrating the importance of ongoing monitoring that is not tied to the Nutrition North Canada program and that is conducted by peer-researchers. To support evidence-based food security and development policy, our results highlight the need for better social, economic and health impact assessments and monitoring of major infrastructure projects, especially in remote Indigenous communities experiencing a food security crisis.

This project responded to a call to action by Inuit and Inuit governments for researchers to use a community-based research approach when conducting research with Inuit (ACUNS, 2018; GNWT, 2017; Graham & McDonald, 2003; Ikaarvik, 2019; IRC, n.d.; ITK, 2018b). As a commitment to community-based research, this project has resulted in three important outcomes. First, it strengthened relationships with ongoing research partners and with the broader community of Tuktoyaktuk, for instance by allowing us to hire two co-researchers, share research results back to the community, and engage interview participants in Nipatur̂uq magazine. Second, it allowed us to collaborate with an Inuvialuit youth (Mataya) in a way that was meaningful to both her and I, engaged us in a collaborative research process, helped improve the relevance of this project for the both of us, and supported both our academic achievements. Third, it created a space to share reflections about the research process and to comment on the personal, institutional and relational tensions that exist when conducting community-based research, especially during unprecedented times.

The piece that Mataya and I co-authored also supported and amplified the voice of other Inuit youth, those involved in the Ikaarvik project, who have called on researchers to conduct better research in Inuit Nunangat (Pedersen et al., 2020). We contributed to the literature by sharing one more story of how we would like youth engagement and community-based research to look like in the future, and we made recommendations for what we would like to see research look like in a post-pandemic world. Importantly, we added nuance to what the impacts of the pandemic have been on research. While in some ways the pandemic has made conducting research more challenging, we also believe that it has improved the relevance of community-based research for the communities involved.

8.2. Next steps

8.2.1. Part I: Food costs in Arctic Canada: the impact of the Inuvik-Tuktoyaktuk Highway

We have been working with the Tuktoyaktuk Community Corporation throughout the research process to confirm research interests, to scope our study and to discuss preliminary results (see Appendix 3: TCC Letter of support, and Appendix 4: Infographic of Project Objectives and Timelines). Our next steps are to obtain community feedback before submitting for publication and to finalize an infographic that we can use for lay language communication about the results. Results will also be communicated through presentations at Arctic-related conferences and events, such as the T-MOSAiC Arctic Infrastructure Science Talk series.

Since the beginning of the food costing work for this thesis, my supervisors and I have been meeting with Nutrition North Canada to discuss their research needs and to align our analysis with the policy directions that they are envisioning for their program. They have shown interest in

our analysis and have demonstrated a willingness to engage with researchers to better understand the impact of the NNC program in northern communities. They have also been supportive in supplying additional data and in sharing their methods for calculating the RNFB. We hope that they will be responsive to our policy recommendations and that this paper will help NNC engage in discussion with leaders in the NWT, in the ISR, and in Tuktoyaktuk to find solutions to the increase in food prices.

Through Dr. Tiff-Annie Kenny's professional networks and involvement with the Oceans Nexus Center, we are also working with a research team (Dr. G. Blume) at the Evans School of Public Policy and Governance at the University of Washington. Through a collaborative project related to coastal communities and social policy for sustainable oceans governance, a research team will be translating our findings into a public policy document so that the results can be communicated more broadly and so they can serve to better inform public policy globally

8.2.2. Part II: Our friendship is reconciliation: a pandemic silver lining in community-based research.

The interviews that Mataya conducted contain important information about the impact of the ITH on food security in Tuktoyaktuk. While this information is nuanced and will require a systematic analysis, preliminary findings indicate that residents of Tuktoyaktuk have noticed the increase in food prices since 2017. The interview recordings will be transcribed and analyzed for future research purposes, and Mataya will be conducting her own analysis (with access to the transcripts) to create the Nipatur̂uq food security issue.

