Gender and the human dimensions of climate change: Global discourse and local perspectives from the Canadian Arctic

by
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Dedication

In loving memory of my Grandad, Hubert Bunce

"The clearest way into the Universe is through a forest wilderness"
-John Muir

1932-2013

Abstract

Gender and the human dimensions of climate change:
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Climate change impacts will be mediated by gender. This thesis examines climate change and gender at both a global and local scale. Globally, as recognition of the role gender plays in one's climate change experience grows, so too does concern that engagement with concepts of gender has been tokenistic. In response, this thesis begins by examining to what extent climate change adaptation, vulnerability and resilience literature engages with concepts of gender, by developing an assessment framework. This systematic literature review finds that while high, medium, and low levels of engagement are relatively equal, there is great disparity in the literature in terms of both geographic regions of focus and genders of focus.

In response to a gap in research on climate and gender from a North American context, this thesis develops local case study, identifying and examining the vulnerability and adaptive capacity of Inuit women in Iqaluit, Nunavut. Interviews were conducted with 42 Inuit women, and were complimented with focus groups, participant observation, and photovoice, to examine how women have experienced and responded to changes in climate already observed. Three key traditional activities were identified as being exposed and sensitive to changing conditions: berry picking, sewing, and the amount of time spent on the land. Key determinants of adaptive capacity included: mental health, physical health, traditional/western education, access to both country food and store bought foods, access to financial resources, social networks and connection to Inuit identity. This thesis finds that gender roles result in different pathways through which changing climatic conditions affect people locally, although the broad determinants of vulnerability and adaptive capacity for women are consistent with those identified in the scholarship more broadly for men.

Résumé de la thèse

Genre et dimensions humaines des changements climatiques: Discours mondial et perspectives locales de l'Arctique Canadien

Les impacts des changements climatiques seront modérés par le genre. Cette thèse examine donc les changements climatique et le genre, à la fois à l'échelle mondiale et locale. Au niveau mondial, la reconnaissance grandissante envers le rôle que joue le genre dans l'expérience vécue des changements climatiques nous mène à questionner l'engagement du terme qui risque d'être que symbolique. En réponse, cette thèse débute en examinant la façon dont la littérature engage le concept du genre dans un contexte d'adaptation, de vulnérabilité et de résilience aux changements climatiques, en développant un cadre d'évaluation. Cette revue systématique de la littérature démontre que le niveau d'engament signifiant varie entre fort, moyen, et minime, et atteste qu'il y a une grande disparité sur le plan de la région géographique ciblée, ainsi que du genre ciblé.

En réponse à cette brèche dans la recherche touchant le climat et le genre dans un contexte Nord-Américain, cette thèse développe une étude de cas locale identifiant et examinant la vulnérabilité et la capacité d'adaptation des femmes Inuits d'Iqaluit, au Nunavut. Des entrevues ont été tenues auprès de 42 femmes Inuits, complémentés par des groupes de discussions, de l'observation participative, et de « photovoix » afin d'examiner comment les femmes vivent et répondent aux changements climatiques qui y sont déjà documentés. Trois activités traditionnelles clés furent identifiées comme étant exposés et sensibles aux conditions changeantes, soit la cueillette de baies, la couture, et le temps passé sur le terrain. Les déterminants clés de la capacité adaptative incluent : la santé mentale, la santé physique, l'éducation traditionnelle et occidentale, l'accès à la nourriture traditionnelle et aux aliments en magasin, l'accès aux ressources financières, aux réseaux sociaux, et le niveau de connexion avec l'identité Inuit. Cette thèse affirme que les rôles des genres résultent en des voies différentes, à travers lesquelles les conditions climatiques changeantes affectent les individus au niveau local, quoi que les déterminants généraux de la vulnérabilité et de la capacité adaptive pour les femmes demeurent similaires à ceux qui ont étés identifiés par la littérature comme affectant les hommes.

ᐃᓕᓐᓂᐊᕈᑎᖓᓄᑦ ᐅᓂᑲᒃᓴᐃᑦ

ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓄᑦ ᐃᒃᐱᒃᓇᐅᑎᔪᑦ ᐊᐱᕐᓱᑕᐅᓂᐊᕐᒪᑕ ᐊᖑᑎ ᐊᕐᓇᐃᓪᓗ ᒪᓕᒃᓗᒋᑦ. ᐃᓕᓐᓂᐊᕈᑎᖓᓄᑦ ᐅᓂᑲᒃᓴᐃᑦ ᖃᐅᔨᓇᓱᒃᓗᑎᒃ ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓂᒃ ᐊᒻᒪᓗ ᐊᖑᑎ ᐊᕐᓇᐃᑦ ᐊᔾᔨᒋᖏᑦᑐᓂᒃ ᐃᒃᐱᒃᓇᐅᑎᖏᓐᓂᒃ ᓄᓇᕐᔪᐊᕐᒥ ᓄᓇᓕᖏᓐᓂᓗ. ᓄᓇᕐᔪᐊᕐᒥ, ᐊᑐᓂ ᐊᖑᑎ ᐊᕐᓇᐃᓪᓗ ᐊᔾᔨᒋᖏᑦᑐᒥᒃ ᐃᒃᐱᒃᓇᐅᑎᖃᕐᒪᑎᒃ ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓄᑦ, ᐃᓱᒫᓗᑕᐅᔪᓪᓗ ᐊᖑᑎ ᐊᕐᓇᐃᓪᓗ ᐊᑐᓂ ᐃᒃᐱᒋᔭᖏᑦ. ᑕᐃᒪᐃᓐᓂᖓᓄᑦ, ᑕᓐᓇ ᐃᓕᓐᓂᐊᕈᑎᖓᓄᑦ ᐅᓂᒃᓴᓕᐊᖑᓂᐊᕐᑐᖅ ᖃᐅᔨᓇᓱᒃᓗᑎᒃ ᐊᑐᑎᖃᕐᑐᒃᑯᑦ ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓄᑦ ᐊᕐᑭᒋᐊᕈᑕᐅᔪᓐᓇᕐᑐᑦ, ᐃᒃᐱᒃᓇᐅᑎᔪᓄ ᐊᒻᒪᓗ ᓱᖁᑕᐃᓕᒪᔾᔪᑕᐅᔪᑦ ᐅᖃᓕᒪᒐᒃᑯᑦ ᐊᖑᑎᑦ ᐊᕐᓇᐃᓪᓗ ᖃᓄᐃᓕᐅᖃᑦᑕᕐᒪᖓᑕ, ᖃᐅᔨᓇᓱᒃᓗᑎᒃ ᐊᑐᕐᑕᐅᓂᐊᕐᑐᒥᒃ. ᐅᖃᓕᒪᒐᐅᓕᕈᓂ ᕿᒥᕈᓂᐅᒐᔭᕐᑐᖅ ᖃᐅᔨᔭᐅᔪᓂᒃ ᓄᓇᓕᒋᔭᖏᓐᓂ ᐊᖑᑎᓪᓗ ᐊᕐᓇᐃᓪᓗ.

ᑕᐃᒪᐃᓐᓂᖓᓄᑦ ᖃᐅᔨᓴᕐᓂᐅᔪᑦ ᐱᑕᖃᖏᓗᐊᕐᒪᑕ ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓄᑦ ᐊᒻᒪᓗ ᐊᖑᑎ ᐊᕐᓇᐃᓪᓗ, ᑖᓐᓇ ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᓄᓇᓕᒃᓂᑦᑐᓂᒃ ᐊᐱᕐᓱᕐᖃᑦᑕᕐᓂᐊᕐᓗᑎᒃ, ᓇᓗᓇᐃᕐᓯᓇᓱᒃᓗᑎᒃ ᐊᒻᒪᓗ ᖃᐅᔨᓇᓱᒃᓗᑎᒃ ᒪᒥᒪᓂᖏᓐᓂᒃ ᐊᕐᑭᒋᐊᕈᑕᐅᔪᓂᒃᓗ ᐃᓄᐃᑦ ᐃᖃᓗᒃᓂ, ᓄᓇᕗᑦ. ᐊᐱᕐᓯᕐᑕᐅᔪᑦ 42 ᐃᓄᐃᑦ ᐊᕐᓇᐃᑦ, ᐊᒻᒪᓗ ᑲᑎᖓᔪᑦ , ᐊᐱᕐᓯᕐᑕᐅᔪᑦ ᖃᐅᔨᓯᒪᔭᖏᑦ, ᓂᐱᓕᐅᕐᑕᐅᓪᓗᑎᒃᓗ ᐊᔾᔨᓕᐅᕐᑕᐅᓪᓗᑎᒃᓗ, ᖃᐅᔨᓇᓱᕐᖢᑎᒃ ᖃᓄᕐ ᐊᕐᓇᐃᑦ ᖃᐅᔨᓯᒪᒃᒪᖓᑕ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᔪᓂᒃ. ᐱᖓᓱᑦ ᐃᓕᕐᑯᓯᒃᑯᑦ ᐊᑐᕐᑕᐅᔪᑦ ᓇᓗᓇᐃᕐᑕᐅᓚᐅᕐᑐᑦ ᐃᒃᐱᒃᓂᐅᑎᖃᕐᓯᒪᓕᕐᓂᖏᓐᓂᒃ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᔪᓄᑦ ᐅᑯᖑᔪᑦ: ᓄᓇᕙᒃᖢᓂ ᐸᐅᖓᓂᒃ ᑭᒍᑕᖏᕐᓇᓂᒃᓗ, ᒥᕐᓱᕐᓗᓂ, ᐊᐅᓪᓚᕐᓯᒪᖃᑦᑕᕐᓂᕐᓗ. ᐃᓗᐊᑭᓐᓂᕈᑎᓚᐅᕐᑐᑦ ᐱᓗᐊᕐᓂᖏᑦ ᐊᕐᑭᒋᐊᕐᑕᐅᔭᓇᐊᓕᑦ ᐅᑯᐊ: ᐃᓱᒪᖏᑦ ᖃᓄᐃᖏᑦᑎᐊᕐᓂᖏᓐᓄᑦ, ᑎᒥᖏᑦ ᖃᓄᐃᖏᑦᑎᐊᕐᓂᖏᓐᓄᑦ, ᐃᓕᕐᑯᓯᒃᑯᑦ ᖃᓪᓗᓇᑎᑐᓪᓗ ᐃᓕᓐᓂᐊᕐᑎᑦᑎᓂᖅ, ᓂᕿᓪᓚᑦᑕᓂᒃ ᐱᖃᑦᑕᕐᓂᖅ ᓂᐅᕕᕐᕕᒃᒥᓪᓗ ᓂᕿᑕᖃᑦᑕᕐᓂᖅ, ᑭᓇᐅᔭᖃᕐᓂᖅ, ᐃᓄᖃᑎᒋᒃᓂᕐᓗ ᐊᒻᒪᓗ ᐃᓄᐃᑦ ᐃᓕᕐᑯᓯᖏᑦ ᐊᓯᐅᕐᐸᓪᓕᐊᓂᖏᑦ. ᖃᐅᔨᓴᕐᓂᐅᔪᖅ ᑐᑭᓯᔭᐅᓚᐅᕐᑐᖅ ᐊᑐᓂ ᐊᖑᑎᑦ ᐊᕐᓇᐃᓪᓗ ᐊᔾᔨᒌᖏᑦᑐᒥᒃ ᐃᒃᐱᒃᓇᐅᑎᖃᕐᓂᖏᓐᓂᒃ ᓯᓚᐅᑦ ᐊᓯᓪᓕᕐᐸᓪᓕᐊᓂᖓᓄᑦ ᓄᓇᓕᒃᓂ, ᑕᐃᒪᓐᓇᑎᒋ ᐊᒃᑐᐊᖃᕐᑕᐅᑎᒐᓗᐊᕐᑎᓪᓗᒋᑦ ᐊᕐᓇᐃᑦ ᐊᖑᑎᓪᓗ ᐃᒃᐱᒃᓇᐅᑎᖃᕐᓂᖏᑦ.