Mataya conducted interviews with youth and Elders because this was the target audience for Nipatur̂uq. We envision future research and publications that can highlight these important

perspectives and that can also include the experience of other community members. For instance, once we have conducted a preliminary analysis of these 10 interviews, we will present key themes and learnings to the Tuktoyaktuk Community Corporation and use them as a launch-off point for further discussions. In the future, we want to conduct more interviews with key informants (such as the grocery store managers and members of the Tuktoyaktuk Community Corporation) and to co-create a community survey that will help the research team more broadly understand the impact of the ITH on food security in Tuktoyaktuk.

We, of course, also hope that Mataya will want to stay involved with the C4FS research project, though her role moving forward has yet to be defined at this moment.

8.3. Concluding thoughts on conducting research during the pandemic

The ongoing global lockdowns have required researchers all over the world to remain adaptive and reactive, changing their research plans with short notice and demanding extraordinary flexibility and perseverance. It is important to document our reflections and locally-situated experiences of the COVID-19 pandemic to draw larger meaning from this global experience (Markham et al., 2020). This thesis is one example of adaptation and resiliency in research, joining many others who have already shared their experiences (Abedi Dunia et al., 2020; Balestrucci et al., 2020; Best & Fredericks, 2021; Kennedy et al., 2021; Vindrola-Padros et al., 2020; Alex Wilson, 2021), and the many that have yet to be published or that have not been published in academic journals. I conclude with a summary of the four important ways in which COVID-19 has affected my ability to conduct research. First, it has added approximately 6 months of delays to my work. Second, it has restricted my ability to conduct fieldwork and thereby shifted the

objectives of my thesis. Third, it has improved the relevance of my research for at least one community co-researcher (Mataya). Finally, it has significantly impacted my mental health.

My research proposal (which I defended five months into the pandemic) contained five contingency plans in case fieldwork continued being delayed. Plan A was to begin analyzing the food costing data, at least until fieldwork was made possible again, at which point I would then be able to do interviews in Tuktoyaktuk. Plan B, C, and D proposed alternative ways to conduct interviews from a distance, such as by doing phone interviews, working with a local youth organization, or hiring a research assistant locally. Plan E, a plan I added in defiance, was to expand my quantitative analysis and to write a thesis about the challenge of conducting research during COVID-19. Rethinking my research, creating these five plans, and moving through each of them to arrive at a completely different outcome than what I had envisioned for my thesis added approximately six months of delays to my work (Between March 2020 and August 2020), and required me to take additional courses to learn economics, econometrics and to deepen my knowledge of statistics.

In shifting the focus of my thesis, the pandemic affected my ability to reach personal goals that I had set when enrolling in a Master of Arts but also created an opportunity for me to question what my motivations had been. I had wanted to conduct research with Inuit, to spend time learning in the North, and to develop my abilities in using social science research methods. When the lockdowns were announced, I grieved the lost opportunities, the lost connections, and the season of fieldwork that I would not get to experience. I began seeing my peers drop out of their programs, and I was forced to ask myself if I also wanted to postpone my studies. What were my intentions? I cared about conducting research that could then be used as advocacy to address the current food security crisis, but I had been positioning myself at the center of those motivations. *I* wanted to

conduct that research. *I* wanted to go *there*. Of course, my research would have been community-based and I would have collaborated with people in the community (to co-conduct interviews, for translations, to host meal-sharing evenings, etc). However, I had not been able to imagine doing research differently, such as from a distance.

While some graduate students are from the communities they chose to research, most graduate students involved in community-based research in the Arctic are not (Wray et al., 2020). The role of the graduate student is then to not only conduct research but also to build brand new relationships (new for them, sometimes pre-existing for supervisors and within the research project), which can be taxing on both the students and the community (Pedersen et al., 2020; Pfeifer, 2019; Wray et al., 2020). On the one hand, spending time in communities is important to these relationships and has been identified as an essential part of community-based research by both the communities (ARI, n.d.; CIHR, 2014; ITK, 2018b) and by researchers (Castleden et al., 2012; Tondu et al., 2014; Wray et al., 2020). On the other hand, I noticed that my forced immobility also created an opportunity for researchers like Mataya and Charmaine to take more of a leadership role in research. For instance, when Mataya and I met at the Canadian Roots Exchange gathering, I had only made plans to visit her when I would land in Inuvik and not to fully involve her in the research[36]. By not being able to go "in the field", it created opportunities for her and other researchers in the region to take ownership of the work and for her to be the project leader. I witnessed her leadership and professional skills develop exponentially and our project became much more meaningful to both of us.

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[36] Initially, I had been very reluctant to mix our friendship with research. I was worried about "objectivity" and of mixing personal relationships/friendships with academic work. I also admired of Mataya's work with Nipatur̂uq and feared slowing down her youthful momentum with the research bureaucracy.

Whose place are we taking when we go "in the field", and are we not robbing someone else, perhaps an Indigenous youth, from these opportunities for training and career advancement?[37] Of course, each project, each phase of the project, and each community has different needs and operates within different contexts. Researchers should follow what the communities advise, but also be willing to suggest critical and creative research approaches that truly de-center their roles as project leaders (ITK, 2018b). Especially when working with youth (and given the increasing internet access in the North and the increasing capacity for northern-led research) I see opportunities to increase the use of online platforms to collaborate, and for graduate students to play a stronger role in facilitating research from a distance. In the process, we might contribute to improving Indigenous research sovereignty, we might make our research more environmentally sustainable, and we might be able to better engage young people in determining a research agenda that is relevant to them.

This shift will not be easy and questioning ourselves and the methods that have served us well is an uncomfortable task. I don't advise that we all do so right at this moment (surely, I am not the only one who is completely exhausted), but rather that we document these questions and that we situate them within the context of COVID-19 so that we can remember our collective discomfort when we inevitably return to community-based research as we know it to be. Now, we may begin to heal from the impact that the compounding global crises have had on our mental

[37] I am unsure where this question leads me. While I develop some thoughts within this text, I think that there are longer discussion to be had about the role of graduate students in conducting community-based research. I have found that most publications relating to the role of the researcher in Arctic community-based research have been written by, and directed at, career researchers (e.i. professors and those who have benefited from decades of Arctic research). There is not a lot of research published by and/or for graduate students, who are in a uniquely different position (e.i. are usually not paid, face difficult job prospects after graduating, might also have children at home). Yet, graduate students are often at the forefront of conducting community-based research. Can we celebrate the achievement of higher education conjointly with local capacity-building? I don't believe that these are incongruous.

health. We have lost many people to the virus, to systemic racism, and to the climate crisis. We need to collectively grieve and heal from our individual and collective traumas. Our stories will be documented for later reflections when we can gather again to share what we have been through and what we have learned.

8.4. Final celebrations

//Tuktoyaktuk! Tuktoyaktuk! Join me here as we celebrate!\\

In defiance of the ongoing global crises, I conclude by celebrating the outcomes of this project. These impacts will be long-lasting for me, for research, for Mataya, and for people in Tuktoyaktuk and other communities in the Arctic and around the world.

I celebrate my resilience and the resilience of my two supervisors as we navigated the COVID-19 pandemic with uncertainty. I also celebrate having reached out to a mental health professional for the first time, and I celebrate how far I have come since.

I celebrate the food costing paper, and that this paper will help improve food security in Tuktoyaktuk and other northern communities. The work that we did will inform Nutrition North Canada of the impact of the subsidy removal, will help other northern communities plan for and mitigate the impact of new transport development projects, and will hopefully lead to better policy that can help address the extremely high cost of food in Tuktoyaktuk and other northern Indigenous communities.

In this thesis, I was also given a rare chance to build on a decade of community engagements and to support the ongoing work of a multi-disciplinary research team. I celebrate

the ongoing work of the peer-researchers in the six ISR communities, and their ongoing support throughout this project.

The outcomes of the work with Mataya are also extremely tangible. Mataya was able to graduate high school with the credits that she earned in this project. She developed professionally and personally, learned about food security, learned about the process of research, is a co-author on an academic paper, and has decided to apply to university. I, we, celebrate her accomplishments.

There is nothing more beautiful, more worthy of a celebration, than the conversations we have had and the process that we have navigated and critiqued together. We celebrate our friendship, and the impact that we have had on each other's lives, and the impact that we will surely have on our readers.