Preface and Contribution of Authors

As this thesis is written in a manuscript-style it is comprised of two stand-alone manuscripts. Both of these manuscripts will be published in academic journals. The following text outlines the publication status of each manuscript along with the list of co-authors and contributions of co-authors.

Manuscript #1: How is adaptation, resilience, and vulnerability research engaging with gender?

Authors: Anna Bunce, and Dr. James Ford

This systematic literature review started as a course paper for Dr. Ford's graduate level class Climate Change Vulnerability and Adaptation (GEOG 514). All data collection, analysis and writing was done by Anna Bunce with guidance, feedback and editing assistance throughout the process from Dr. Ford. This manuscript has been submitted to Environmental Research Letters and is currently in press.

Manuscript #2: Vulnerability and adaptive capacity of Inuit women to climate change: A case study from Iqaluit, Nunavut

Authors: Anna Bunce, Dr. James Ford, Dr. Sherilee Harper, Dr. Victoria Edge and the IHACC team

This manuscript was written based on the field work carried out by Anna Bunce in Iqlauit in June 2014 and falls under the larger Indigenous Health Adaptation to Climate Change (IHACC) research project (PI Dr. James Ford). Data collection, analysis and writing was conducted by Anna Bunce. Drs. James Ford, Martha Dowsley and George Wenzel provided guidance, feedback, and editing help. Drs. Sherilee Harper and Victoria Edge are listed as co-authors as a result of their assistance with the Arctic portion of the larger IHACC project. Currently this paper is being prepared for submission to the journal Natural Hazards.

Acknowledgements

Academic work is not an independent pursuit, but instead a collaborative endeavor. This thesis simply would not exist without the contributions, guidance, and support of a wide variety of individuals.

First and foremost I would like to acknowledge and thank the community members who were interviewed, or participated in the photovoice and/or focus group portions of this research. I recognize that Iqalummiut are often asked to answer the questions of researchers and it can be a tiring exercise, to say the least. Thank you for your willingness to take the time and share your experiences, stories, and thoughts with me. You welcomed me into your homes and affectionately shared your community with me during each of my visits. Our unforgettable conversations have left an indelible mark on my heart, worldview, and academic outlook. Nakurmiik.

I would like thank my supervisor Dr. James Ford. Thank you for your trust and confidence in my abilities, ongoing guidance, superb editing skills, and rapid fire email responses. I always left our meetings feeling better and with a clear sense of direction. Thank you to my committee members Drs. Martha Dowsley and George Wenzel. Your guidance, knowledge and support throughout this process have been much appreciated and have greatly enriched my thesis and learning.

I have had the privilege of conducting this research as a part the larger multi-disciplinary Indigenous Health Adaptation to Climate Change (IHACC) project. I would like to thank the entire IHACC research team for creating such a stimulating academic space for young researchers. Being a part of this diverse and multidisciplinary team has taught me a great deal about collaboration and what research can do. In particular I would like to thank Dr. Sherilee Harper for her ongoing mentorship. Asking myself "What Would Sheri Do?" has became my starting point for research-related problem solving and has never steered me wrong. Thank you for making my first introduction to Iqaluit such a positive and memorable one.

I have been incredibly fortunate over the years to get to know all the wonderful members of the Nunavut Research Institute. Thank you for sharing your space, tea, and photocopier with me and for the warm welcome that always makes me feel right at home. I would particularly like to acknowledge Mary Ellen Thomas and Jamal Shirley. Thank you both for sharing your knowledge with me so generously and providing ongoing feedback for all the projects I've been involved with in Iqaluit.

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In relation to the photovoice aspect of my data collection I would like to thank Marie-Pierre Lardeau and Pascale Arpin. Marie-Pierre, thank you for your methodological guidance, friendship, and incredible cooking. Pascale, thank you for leading the photography portion of the photovoice workshop. Your clear explanations and easygoing attitude were exactly what I was looking for.

I would like to thank all the members of the McGill Geography Department, particularly the professors who taught me during the first year of my Masters degree for pushing me to new academic heights. I cannot express my gratitude for Elisa David and Franca Mancuso for always having an answer to my questions and guiding me through

McGill's notorious red tape with a smile. Thank you to Julie Jones for her help and thoroughness during the initial stages of my systematic review. A big thank you to Lesya Nakoneczny for designing the figures in Chapter 2 and to Michelle Maillet for translating my abstract into French.

I have been incredibly fortunate to be a member of the Climate Change Adaptation Research Group at McGill University for over four years and have learned so much from everyone past and present who has worked in Burnside 321. Our regular brainstorming, discussions, and advice sharing has not only shaped my work but also my life. Joanna Petrasek-MacDonald, Diana King, Lewis Archer, and Sara Statham have been particularly key as I've worked on this thesis. Sara, thank you for clearing the path and guiding me down it with such warmth and generosity. Lewis, thank you for the words of encouragement and reinvigorating writing breaks. And to Diana and Joanna: thank you for your advice, listening ears, commiseration, and general understanding. Thank you for helping me knit away, dunk away, and laugh away my worries.

I cannot offer enough thanks to my two research assistants and translators Naomi Tatty and Ooloota Nowdluk. Naomi, my northern Anaana, thank you for teaching me so much. From sewing skills to life advice, your guidance not only directed my academic work but has also had a deep influence on my life. You opened up your home and family to me and I am regularly humbled by your generosity. Your candor and honesty meant I always knew you would keep me from going in the wrong direction. Thank you for being my compass. Ooloota, I cannot imagine Iqaluit without you in it. You bring a lightness and healthy dose of laughter wherever you go. Your good humour, yet keen engagement with my research has always made me so grateful for the privilege of working with you. Thank you for sharing your joyful spirit with me.

Finally, I want to thank my parents and sister who have provided constant support and encouragement of my academic pursuits since my pre-school days even if they are not always 100% sure they can describe what I am doing. Mum, thank you for fostering my imagination and love of people's stories. You always know just what to say and how to make me laugh. Dad, thank you for nurturing my curiosity and thirst for knowledge. Your pride in my achievements is part of my fuel. I could not have found two more supportive, loving, and wonderfully funny parents. And finally to Maggie, the best "little" sister I could ask for. Thank you for all the phone calls, always just getting it, and keeping me laughing.

Thank you.

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Chapter 1
Introduction

1.1 Background

Climate change poses a significant threat to humanity (IPCC, 2014). The many environmental, health, social, and economic risks posed necessitate a strong response from the global community. In order to address these risks, the stabilization and reduction of greenhouse gas emissions is essential (i.e. mitigation). However, adaptation must also play a fundamental role in moderating the effect climate change is already having and will continue to have on global systems, as we are already locked into some degree of climate change even with stringent mitigation action (Pielke et al., 2007; Costello et al., 2008; Moss et al., 2013). Here, adaptation refers to "the process of adjustment to actual or expected climate and its effects" (IPCC, 2014), and concerns policies, measures, strategies, and actions designed to reduce climate change impacts and support resilience.

To underpin adaptation efforts we need an understanding of the vulnerabilities facing human systems (Adger, 2006; Ford and Smit, 2004; IPCC, 2014; Kelly and Adger, 2000). At both a global and local level, populations will experience different levels of vulnerability to climate change impacts. An understanding of who and what are vulnerable, how this vulnerability is manifest, and what supports or hinders adaptive capacity is essential for decision makers attempting to address climate change, and can also help empower communities to manage the risks posed by climate change and utilize potential opportunities (Ford and Smit, 2004; Kelly and Adger, 2000; Smit and Wandel, 2006).

This thesis examines gender and climate change at both a local and global scale by examining how gender is being brought into the climate change adaptation, resilience, and vulnerability (ARV) discourse, and analyzing the ways in which climate change interacts with women through a case study focused on the Inuit community of Iqaluit, Nunavut. The work stems from recognition that climate change will not be gender neutral. In 2008, for example, the UN's Commission on the Status of Women identified Gender and Climate Change as an emerging and important issue facing women (UN Commission on the Status of Women, 2008). Due to women's marginalized position in society, climate change is expected to have a greater impact upon women, especially poor women (Lambrou and Piana, 2006; O'Neill et al., 2010).

Globally, the adaptation experiences of marginalized sub-groups such as women, children and the elderly lack representation in climate change literature (Lesnikowski et al., 2015; Lambrou and Piana, 2006). Although a growing body of literature on climate change and gender is developing, it remains focused on broad policy pronouncements rather than specific case studies and is critiqued as resting too heavily on generalizations (Demetriades and Esplen, 2008). The propagation of these generalizations ignore the diversity of experiences and fail to embrace women's unique skills and knowledge that provide valuable insight and should be accounted for when determining adaptation priorities (Carvajal-Escobar et al., 2008). Literature that does focus on gender within the context of vulnerability, climate change, and adaptation, posits that the success of climate change research, policy and practice will depend on their ability to mainstream gender in

a highly engaged manner (Dankelman, 2002; Edvardsson Björnberg and Hansson. 2013; Lambrou and Piana, 2006; O'Neill et al., 2010). In response to these gaps, there is a call by researchers to further develop research surrounding coping strategies (individual and household level actions) and adaptation strategies (community or societal level actions) being developed in relation to gender as well as an exploration of the way climate change affects gender roles at a household level (Brody et al., 2008). Very little work is doing this within a North American context and even less in relation to Inuit communities (Bunce and Ford, in review).

As higher latitude regions are experiencing climate change earlier and with greater intensity than other regions worldwide (Larsen et al., 2014), the Arctic provides a rich ground for a case study of female climate change experiences (Berkes and Jolly, 2001; Ford et al., in press). In particular, the Canadian territory of Nunavut has been identified as a 'hotspot' of climate change impacts, which have been documented to be affecting livelihoods, culture and well-being of communities (Ford et al., 2007; IPCC, 2014; Nunavut Climate Change Strategy, 2011; Prowse and Furgal, 2009;). Earlier ice break up and freeze up, a reduction in summer sea ice extent, and changes to permafrost are just some of the climatic stressors already affecting traditional harvest activities, such as hunting, and infrastructure (Cunsolo Willox et al., 2013a; Ford et al., 2013). While the literature recognizes the creative adaptations taking place among Inuit communities in response to climate change and significant adaptive capacity – underpinned by the traditional knowledge, strong culture values, and social networks – there has been little work examining the role of gender in Inuit climate change experiences and vulnerability (Bunce and Ford, in review; Dowsley et al., 2010). Without an adequate baseline understanding of the unique gender specific experiences of climate change impacts, both local and global policy run the risk of creating maladaptive responses which fail to address the experiences of all (Alston, 2013; Denton, 2002).

1.2 Research Aims and Objectives

This thesis seeks to increase our understanding of the gendered nature of climate change vulnerability and adaptive capacity, using a case study of Inuit women in Iqaluit, Nunavut. Specifically, the thesis has 3 objectives:

1. Systematically review the gender and climate change scholarship, evaluating how concepts of gender are being integrated within climate change adaptation, resilience and vulnerability (ARV) research, and characterizing the current global discourse of gender and climate change (chapter 2).
2. Identify and characterize the vulnerability and adaptive capacity of Inuit women in Iqaluit, documenting factors which positively or negatively impact sensitivity and adaptive capacity to changing conditions (chapter 3).
3. Highlight the similarities and differences between the climate change experience of Inuit women and the global narrative surrounding women and climate change (chapter 4)

1.3 Thesis within the larger IHACC project

This thesis is part of a larger multidisciplinary project called the Indigenous Health Adaptation to Climate Change (IHACC) project, which seeks to identify and characterize the vulnerability and adaptive capacity of remote Indigenous communities to the health effects of climate change. This project operates in indigenous communities in Peru, Uganda, and the Canadian Arctic. By applying both scientific and Indigenous Knowledge the IHACC projects seeks to characterize current vulnerability, estimate future vulnerability, implement and monitor pilot interventions, provide comparative analysis, develop adaptation plans, and mentor and empower adaptation leaders. This thesis aids in the characterization of current vulnerability and adaptive capacity of Inuit women and aims to provide an estimation of future vulnerability by using the vulnerability framework.

1.4 Thesis Overview

As this is a manuscript-based thesis, both Chapters 2 and 3 are reproductions of distinct manuscripts. Chapter 2, comprised of the first paper, is a systematic literature review investigating to what extent climate change adaptation, resilience, and vulnerability research engages with concepts of gender. This manuscript is currently under review at *Environmental Research Letters*. The second paper, Chapter 3, is a geographically focused case study looking at the climate change experiences of Inuit women living in Iqaluit, Nunavut. This research takes a vulnerability approach, outlining the exposures, sensitivities, and factors that impact the adaptive capacity of Iqalummiut Inuit women. This chapter will be submitted to *Arctic*. As each manuscript is an individual work, some overlap and repetition may occur between the two chapters. The concluding chapter, chapter 4, ties together main ideas from both manuscripts to discuss the ways in which the experiences of Inuit women differs from the global narrative surrounding the women's climate change experience.

Chapter 2

How is adaptation, resilience, and vulnerability research engaging with gender?

1. Introduction

The last decade has experienced a significant expansion in climate change adaptation, resilience, and vulnerability (ARV) research that seeks to identify the risks posed by climate change and inform decision making on risk reduction (Wang et al., 2014). The field is diverse, with studies utilizing a variety of conceptual and methodological approaches, and focusing on different sectors, scales, and populations. A number of targeted reviews have sought to characterize research domains and publishing trends in this rapidly emerging field (Wang et al., 2014; Ford and Pearce, 2010, Ford et al., 2012, Bassett, 2013; Chapman et al., 2014; Preston et al., 2013). These studies document how the ARV field is evolving and in some instances have critically examined the concepts, assumptions, and blind-spots in research conducted.

One area of increasing interest in the ARV field has been on the gendered dimensions of climate change (Lambrou and Piana, 2006; Patt et al., 2009). This work highlights that climate change is not gender neutral, with structural and social inequalities, and socially constructed roles and expectations, differentiating vulnerability by gender, influencing the types and nature of adaptations recommended in research. While increasing emphasis on the gender dimensions of climate change in ARV studies is welcome in this regard, concerns have been expressed about the extent of engagement with gender. Some have argued that the incorporation of 'gender' has been tokenistic, with studies simply documenting that climate change will have differential impacts by gender, but contributing little to our understanding of the processes creating vulnerability or stimulating real change to reduce inequalities (MacGregor, 2010; Alston, 2014). Adaptations based on tokenistic engagement of gender risk reinforcing and entrenching pre-existing gender inequalities and vulnerabilities, and may result in interventions which are maladaptive or adaptations that are more effective for one gender than another (Edvardsson Björnberg, 2013; Fazey, 2011).

Reflecting these concerns, we examine how gender is incorporated into ARV studies published in the peer reviewed literature, asking the question: How is gender being engaged in climate change ARV research? In doing so, the work addresses an important gap in understanding, with few studies systematically examining how gender is being framed within this scholarship (Lambrou and Piana, 2006, MacGregor, 2010; Preet et al., 2010).

2. Methodology

In this section we develop an assessment framework for examining how gender is being engaged in ARV research. "Research" is defined as the systematic inquiry or investigation on climate change adaptation, resilience, or vulnerability, capturing studies which seek to identify and characterize how climate change affects human systems, along with work which identifies, evaluates, and prioritizes interventions to reduce vulnerability and enhance resilience. Our approach recognizes that the ultimate aim of much ARV

research is to inform decision making on risk reduction at a range of scales from the household to regional to national level, with a variety of approaches to achieving this (Ford et al., 2010; Schröter et al., 2005). At one extreme, studies seek to achieve this by developing scientific understanding on causality of vulnerability, describe conditions, characterize future trajectories etc, with the hope that this information will end up being useful to knowledge users. In this so-called 'linear model' or the 'science supply paradigm', the aim of research is to supply information for knowledge users to act on (Sarewitz and Pielke, 2007). Increasingly, however, this approach to knowledge creation has been critiqued, particularly in the context of wicked problems like climate change (Dilling and Lemos, 2011; Sarewitz, 2011), with many ARV studies now explicitly seeking to create usable or actionable knowledge (Ford et al., 2013; Lemos et al., 2012). In this research, community engagement and emphasis on local empowerment figure strongly, in which researchers often take a normative stance, seeking not only to understand but also catalyze change. We recognize the importance of both approaches to research, yet differentiate both in our model of engagement to capture those explicitly seeking move research to action.

2.1 Conceptual model

To determine the ways in which ARV research is engaging with gender, we developed a conceptual model capturing attributes of 'engagement.' Building upon the gender studies scholarship, and the climate and gender literature, the model recognizes that engagement occurs on a spectrum. Research that engages with gender at a low level simply acknowledges that gender exists and in some way interacts with the issue being examined. Conversely, studies that engage with gender at a high level acknowledge different gender experiences, consider gender throughout the research process, recognize and highlight the underlying power structures behind gendered experiences, and advance the cause of greater gender equality (Derbyshire, 2002; March et al., 1999; The Gender Manual, 2008). The conceptual model has three attributes, each of which has key components, which capture how gender is incorporated in a study.

2.1.1 Gender-Mainstreaming

Gender-mainstreaming refers to the promotion of gender equality by ensuring the different needs, experiences and capabilities of all genders are considered when conducting research projects and in making policy recommendations (Haddad and Villalobos Prats, 2012; Walby, 2005), and can be considered a function of gender-transformativeness, gender-responsiveness and gender-sensitivity. These three components capture how thoroughly gender is being addressed in research. *Gender-sensitivity* is evidenced by explicit acknowledgement of the different experiences and needs as they differ by gender, having "clear, specific objectives, actions and indicators that will lead to reductions in gender disparities" (Preet et al., 2010 p. 3) and by using gender sensitive language (Haddad and Villalobos Prats, 2012; Vincent et al., 2010). *Gender-responsiveness* is in evidence when research findings are presented in a gender-disaggregated manner, and /or when progress indicators measure the different impacts of a policy intervention on both men and women, and, ideally, those elsewhere on the gender spectrum (Haddad and Villalobos Prats, 2012; WHO | MDG 3, n.d.). Finally, *gender-transformativeness* involves the rethinking of social values, organizational

practices, policies, and goals of different sectors to include gender (MacGregor, 2010; Preet et al., 2010, Walby et al., 2005). For example, this may involve evaluating how resources are distributed following a climate related disaster such as flooding to ensure equal access, or focusing on integrating women's local knowledge in adaptation planning.

2.1.2 The Experience of Gender

Engaging with concepts of gender at a high level goes beyond describing the practical needs of particular genders to discuss and advance the strategic needs of gender (March et al., 1999; Moser, 1989). *Practical gender needs* can be defined as meeting practical interests in response to an immediate perceived necessity (March et al., 1999). Such needs can be addressed by promoting the improvement of living conditions through a focus on issues such as access to health care, food and water distribution, employment, and housing (Moser, 1989). By addressing practical needs, research aims to improve the differentiated access, roles and rights as they play out within gender norms and parameters. *Strategic needs* are those related to gendered divisions of labour distribution, power, and control. Addressing strategic needs in research often involves a transformation of roles, redistribution of power, and re-evaluation of legal rights and social responsibilities. This may involve the requirement for equal gender participation and consultation for climate change projects or actively working to transform gender roles through ARV research. In this way, researchers can examine the root causes of gender inequality that create differential vulnerability.

In the context of ARV research, practical and strategic needs are woven throughout. Recognizing the differential nature of climatic change impacts is at the core of much ARV literature, although focusing on practical needs through a gendered lens is less common. Recognizing how one's gender impacts practical needs and how the practical needs of one's gender may change due to environmental stressors is important if ARV research is to engage with gender at a high level. While addressing practical needs of different genders is necessary, failing to move beyond this and acknowledge the underlying causes that have led to differentiated climate change experiences is insufficient and may perpetuate uneven climate change impacts between genders. In this way, acknowledging strategic needs indicates greater engagement with concepts of gender (Moser, 1989).

2.1.3 Degree of Action

The final attribute of engagement concerns the level of action being taken. While gender mainstreaming and the experience of gender addresses the depth of understanding and engagement with gender issues in research, engaging with gender at a high level results in moving beyond understanding and acknowledgement towards promoting inequality reduction (Walby, 2005). While it is unreasonable to expect research to be the sole driving force in overcoming systemic gender inequality, research does have a role to play documenting gender inequity and promoting efforts to overcome it, both within the region or sector of focus, and in academia more broadly (Arora-Jonsson, 2011). Building on Lesnikowski et al. (2011), the degree of action attribute helps categorize how much change may be enacted as a result of the research.

The lowest level of actions are *statements of recognition* which acknowledge that a relationship between gender and ARV exists. This indicates awareness of the potential gendered dimensions of climate change impacts and adaptations, but does not indicate that action has been taken or proposed to reduce inequality. Statements of recognition indicate a lower level of engagement. *Groundwork statements* not only recognize a relationship between gender and ARV, but also outline recommendations for how gender inequality can be reduced through the research process or policy intervention. Such statements take preliminary steps towards greater gender equity by informing ARV practices, but do not themselves constitute change in policies, programs or the delivery of services. Finally, *statements of action* are considered as to be highly engaging as they capture cases where concrete actions have been taken as part of the research process to increase gender equality within ARV research or through ARV processes. Statements of action are informed by and build from statements of recognition and groundwork statements to promote or instigate changes in programming, policy and delivery of services.

2.2 Assessment rubric

An assessment rubric was designed to operationalize the conceptual model to examine the level of gender engagement in ARV research. The rubric is based on a series of standardized indicators (i.e. questions) organized around the three attributes of engagement and their associated components, as illustrated in Table 1.