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Appendices

Appendix 1: University research ethics certificates

Appendix 2: Research licenses

Appendix 3: Letters of support

Appendix 4: Infographic of Project Objectives and Timelines (Pre-Pandemic)

Appendix 1: Ethics Certificates

Ethics Certificate for the Participatory food costing project

File Number: H01-14-10C

Date (mm/dd/yyyy): 10/26/2015

Université d'Ottawa
Service de subventions de recherche et déontologie

University of Ottawa
Research Grants and Ethics Services

Ethics Approval Notice

Health Sciences and Science REB

Principal Investigator / Supervisor / Co-investigator(s) / Student(s)

First Name	Last Name	Affiliation	Role
Laurie	Chan	Science / Biology	Principal Investigator
Shannon	O'Hara	Others / Others	Co-investigator
Sonia	Wesche	Arts / Geography	Co-investigator

File Number: H01-14-10C

Type of Project: Professor

Title: Food security, Ice, Climate and Community Health

Approval Date (mm/dd/yyyy)	Expiry Date (mm/dd/yyyy)	Approval Type
10/26/2015	10/25/2016	Ia

(Ia: Approval, Ib: Approval for initial stage only)

Special Conditions / Comments:
N/A

Ethics Certificate for the C4FS project

18/02/2021

Université d'Ottawa

Bureau d'éthique et d'intégrité de la recherche

Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	S-11-20-6256
Titre du projet / Project Title	Learning from and enhancing Community Capacity for Climate Change and Food Security (C4FS) action in the NWT
Type de projet / Project Type	Recherche de professeur / Professor's research project
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	18/02/2021
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	17/02/2022

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Sonia WESCHE	Département de géographie / Department of Geography	Chercheur Principal / Principal Investigator
Mathieu KIM	Département de géographie / Department of Geography	Étudiant-chercheur / Student-researcher

Conditions spéciales ou commentaires / Special conditions or comments

Appendix 2: Research Licenses

Research license for the participatory food costing project

Licence No. 15446
File No. 12 410 978
March 18, 2014

2014
Northwest Territories Scientific Research Licence

Issued by:	**Aurora Research Institute – Aurora College** Inuvik, Northwest Territories
Issued to:	Dr. Laurie HM Chan University of Ottawa 30 Marie Curie Ottawa, ON K1N 6N5 Canada Redacted for privacy
Affiliation:	University of Ottawa
Funding:	ArcticNet
Team Members:	Tiff-Annie Kenny; Myriam Fillion; Evelyn Storr; Shannon O'Hara
Title:	**Food Security, Ice, Climate and Community Health**
Objectives:	To develop an understanding of Inuit dietary change in Canada, with respect to environmental, cultural, economic and social constraints.
Dates of data collection:	March 18, 2014 to December 31, 2014.
Location:	Inuvik

Licence No.15446 expires on December 31, 2014
Issued in the Town of Inuvik on March 18, 2014

Redacted for privacy

Pippa Seccombe-Hett
Director, Aurora Research Institute

Research license for the C4FS project

License No. 16697
File Number: 12 410 1157
February 17, 2020

2020

Northwest Territories Scientific Research Licence

Issued by:	**Aurora Research Institute - Aurora College** **Inuvik, Northwest Territories**
Issued to:	Dr. Kelly Skinner University of Waterloo 200 University Ave W School of Public Health and Health Systems Waterloo, ON N2L 3G1 Redacted for privacy
Affiliation:	University of Waterloo
Funding:	Canadian Institutes of Health Research
Team Members:	Mylene Ratelle, Deborah Simmons, Brian Laird, Andrew Spring, Jennifer Fresque-Baxter, Gina Bayha, Julian MacLean, Melaine Simba, John B. Zoe, Sonia Wesche, Warren Dodd, Myriam Fillion, Tiff-Annie Kenny, Sonja Ostertag, Alex Latta
Title:	**Food Security Initiatives across the Northwest Territories**
Objectives:	To address priorities and inform both climate change and food security action and support-structures at local, regional, and territorial scales.
Dates of data collection:	February 18, 2020 to December 31, 2020
Locations:	Tuktoyaktuk, Délįnę, Tulít'a, Yellowknife, Paulatuk