Table 1: The conceptual model for examining the level to which climate change ARV studies are engaging with gender

Attributes and components of engagement	*Questions/Indicators*	*Scoring System*
1. Gender Mainstreaming: Extent to which gender concepts are being applied in the ARV research process		**Total possible score: 3**
Gender-Transformativeness	Does the research critically analyze social values, organizational practices, and goals? Does the research promote the rethinking of societal structures of power as they relate to gender?	Presence: score of 1 Absence: score of 0
Gender-Sensitivity	Is there explicit recognition of the different needs and experiences by gender? Are there objectives, actions, and/or indicators that aim to reduce gender disparities? Is gender sensitive language used?	Presence: score of 1 Absence: score of 0
Gender-Responsiveness	Are the research findings presented in a gender-disaggregated manner? Do progress indicators measure the different impacts experienced by both genders? Are there recommendations or evidence of equal participation in decision making processes by all genders?	Presence: score of 1 Absence: score of 0
2. Experience of Gender: Extent to which the specific needs of different genders are acknowledged and addressed throughout ARV research processes.		**Total possible score: 3**
Practical needs	Does the research focus on improving the practical and differentiated needs each gender experiences within current gender norms?	Presence: score of 1 Absence: score of 0
Strategic needs	Does the research aim to reduce gender inequity through a re-evaluation of power distribution/societal roles and responsibilities/legal rights?	Presence: score of 2 Absence: score of 0
		Total possible score: 3

3. Degree of Action: Extent of action being taken to reduce gender inequality in ARV research processes		
Statements of Recognition	Does the paper acknowledge that a relationship exists between gender and ARV?	Presence: score of 1
Groundwork	Are recommendations made that would reduce gender inequity in ARV work? Are recommendations made that aim to reduce gender inequity through ARV processes?	Presence: score of 2
Action	Does the paper describe concrete actions that have been taken or are being taken to reduce gender inequality through ARV processes?	Presence: score of 3

Peer reviewed articles were used as the data source from which to examine how gender is being considered in ARV research. To identify relevant articles and ensure comprehensiveness in the review, we conducted a systematic literature review (Berrang-Ford et al., In Press). Search terms were first developed to capture research focusing on gender, and were applied within Scopus and Web of Knowledge focusing on studies published between 2006 and 2014 (Table 2). To be included, studies had to have as substantive focus on gender. The initial review returned 1,284 articles which were screened based on inclusion/exclusion criteria and reading of the title and abstract, with 232 relevant documents remaining for full reading. After this final screening, 123 documents were retained as reporting on studies examining gender in the context of climate change ARV (See supplemental data for complete list of included documents). The majority of excluded articles did not substantially focus on adaptation, resilience, or vulnerability, focused exclusively on natural systems, or did not focus on gender.

Table 2. Review parameters

Inclusion	***Exclusion***
Published from Jan 1st 2006-February 18 2014	Anything published prior to January 1st 2006

Discusses adaptation, vulnerability and resilience in relation to humans or that are human driven	Discussions of adaptation, vulnerability or resilience that are not human driven
Discusses gender in some capacity (either focused on male or female or both genders)	Fails to discuss gender in any way
Focuses on contemporary climate change issues	Papers focused on prehistoric climate change
Focuses on adaptation, vulnerability or resilience (or a combination of the three)	Focuses exclusively on mitigation

Search Term Focus	***Boolean Search Terms***
Gender based search terms	Gender* OR women OR men OR feminine OR masculine
Climate Change search terms	"climat* change" OR "global warming"
Adaptation, vulnerability and resilience search terms	Adapt* OR cope OR coping OR plan* OR manag* OR interven(OR adjust OR modif* OR action* OR groundwork OR innovation* OR participatory OR plans OR planning
Resilience search terms	Resilien*
Vulnerability search terms	Vulnerabl*

2.3. Coding scheme

Each peer reviewed article was coded using the assessment rubric. Firstly, articles were coded to capture the region, sectoral focus, and type of study (adaptation, vulnerability, and/or resilience). Secondly, indices for each component of engagement were calculated, capturing the extent to which indicators of each component were evident in the study (Table 1):

- **Gender mainstreaming**: the presence or absence of gender-transformativeness, gender-sensitivity, and gender-responsiveness in the sector(s) of focus was used to determine the extent to which each study engaged with gender. Articles that showed evidence of each of these components was considered to be engaging with gender at a higher level than those that address two or fewer. Each component of gender mainstreaming received equal weighting and was scored out of 1, for a maximum score of 3.
- **Experience of gender**: articles that examined the gender experience purely by focusing on practical needs received a score of 1, while articles that explored the power dynamics and strategic needs of genders in relation to each received a score of 2. Three points were awarded to studies that examined both the practical needs of gender and strategic gender interests. To evaluate this, the gender(s) of focus in each article were examined to determine whether the research was aiming to address either the practical needs, strategic needs, or both of the gender(s) of focus. In instances where it was unclear as to what kind of gender experience the paper was focusing on, papers received a zero. The differential weighting reflects the fact that gender equality is a human right recognized by the UN and a well-established means to increasing health outcomes, poverty reduction, and increased education of women and children (Gender Equality Overview, n.d.; The Universal Declaration of Human Rights; WHO, 2015; Preston et al., 2010). Studies that focus on the strategic needs and relative position of genders to each other, are consequently viewed as taking greater strides towards gender equality as they focus on the power structures that shape gender roles.
- **Degree of action**: studies that made statements of recognition were considered to have taken the smallest degree of action towards reconciling gender and ARV work and were scored as a 1. Articles that lay groundwork by making recommendations as to how to reconcile gender and ARV research, moved beyond statements of recognition and received a score of two, receiving one point for making a statement of recognition and a second point for building upon this with groundwork statements. Studies which detailed actual actions being taken to reconcile ARV work with concepts of gender were awarded a score of three as these studies exhibited statements of recognition, made recommendations, and detailed actions being taken. As with the experience of gender category, papers where the degree of action taken by the paper was unclear received a zero.

An engagement index was then calculated by summing scores for component indices using equal weighting, calculated on a nine point scale, building on similar evaluation methodologies developed in the climate change field (Ford et al., 2013, Preston et al., 2010; Sherman and Ford, 2014). Based on this nine point scale, articles were then categorized as having high, moderate, or low levels of engagement with gender. To be

classified as having a high level of engagement, articles had to score between seven to nine points; moderate levels of engagement scored between four to six points; low levels of engagement were categorized as those articles scoring between zero and three points (see Table 3 for examples of how the index was operationalized). Results were entered into Excel for analysis. Descriptive statistics were used to examine trends in gender engagement across studies, and chi-squared tests were used to examine the significance of relationships between performance and article characteristics (e.g. geographic region, academic sector, article type), with significance set at 95%

While the review is comprehensive and systematic, limitations of the study include a focus solely on peer-reviewed articles, and we acknowledge a substantial body of work in the 'grey literature' on gender and climate change. Articles were evaluated based on the information presented in each peer-reviewed article. As a result, each document was evaluated as a whole, without a specific evaluative focus on process or societal implications beyond what was described in the paper. We note that articles themselves may not fully substantiate the extent to which gender concepts are integrated into a particular research project: key components of engagement may not have been documented, or conversely, may be overstated. Notwithstanding these caveats, the use of peer reviewed articles as a basis for systematically examining the extent to which research engages in a particular subject is widely accepted (Ford et al., 2013; Ahmed and Fajber, 2009; Smyth, 2009), and develops a baseline and exploratory characterization of how gender is being incorporated into ARV research.

Table 3. Examples of the scoring system

	Low level of engagement	*Moderate level engagement*	*High level engagement*
Article Title	Understanding the vulnerability, resilience and adaptive capacity of households in rural Victorian towns in the context of long-term water insecurity	Women's rights in climate change: using video as a tool for empowerment in Nepal	Farm income, gender differentials and climate risk in Cameroon: typology of male and female adaptation options across agroecologies.
Article Description	Paper looks at how individuals and households in a rural Australian region are adapting to long-term water insecurity and aims to identify risk factors for vulnerability. Considers health and well-being impacts of climate change. Found clear gender differences in the way men and women identified, communicated and dealt with climate change. Paper stated that men had a tendency to prefer hard adaptations, while women preferred soft adaptations	Research project aimed to understand how the use of participatory video could help women secure rights in the face of the effects of climate change. Women in Nepalese communities were interviewed about changes they have experienced, how they are coping and what could be done to adapt and then chose which adaptation video they would make a video about.	Farm income, gender differentials and climate risk in Cameroon: typology of male and female adaptation options across agroecologies. This paper focused on analyzing and identifying the effect of climate risk on farm production and management options for both male and female farmers.

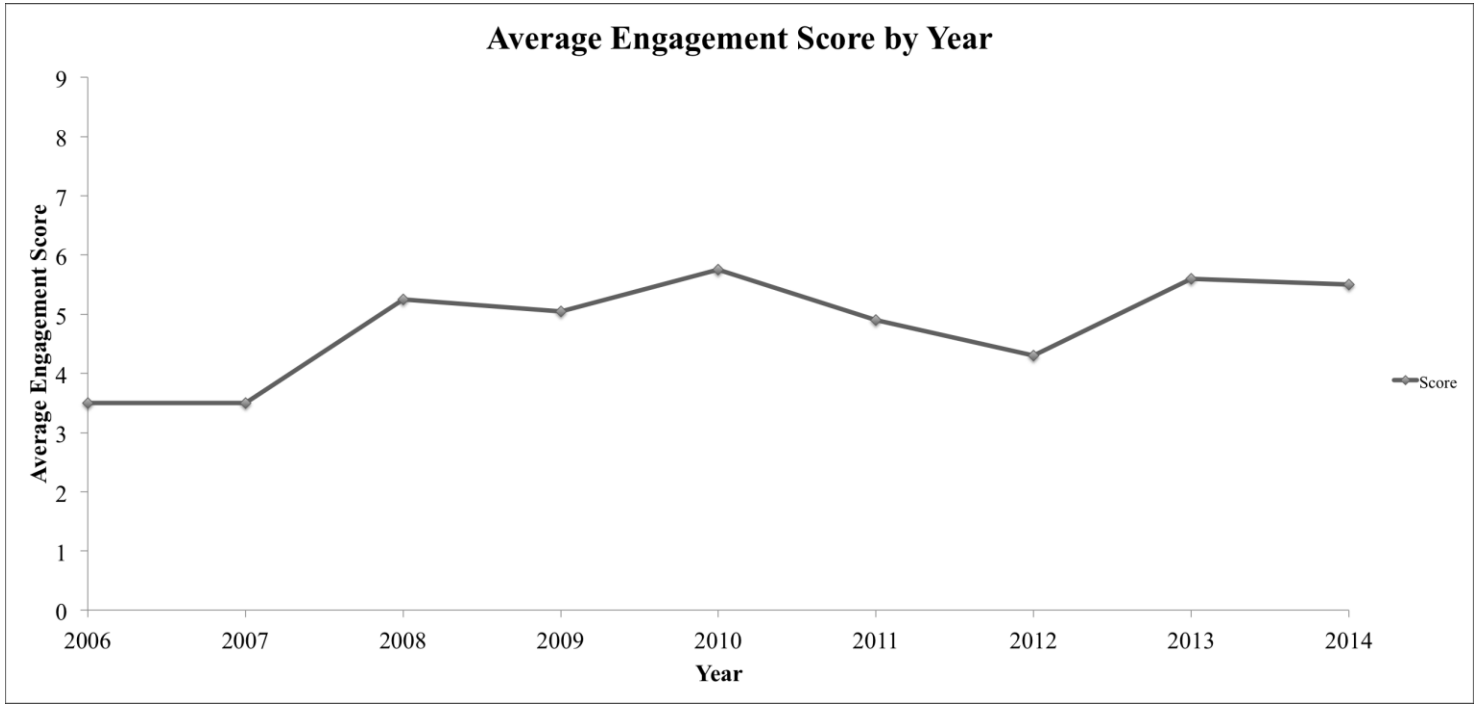
Reasons behind engagement score	• Did not consider either strategic or practical needs. • Showed evidence of gender responsiveness but no evidence of gender transformativeness, or gender sensitivity • Only made statements of recognition	• Only looked at practical gender needs • Showed evidence of all three areas of gender mainstreaming: gender transformativeness, gender responsiveness, and gender sensitivity. • Made groundwork statements	• Looked at both practical and strategic gender needs • Showed evidence of all three areas of gender mainstreaming: gender transformativeness, gender responsiveness, and gender sensitivity. • Made groundwork statements

3. Results

3.1 Focus on gender in ARV studies has increased over time, accompanied by an increase in studies that engage with gender at a high level.

Of the 123 articles examined, 41% (n=50) were classified as having a high level of engagement with gender, scoring a 7 or 8 out of a possible 9 points, with no studies receiving a maximum score. 28% (n=34) had moderate engagement, and 31% (n=38) a low level of engagement. The number of papers examining gender in ARV research increased over the observation period. The average level of engagement also increased from 3.5/9 in 2006 to 5.6/9 in 2013, although varying by year with a maximum level of 5.75/9 in 2010 (Figure 1).

Figure 1: Average engagement score by year



The literature reviewed provides insight into how gender is framed within ARV work. Of all the work reviewed, 48% (n=59) had gender as the main focus of the article: the average engagement score for these articles was 6.83, indicating a high level of gender engagement. For those articles where gender was not the main focus, the average score was 3.44. In terms of genders being addressed, most examine the female experience. Only one article explicitly focused on men and no articles focused on those who identify elsewhere on the gender spectrum. Rather, papers either explicitly spoke about women (42% of all articles) or spoke about both men and women (57%).

3.2. Studies perform highest on gender mainstreaming and integrating the experience of gender

Performance of reviewed studies differs between attributes of the conceptual model of engagement, with studies scoring highest on gender mainstreaming and experience of gender (see supplemental data). In both cases, studies either fully engage with the attribute in question or not, with the least number of studies categorized as having moderate performance. With gender mainstreaming,

for example, 44% (n=54) of articles had a high level of engagement, compared to 33% (N=41) with a low engagement; for the experience of gender, the results were 36% (n=44) and 52% (n=64) respectively. With regards the extent of action being taken to reduce gender inequality (i.e. degree of action), the majority of reviewed articles were classified as groundwork (51%, n=63). Such studies make recommendations on how to reduce gender inequity in ARV work, and are indicative of the literature moving beyond simply recognizing that gender is important to consider. Only a small number of articles, however, were classified as 'actions,' describing concrete actions that have been taken or proposed to reduce gender inequality in the research process or through proposed / developed adaptation strategies (Spring, 2006; Lane and McNaught, 2009).

3.3. Adaptation focused research has higher levels of engagement than vulnerability work, with resilience studies having a limited gender focus

The reviewed articles were almost equally split between having an adaptation or a vulnerability focus (61%, n= 75 and 63%, n = 77 respectively), while only 6% (n=8) had a resilience focus. Articles taking a resilience approach also had the lowest average engagement score at 4.5 compared to adaptation and vulnerability approaches that scored 5.69 and 4.87 respectively.

Articles with a primary emphasis on adaptation—including studies examining or proposing adaptations—were more likely ($p=<0.05$) to have a higher level of engagement than studies examining vulnerability, scoring higher on all three attributes of the conceptual model (see supplemental data). Fifty-seven percent (n=43) of adaptation articles exhibited evidence of gender-transformativeness, while 46% of vulnerability (n= 35) focused studies did. Adaptation work also scored higher on gender-responsiveness and gender sensitivity (see supplemental data).

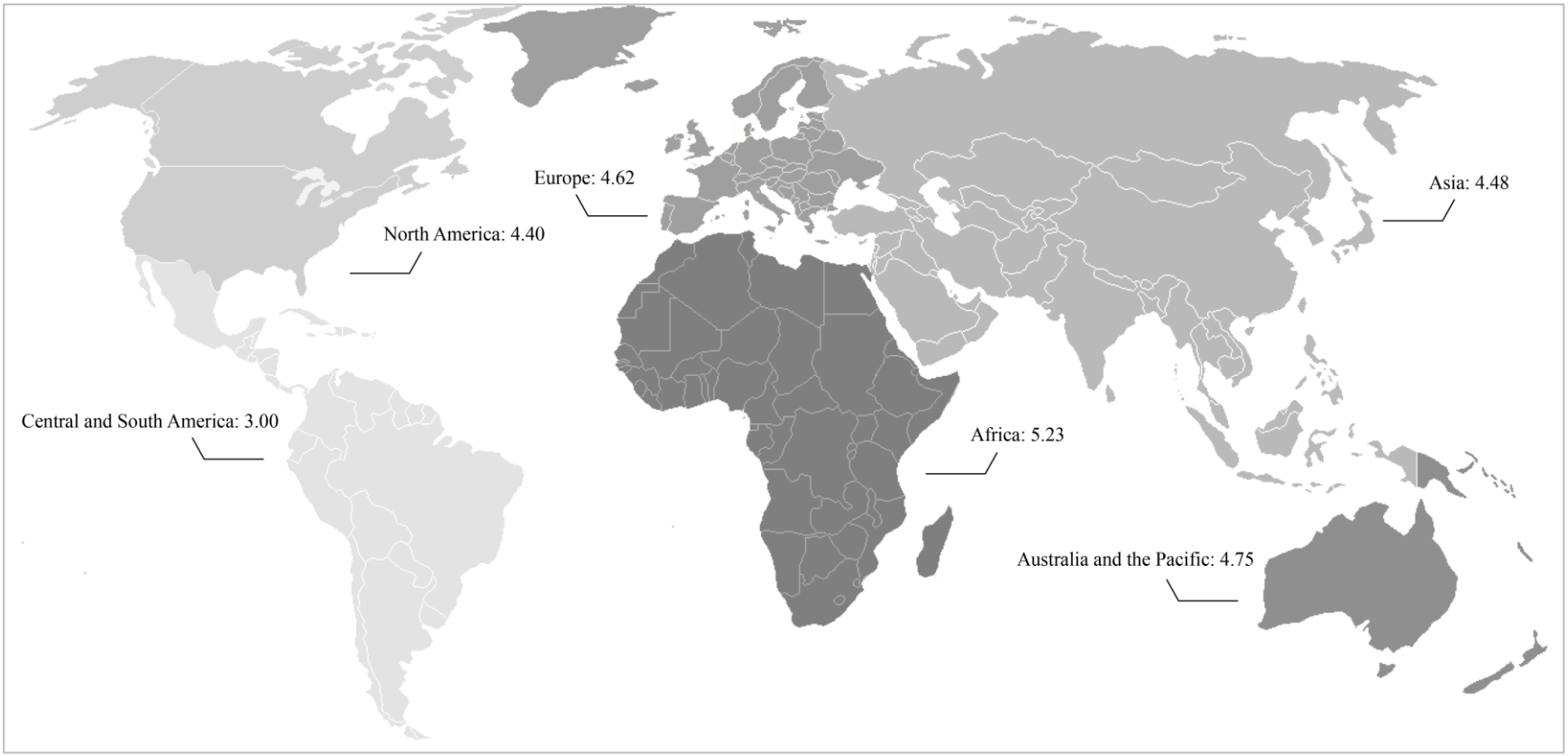
In relation to the experience of gender, adaptation focused work was more likely ($p=<0.005$) than vulnerability studies to move beyond practical needs to discuss the strategic needs of a specific gender. Vulnerability focused articles trailed adaptation work largely because of the high proportion that did not look at either practical or strategic needs of the gender experience.

When examining the degree of action taken, adaptation and vulnerability literature both generally did not score the highest level of engagement, with 3% (n=1) respectively classed as actions (see supplemental data). Adaptation focused papers however, were more likely to move beyond statements of recognition and provide recommendations than those taking a vulnerability approach.

3.4. Significant geographic disparities exist in gender engagement, with studies from Sub-Saharan Africa scoring the highest

Sub-Saharan Africa (SSA) is the region where most of the reviewed articles examining gender in the ARV research are focused (n=49, 40%). Studies from this region also have the highest performance, with an average engagement score of 5.2/9 (Figure 2). There is strong evidence of gender-transformativeness, gender-sensitivity and gender-responsiveness in research from SSA, with level of engagement increasing over the observation period.

Figure 2: Average Engagement Score by Region



In other regions, few ARV studies are integrating gender considerations, with no studies documented from North Africa, and one study in the Middle East (Spring, 2006) and among the Small Island Developing States (Lane and McNaught, 2009). In North, South and Central America combined, twelve studies were identified (4 from Canada, 5 from Mexico, 2 from the US, and

focused on Brazil and Chile), with work from this region calculated as having the lowest engagement (4.16/9). Europe had a similarly low number of articles (n=8), with an average engagement score of 4.62.

Twenty percent (n=24) of all articles focused on Asia, although this primarily reflects the high number of articles focusing on Bangladesh (n=11). Vulnerability studies were most common in Asia, in which gender was rarely the main focus of an article, rather being considered as a factor that impacts vulnerability.

At a national level, Bangladesh (n=11) and Australia (n=11) have the most articles examining gender in an ARV context, although studies from these nations generally scored low on the engagement index. In Bangladesh, this reflects poor performance across studies on the experience of gender component of the assessment framework: over half the articles focused just on practical gender needs or failed to examine either component of gender experience. In Australia, the reviewed studies scored low across the all three components of the assessment framework, an exception being a study examining the destabilizing impact of climate change on the mental health of rural Australian men (Alston, 2011). Not only did this article receive an overall engagement score of 8, but it was the only article in the entire dataset which examined exclusively male experiences. The majority of studies from Bangladesh (8/11) and Australia (8/11) focused on vulnerability.

3.5. Levels of engagement differ by sectoral focus

Gender was addressed in ARV studies taking place primarily in three sectors. Health was the focus of 23% (n=28) of articles, with a strong emphasis on examining gender in the context of determinants and experience of vulnerability (particularly temperature related). Eight health articles had gender as a main focus of the paper (Alston, 2011; Carter, 2011; Dominelli, 2013; Jerneck and Olsson, 2013; Natalia, 2011; Preet et al., 2010; Rich et al., 2012; Van Zutphen et al., 2014). Health focused research as a whole scored low on the engagement index, however, averaging 3.57 (the lowest documented), and was constrained by the limited examination of the specific needs of different genders in this work (i.e. experience of gender). Health studies largely made statements of recognition with just 32% (n=9) providing gender groundwork.