Licence No. 16697 expires on December 31, 2020
Issued in the Town of Inuvik on February 17, 2020

Redacted for privacy

Pippa Seccombe-Hett
Vice President, Research
Aurora Research Institute

Appendix 3: Letters of Support

Letter of support for this thesis project

Tuktoyaktuk Community Corporation
P.O. Box 350
Tuktoyaktuk, NT X0E-1C0
Phone: (867) 977-2390/2004
Fax: (867) 977-2504
Email: manager@tukcommunitycorp.com

December 10, 2020

Sonia Wesche
Associate Professor
University of Ottawa

RE: C4FS

Dear Sonia,

I am writing to you on behalf of the Tuktoyaktuk Community Corporation Board of Directors regarding the Community Food System project in Tuktoyaktuk.

The board recommends that your team consider the benefits that the Inuvik-Tuk Highway has brought to our community.

Regarding the Community Research Lead, the Board is in support of this one condition; paper supply must be provided in the budget.

I look forward to working together to finalize a MOU.

Respectfully,

Redacted for privacy

Jocelyn Noksana
Corporate Manager
For/ Ryan Yakeleya
Chairperson

Letter of Support for the C4FS project

March 20th, 2019

Re: Support for CIHR Food Security and Climate Change Proposal: "Enhancing Community Capacity for Climate Change and Food Security Planning and Policy in the NWT" (PI: Skinner)

To Whom it May Concern:

On behalf of the Tuktoyaktuk Community Corporation, I am writing to express our support of the proposed CIHR project led Dr. Kelly Skinner, entitled "Enhancing Community Capacity for Climate Change and Food Security Planning and Policy in the NWT". Principal Applicant Dr. Sonia Wesche (University of Ottawa) and Knowledge User Jullian MacLean (Inuvialuit Regional Corporation) have been working with our community on climate change and food security research over the past several years. Other Co-applicants (Sonja Ostertag and Tiff-Annie Kenny) have also worked with us on related projects. MacLean has been working directly with a local coordinator to implement weekly Nutrition North cooking circles for the past four years. Most recently, Wesche, Kenny and MacLean conducted a Food Security Engagement process in March 2018, and data verification in February 2019 to inform the development of a regional Food Security Strategy. We want to build on this momentum.

Tuktoyaktuk is a small (pop. 898), coastal community in the Inuvialuit Settlement Region, where residents have a strong relationship with the land, and rely on both country food (from the land) and store-bought food. Climate change is impacting our food system in different ways, and we welcome projects that will help us adapt to these changes, while supporting our community food initiatives. Furthermore, we are dealing with the newly constructed Inuvik-Tuktoyaktuk highway (opened in November 2017), which offers new opportunities for food transport in and out of the community, but also brings in significant numbers of tourists. Climate change is already affecting the road infrastructure, and we need to better understand how it is impacting our food security, and options for adaptation. Through the recent Community Engagement process led by Wesche and MacLean, the community identified additional areas that may help residents adapt to change, including capacity-building and infrastructure related to a) harvesting and land-based education, with a focus on youth, b) healthy eating and cooking, and c) food preservation and storage (e.g. community icehouse/freezer), focused on country food. We would like to work with the researchers to develop and implement an action plan around these issues.

We are very interested in the plan to hire a local Community Coordinator, who can engage community members and ensure that Indigenous knowledge helps guide this project in an ethical way. We are pleased that this project focuses on capacity-building and knowledge-sharing, which will support our community in making informed decisions about initiatives related to food and climate change. We look forward to being involved and sharing lessons learned with other case study communities.

The Tuktoyaktuk Community Corporation looks forward to working with Dr. Skinner, Dr. Wesche, Mr. MacLean, and the project team over the 4 years of this research. Tuktoyaktuk is

currently experiencing significant change, and this research will help us better plan for the future, with the hope of improving food security and the health and well-being of our people.

Sincerely,

Redacted for privacy

Eddie T. Dillon, Chair
Tuktoyaktuk Community Corporation
Tuktoyaktuk, NWT

Appendix 4: Infographic of Project Objectives and Timelines (Pre-Pandemic)