A considerable amount of gender and ARV research was also documented in environmental management (n=25). Gender was the main focus in this work in just over one third of these cases (n=9), and was primarily examined as a determinant of vulnerability. Studies here received an average of 4.24 in the engagement index, with relatively high scores in the experience of gender and degree of action (see supplemental data). Articles focusing on hazards research comprised 13% (n=16) of included papers, and primarily focused on vulnerability. Studies here performed low on engagement in general, scoring 3.69, with few going beyond recognizing a relationship between gender and ARV to consider higher levels of action needed to address gender inequality.

While health, environmental management, and hazards research were well represented in this review, other prominent sectors were notably absent. Research looking at gender and ARV within the context of agriculture yielded only six articles, while food security focused articles numbered four. Studies examining ARV and gender in relation to livelihoods returned only three results, which was the same for migration focused research within this body of literature.

3.6 Performance in regards to strategic needs and gender-transformativeness highlight the difficulty of overcoming societal norms.

Few papers focused exclusively on the strategic gender needs, with most papers focusing either on practical gender needs or both practical and strategic gender needs. While 36% of articles discussed either practical or strategic gender needs in relation to climate change, 25% of papers failed to discuss either. No clear trend over time could be distinguished to suggest that a general movement away from practical needs towards strategic gender needs is occurring.

Similarly, gender-transformativeness emerged as a strong indicator of engagement. If an article exhibited gender-transformativeness, it almost always had evidence of gender-sensitivity and gender-responsiveness as well. This indicates that research which is critically analyzing underlying social and organizational structures and advocating for changes to these structures as they relate to gender, is likely already aware of the varied life experiences mediated by gender, presenting disaggregating data, and using progress indicators to measure the different experiences of each gender. Yet, overall levels of gender-transformativeness were low, reflecting larger societal norms

4. Discussion

This paper systematically examines how climate change adaptation, resilience, and vulnerability (ARV) research is engaging with gender. While gender is being engaged with at a high level in some ARV studies in the peer reviewed literature, significant variations in the level of engagement occur depending on article type, geographic region, and sectoral focus. These geographical variations highlight potential areas for future research. Similarly the varying levels of engagement across sectors illustrates the ways in which the methodologies, conceptual frameworks, and research structures applied to particular sectors differentially engage with concepts of gender. Gaps also point to larger systemic struggles in relation to gender equity and power distribution. Across all articles, consideration of gender-transformativeness was limited, which is indicative of the difficulty in overcoming societal and institutionalized norms. Similarly, the negligible number of resilience focused studies integrating gender issues examined in this review, may be related to these systemic issues. Resilience literature has been critiqued as lacking a focus on power and marginalization, which are implicitly aligned with gender based research (Whyte, 2014).

We find that while gender is an increasing focus in ARV studies, it remains marginal: we documented only 123 ARV studies published in the peer reviewed literature between 2006 and early 2014 as having a gender angle, a small fraction of a much larger body of scholarship on adaptation, resilience, and vulnerability [e.g. see 1]. Further, gender research is rooted in the female experience with only one articled explicitly focusing on men, no studies focusing on those outside the gender binary, and studies focusing on both genders still predominantly highlighting the experiences of women.

In the literature focusing on women, two framings were generally discernible, with women either being described in a passive manner as a vulnerable sub-population or viewed as active participants in responding to climate change impacts. Studies that viewed women as a vulnerable sub-population primarily focused on health and natural hazards in a changing climate. The majority of these articles assigned women to a list of vulnerable members of society along with children and the elderly, yet rarely examined

the causal processes making women more vulnerable, overlooked the agency of women in responding to climate impacts, and failed to examine the barriers than need to be overcome to reduce vulnerability. This failure to explicitly state or examine the root causes of vulnerability, coupled with a tendency to frame gender only in terms of sex-disaggregated data, contributed significantly to the lower levels of engagement across vulnerability and health focused articles. The reductionist tendency of climate change discourse has also been noted in the political ecology literature; Bee et al., (2012) for example, warns that the tokenistic inclusion of uncritical gender-sensitive language fails to challenge the underlying roots of gender inequality. Such work risks perpetuating vulnerability stereotypes that may not be accurate in all circumstances.

Alternatively, women were depicted as possessing specific knowledge and skills necessary for understanding the risks posed by climate change and for developing effective, equitable, and sustainable response options. This work described explicitly targeting women to help ensure their experiences are engaged in the research process and help define recommended adaptations. Yet, as Arora-Jonsson (2011) warns, inviting women to participate in discussions that are ruled by hierarchical patriarchal systems may not result in highly inclusive outcomes. Women being brought into these contexts may struggle to express themselves due to the social confines and expectations of their gender. While some of the studies reviewed here sought to challenge existing power relations through ARV research (i.e. through their engagement with gender transformativeness), these were the exception, with most studies not exhibiting evidence of gender engagement at this level.

These two general framings of how women are depicted in ARV studies, generated through a systematic examination of the literature, are broadly consistent with other work commenting on the field. Yet there also key differences. While Arora- Johnsson (2011) argues that women in the climate change literature as a whole are often described as 'environmental saviors', the peer reviewed articles we reviewed exhibited a more nuanced understanding of the role women play and have the potential to play in relation to ARV. Similar, MacGregor's (2010) argument that women are frequently depicted as "the problem" was not borne out here, with only two of the 123 articles taking this stance.

The treatment of gender in ARV studies is important given the role of research in generating understanding on the experience of climate change, identifying factors determining vulnerability and resilience, identifying and evaluating adaptation opportunities, ultimately framing the nature of the problem and response options. A failure to fully engage gender in this work may compromise vulnerability reduction activities, and could result in maladaptation or adaptation which has uneven impacts across the gender spectrum (MacGregor, 2010). Particularly given the action orientated nature of much work in the ARV field, and outreach and advocacy role researchers are increasingly playing, the impacts of such neglect stem well beyond academic understanding. Yet equally we need to caution that research agendas often exist independently of local policy mandates and processes, so that even research which is highly engaged with concepts of gender may have limited impact on the gender norms of everyday life or policy processes.

5. Conclusion

In this paper we systematically examine the extent to which gender is being engaged with in climate change adaptation, resilience, and vulnerability (ARV) research. We find that while gender is an increasing focus in this literature, it remains in its infancy. Although there is recognition of the links between gender and climate change, outside of Sub Saharan Africa, few of the studies we review have a high level of gender engagement. If gender is to be engaged with at a high level, studies need to move beyond just recognizing that climate change impacts are often gendered, to critically examine the underlying social-cultural-political processes that determine differential vulnerability along gender lines, and influence the effectiveness and gender implications of adaptation.

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Chapter 3

Vulnerability and adaptive capacity of Inuit women to climate change: A case study from Iqaluit, Nunavut

1. Introduction

The impacts of climate change will not be gender neutral. Culturally defined gender roles influence human-environment interactions, creating different pathways through which climate change will affect livelihoods and well-being (Sultana, 2014; Dankelman, 2010). Climate change also has the potential to further exacerbate differentiated vulnerability by gender (Alston 2014; Denton, 2002). Although the literature on climate change and gender is expanding, it remains broadly focused and generalized, with few studies actually examining how gender influences the experience and response to climate change in different geographic contexts and among different populations (Arora-Jonsson, 2011; Bunce and Ford, in review; Demetriades and Esplen, 2008). This gap is particularly noticeable in high income nations, with a recent review indicating that only seven studies focus explicitly on the gendered nature of climate change impacts in North America and eight in Europe (Bunce and Ford, in review). By comparison, the gender and climate scholarship is more advanced in Sub-Saharan Africa and emerging rapidly in Asia (Bunce and Ford, in review).

One region of particular interest for the gendered nature of climate change impacts is the Arctic, which is experiencing the most rapid climate change globally (Larsen et al., 2014). Here, gendered roles in Indigenous communities are expected to result in quite different vulnerabilities among men and women (Ford, 2012). Among Inuit communities, for example, where much of the work on the human dimensions of Arctic climate change has been conducted, research has identified heightened susceptibility to climate change impacts for those engaged in traditionally male dominated land based activities such as hunting, fishing, and trapping (Furgal and Seguin, 2006; Ford et al., 2010; Pearce, et al., 2011; Ford et al., 2013; Cunsolo Willox et al., 2012). The female experience of climate change has been largely overlooked, however, with just three peer reviewed articles having an explicit female focus, with an emphasis on food systems and documenting observations of change (Beaumier et al., 2014; Beaumier and Ford, 2010; Dowsley et al., 2010). Although the literature often lacks a detailed examination of the climate change experience of Inuit women, research occasionally highlights aspects of their experience; Harper et al. (2015) found that Inuit women were more likely to report feeling angry, scared, and frustrated by environmental change than Inuit men.

Traditionally, female roles in Inuit society were largely focused on providing for the family through activities surrounding the home (e.g. caring for children, processing food, making clothing) (Billson and Mancini, 2007). Many of these activities remain important, and have expanded in-light of sweeping socio-cultural changes affecting Inuit communities since the 1950s/60s to include engagement in waged employment (Billson and Mancini, 2007; Chabot, 2003). Indeed, in many households, Inuit women are often the main income earners; a role that often underpins household hunting activities by providing access to financial resources but also reduces the amount of time women have for engaging themselves in traditional activities (Billson and Mancini, 2007; Wenzel, 2000). Reflecting these roles, it may seem that women are less exposed and sensitive to climate change impacts than men, although, as noted above, few studies have explicitly

examined the female experience of climate change in contemporary Inuit settlements or explored their potential vulnerabilities in-light of projected future change (Ford et al., 2012).

In response to this gap in understanding, we examine the current vulnerability and adaptive capacity of Inuit women to climatic change, drawing upon a community case study from Iqaluit, Nunavut, Canada. Structuring the research using a 'vulnerability approach,' (Ford and Smit, 2004) we document the observations of environmental change noted by Inuit women, and examine how these changes, in combination with socio-economic conditions and processes, are affecting livelihoods and well-being.

2. Methodology

2.1 Vulnerability Approach

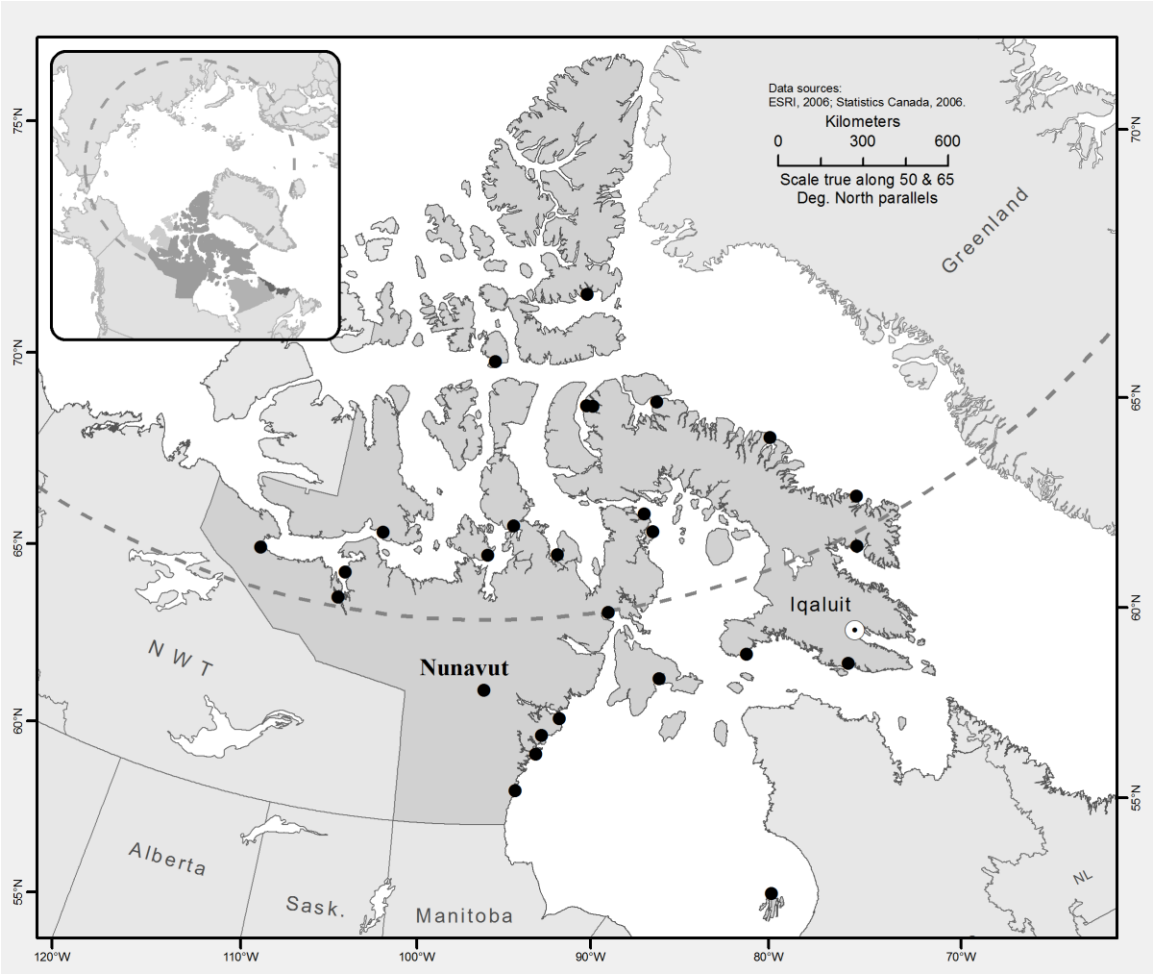
This research uses a 'vulnerability approach' to identify and characterize how Inuit women experience and respond to climate change impacts in the context of multiple stresses. Vulnerability can be defined as the capacity to be wounded, and is derived from the Latin verb *vulnerare,* meaning "to wound" (Smit and Wandel, 2006; Kelly and Adger, 2000). Drawing upon a contextual framing, we view vulnerability as a function of both exposure and sensitivity to climate change impacts, and adaptive capacity to manage these impacts (Adger, 2006; Ford and Smit, 2004; Smit and Wandel, 2006; O'Brien et al., 2007). In the context of the focus on Inuit women here, *exposure* can be understood as the nature of climate-related risks that directly or indirectly affect the lives of women (e.g. magnitude, frequency, spatial extent, timing etc of climate-related risks). *Sensitivity* captures the factors which differentiate susceptibility to exposures among women depending on livelihood conditions and strategies, gender roles, and household and community characteristics, and determines the pathways through which exposure will affect women (Ebi et al., 2006; Ford et al., 2010; Sherman et al., 2015). *Adaptive capacity* captures the ability to manage and respond to climate-related exposure sensitivities, including the ability to take advantage of new opportunities (Ford and Smit, 2004; Smit and Wandel, 2006).

The recognition of the role of adaptive capacity and sensitivity expands the scope of vulnerability studies to consider the role and importance of non-climatic factors in amplifying or attenuating vulnerability (Ford et al., 2010b). As such, vulnerability is not just a function of climate change, but is affected by social, economic, cultural, and political conditions and processes that operate at multiple scales over space and time. (Turner et al., 2003; Ford et al., 2013; Fazey et al 2010). While critiqued by some to imply a focus on negative impacts or for establishing people as passive victims (e.g. Cameron, 2012; Haalboom and Natcher, 2012), it is noteworthy that vulnerability approaches focus attention on the complex interaction between human and biophysical factors affecting how climate change interacts with human systems, drawing upon a long history of vulnerability research in the natural hazards field (Pearce et al., 2015; Ford et al., 2013; Ribot, 2011, 2014). Indeed, the use of a vulnerability approach does not imply an *a priori* focus on the negative, with many studies using a vulnerability approach indicating substantial resilience and agency at a community level (Ford et al., 2010; Ford et al., in press).

This study focused specifically on identifying and characterizing the current vulnerability of Inuit women in Iqaluit, Nunavut, to changes in climate already experienced. This approach can help us develop a deeoer understanding of how social and biophysical processes shape vulnerability, and establish a range of possible societal responses to future change (Fazey et al., 2009, 2015; Ford et al., 2010; McLeman and Hunter, 2010; Hofmeijer et al., 2013; Sherman et al., 2015). Examining future vulnerability in light of projected climate change, however, is beyond the scope of the paper, and will be the focus of future work.

2.2 Iqaluit case study

Figure 1. Iqaluit, Nunavut



The case study community of Iqaluit is located in the Qikiqtaaluk or Baffin region of the Canadian territory of Nunavut (Figure 1). Since becoming the territorial capital in 1999, the community has experienced substantial growth in terms of population and infrastructure (Table 1) (Searles, 2010; Government of Canada, 2013). As the largest community in Nunavut, Iqaluit has a large non-Inuit population (41% non Inuit, 59% Inuit (Government of Canada, 2013)), a hospital, and a diversity of other social services,

such as shelters and food banks; as such, the community is quite different from smaller Inuit communities where much of the human dimensions of climate change research has been conducted (Searles, 2010; Ford et al., 2012). Inhabitants come from diverse backgrounds and geographical locations, often moving to Iqaluit for economic or social reasons (Searles, 2010). While much of the community is engaged in some form of wage work, hunting and other harvesting activities remain a key part of community life (Ford et al., 2012). Women in the community are highly engaged in the labour force both formally in the service industry and in Iqaluit's large government sector, and informally through providing childcare or earning an income through traditional art and craftwork. Many women engage in their community through volunteer work and there is a growing number of Inuit women entering the political sphere at all levels of government (Minor, 2002).

Table 1. Community and Territorial characteristics based on 2011 census data

	Iqaluit	Nunavut
Population		
Population	6,699 (47%)	31,906
Inuit population	3,881 (14%)	26,100
Female population (both Inuit and Non-Inuit)	3,150 (19%)	16,395
Proportion of population who identify as Inuit	59.1%	85.4%
Median age of population	30.0	24.1
Economy		
Total population age 15 and over in the labour force	3,925 (29%)	13,485
Population age 15 and over without income or income less than $27,815	35.5%	55.5%
Percentage of population who rent their home	76.7%	79.0%
Education		
Percentage of population with no educational certificate, diploma, or degree	25.7%	48.1%
Percentage of population with a high school diploma	15.4%	11.7%
Percentage of population with a postsecondary diploma, certificate, or degree	58.7%	40.2%
Percentage of population with a university degree	25.4%	12.6%

2.3 Data Collection

A mixed methods approach was employed to incorporate the knowledge and observations of female Inuit residents in Iqaluit (Iqalummiut) and key informants to document and characterize current exposure, sensitivity, and adaptive capacity.

2.3.1. Interviews with Iqalummiut women

Semi-structured interviews (n=42) were conducted with Inuit women who were currently living in Iqaluit. Interviewees were recruited using a snowball sampling method, aimed at recruiting Inuit women over the age of 30 who had a hunter in their family. The focus on households with a hunter reflected interest of the research team and community collaborators on vulnerabilities specifically around harvesting activities, and belief that it is through such activities that households will be most affected by climate change (Berkes and Jolly, 2002; Furgal and Seguin, 2006; Ford et al., 2010). Research assistants,

stakeholders, and other community members recommended women who in turn recommended other potential participants. An open-ended interview guide was developed as a framework for the interviews (Table 2), structured using the vulnerability framework, and was pre-tested for content and context with multiple academics, research assistants, community members, and stakeholders. Questions were wide ranging, and sought to: i). document observed changes in climate, the environment, livelihoods, and culture (exposure); ii). examine implications of these changes on community life and well-being, and identify factors resulting in differential impact (sensitivity); iii). identify and characterize strategies and coping mechanisms used to plan for, adapt to, and manage these changes (adaptive capacity); and, iv). identify potential future impacts of climate change. Participants were encouraged to reflect not only upon these questions from their own personal experiences and recollections, but also from the perspectives of previous generations (mothers, aunts, and grandmothers). Interviews were conducted in the interviewee's preferred language (English or Inuktitut).

Table 2. Key themes in interview guide with examples of types of questions asked under each theme

Key Theme	Types of Questions Asked
Exposure	• Have you noticed any changes to the land since you were a child? • How has Iqaluit changed in the last 10 years?
Sensitivity	• How do you feel about change X? • Do you think women experience change X differently than men do? • How has this changed over time?
Adaptive Capacity	• Is there anything you do differently now because of change X? • What do you do to make yourself feel better when you are experiencing stress?

2.3.2 Participant Observation

Informal discussions, participant observation, and participation in various activities were undertaken by the lead author while in Iqaluit to provide insight into how environmental and social changes impact the ways in which Inuit women experience their gender in contemporary Iqaluit. Spending time in the community for ~5 months, allowed for particular insight into the dynamics of spousal relationships, childrearing practices, and the triumphs and struggles of being a working mother in the community. This provided important contextual information on how daily life is affected by environmental and social change. Experiences and observations were recorded in a field notebook.

2.3.3 Focus Groups Discussions

Two stakeholder focus group sessions were held and attended by federal, provincial and municipal government employees from a variety of sectors, along with employees of Northern science organizations and Indigenous organizations to whom this work was relevant. Each group had a diverse representation of age, gender and ethnicity. In each session the goals of the research were explained and focus group participants were asked to comment on how Iqaluit was changing for women and how environmental changes

may be impacting women. These focus groups generated insight into stakeholder priorities and perceptions, and provided comparison to the priorities and perceptions of female Inuit interviewees. The focus groups were the only time non-Inuit individuals as well as Inuit and non-Inuit men contributed to this project.

2.3.4 Photovoice

Interview participants who indicated interest in the research were invited to participate in a photovoice exercise (n=3), which aimed to develop a detailed and more in-depth understanding of the lives of Iqaluit women in-light of rapid social and environmental change being observed. The lead researcher had worked previously with the three women as part of a previous project, and this relationship allowed for frank and in-depth discussions on the topic.

The photovoice methodology built upon previous work conducted in Iqaluit and other studies with women in cross-cultural contexts (Harper et al., 2015; Healey et al., 2011, Lardeau et al., 2011; Palibroda et al., 2009), and began with a workshop outlining the method and introduced participants to photography skills such as lighting, composition, and camera settings. A local photographer led the photography portion of the workshop. Participants decided what the focus of their photovoice research would be as a group. Already primed from the semi-structured interviews, the women were aware of the focus of the research and decided their research would focus on the question "What makes it difficult for Inuit women to deal with changes in their lives?" While the question was not specific to climate change, the aim was to develop broad insights on contextual factors relevant for determining vulnerability and adaptive capacity to a variety of stresses, included those related to climate. After practicing with the cameras, the participants left for the week with the goal to take photographs in response to the question above. On completion, each participant then chose four photographs that were then discussed amongst the group.

Using Wang's (1999) SHOWeD technique, participants were asked to discuss what was happening in each picture, how it related to their lives, why the issue(s) highlighted in the photograph exists and what could potentially be done about this issue. Building on discussions in this workshop, the women collectively decided to continue taking photographs in response to this question over the next five months. However, five months later it was difficult to gather the women together to discuss the photos they had taken: two of the women were full time working mothers and had limited time free to meet, the third woman was struggling with personal challenges. The reality of these three women's lives further articulated some of the issues they had highlighted in the first Photovoice workshop. Instead of meeting in a group, the lead author arranged individual meetings with two of the women to discuss their photographs.

2.4 Data Analysis

Data were analyzed using thematic analysis with descriptive and analytic codes used to organize the data (Hay, 2000). This process was done using ATLAS.ti, a software program designed for coding qualitative research. Interviews were transcribed and coded for main themes using key quotes and written memos, with master codes following the vulnerability framework. Data from the focus groups and the Photovoice discussion

sessions were coded for main themes using key quotes and written memos. Overall, data analysis focused on the depth of content.

Some quantitative data were extracted from interviews, such as age, relationship status, current employment, housing status, etc., which provided a profile for each interviewee and an overall numerical picture of interview respondents. Descriptive statistics were used to analyze these quantitative data.

3. Results

In this section we begin by outlining the participant profile, before presenting results structured using the vulnerability framework.

3.1 Participant profile

Women with a diversity of life experiences and lifestyles were interviewed in an effort to capture a wide range of experiences. Of the Inuit women interviewed (n=42), the majority were in a relationship (n=32). Interviewees were mostly long-term Iqaluit residents, with 92% (n= 39) having lived in Iqaluit for over 20 years and 41% (n=17) having lived in Iqaluit their entire lives. The majority of interviewees stated that most of their extended family lived in Iqaluit (n=28). Although efforts were made to interview women from a variety of socio-economic backgrounds, the vast majority of women interviewed live in low-income households, working in low paying jobs and often the only members of their household bringing in a consistent income. Despite the low levels of income, 61% (n= 26) of interviewees were employed, with the 46% (n= 19) employed full time. The majority of interviewees rented their homes (n=34) and 77% (n= 32) had children and/or grandchildren living in their home.

3.2 Exposure

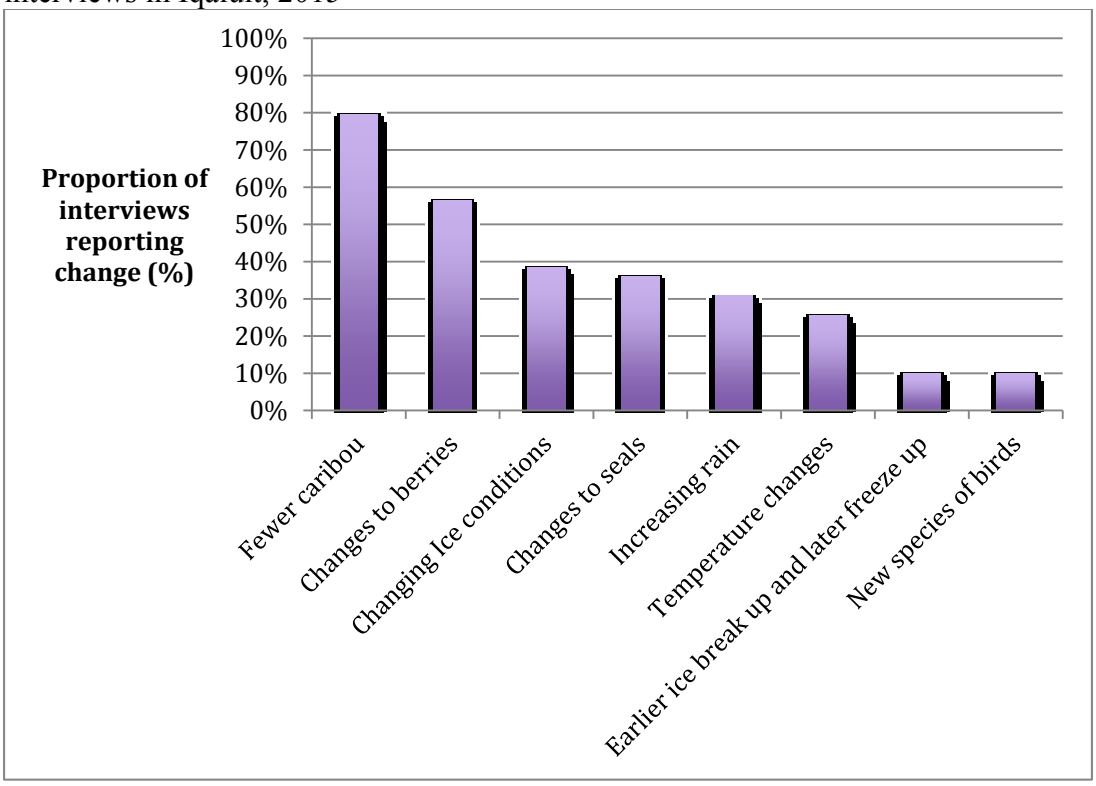
3.2.1. Observations of a changing environment

"It's not just scien[ce], it's not just somebody telling us the ice is melting; we're actually living it here." - Interviewee #101335, University-educated grandmother

Consistent with research across the North, women in Iqaluit were experiencing considerable environmental changes in and around the community. While interviewees did not always explicitly link these changes to longer term climate change, many of the observed changes are consistent with those identified as symptomatic of longer term directional change in the scientific literature. Ten changes were reported by more than one participant (Figure 2), with declining caribou populations the most frequently reported, noted by 80% of interviewees. Women expressed that particularly over the last 10-15 years, there have been significantly fewer caribou in the surrounding area, which has reduced access to this highly sought after country food. This observation is consistent with studies which have reported a >95% decline in the South Baffin caribou population in the last 20 years (Jenkins et al., 2012). While respondents described caribou populations in Iqaluit to be cyclical, fears were expressed that the current decline could be linked to observed changes in snow and ice regimes as well as increases in resource

extraction in the region. Indeed, the broader scholarship has identified how changes to snow and ice cover, more frequent rain-on-snow events, and mining development can have detrimental long-term impacts of caribou populations (Callaghan et al., 2012; Cameron et al., 2005; Boulanger et al., 2012). After caribou, interviewees most frequently mentioned changes to berries (56%), noting they have been smaller, seedier and less abundant since their childhood and particularly in the last three years. Berries are discussed in greater detail in section 3.3.1.

Figure 2. The main changes in environmental conditions reported by Inuit women during interviews in Iqaluit, 2015



Sea ice was described as being thinner, with interviewees expressing concern about how fast the ice melts in spring as well as the way in which the ice is melting. Women observed that the ice is melting from below, a phenomenon which was described as new: "The ice breaks up early and it's always thin now, not like it used to be"(Interviewee #190450, middle aged, life-long Iqaluit resident). Thin ice and early break up were described as creating more dangerous travel and reduced time spent on the land. Records of the number of ice free days and stable ice days align closely with these observations; since the early 1980s in Iqaluit, the number of ice free days has steadily increased, while the number of stable ice days has fallen over the same period (Ford et al., 2013 [supplemental data])

Interviewees often noted changes related to seals, particularly regarding their fur and population size. Women reported sealskins to be thinner and with shorter fur (Interviewees #225707, #183554, #154335, all older women, who have lived in Iqaluit their entire lives or for more than 20 years). Some interviewees also mentioned that seals

now have less fat than in previous decades, and many stated that seals did not seem to be as abundant as they once were. The scientific literature on seal populations in the eastern Arctic suggests that numbers may be in decline due to loss of sea ice, which plays an important role in the life cycle of Arctic seals (Ferguson et al., 2005; Kovacs and Lydersen, 2008). One woman linked this population change to increasing numbers of orcas (*Orcinus orca*) in the region, while others suggested these changes may be related to mining development. Similar observations are evident in other regions. In Hudson Bay, for instance, orca sightings are increasing as the sea ice opens up, allowing orcas to expand their predation range (Higdon and Ferguson, 2009; Nancarrow, 2010). Seal habitat disturbances related to economic development, such as an increase in shipping or air traffic, have also been found to result in behavioural changes among Arctic seals more generally (Frid and Dill, 2002).

Increasing temperatures, which have impacted snow and frequency of rain were mentioned in 10 interviews (26%). These observations are consistent with other studies that have documented a trend of rising average temperatures since the1980's (Ford et al., 2013 [supplemental data]). Increased incidences of rain were reported to be associated with changes to berry harvests, as too much rain was explained as having a negative impact on fruiting and flowering cycles. Freezing rain during spring and summer months, a previously rare phenomenon, was also described as becoming more common, an observation also supported by academic literature which has found the frequency of freezing rain increasing across the Canadian Arctic likely due to rising air temperatures (Hanesiak and Wang, 2005). Generally, weather was described as less predictable. As one interviewee stated: "It's hard to tell what the weather is going to be" (Interviewee #134806, middle aged homeowner).

Ten percent of interviewees described seeing new species of insects, birds, and plants around Iqaluit. Increasing numbers of mosquitoes were said to be particularly bothersome and discouraged some women from spending time on the land during summer months (Figure 3). Participants also described seeing mammals that were previously less common in the area, such as polar bears (*Ursus maritimus*) and orcas, more frequently around the mouth of Frobisher Bay.

Figure 3. Photovoice photo of tent in Apex area of Iqaluit taken by Ooloota "There are so many mosquitoes… They're huge already!"

3.3 Sensitivity

Through interactions with the socio-economic realities of contemporary Iqaluit and gender roles of women, the environmental changes documented in section 3.2 are affecting aspects of traditional activities women in the community engage in. Three livelihood activities emerged as being particularly sensitive to climate change: berry picking, sewing, and the amount of time women are able to spend on the land. The mental health impacts of the changes to these three activities were also discussed as a sensitivity of particular importance.

3.3.1 Berry picking

"[I feel] calm. [Berry picking] just makes you think a lot. Sometimes [you] don't think at all." – Interviewee #134806, middle aged homeowner

Berry picking is a female dominated land-based activity and more commonly documented poor berry seasons have had a particular effect on Inuit women in Iqaluit. "With there being less berries I think that impacted women more than men. Because …. more women go berry picking than men" (Interviewee #134806, middle aged homeowner). Women often engage in berry picking while men are hunting and it is an activity well suited to simultaneously caring for children (Billson and Mancini, 2007). Interviewees described berry picking as a widely accessible activity, which gives women a quiet space to relax, chat with female friends, and de-stress by losing oneself in the repetitive motions of picking. Around Iqaluit, crowberries (*Empetrum nigru*), blueberries (*Vaccinium cyanococcus*), and blackberries (*Rubus arcticus*) are picked and tend to be eaten on their own after being freshly picked, or mixed with animal fat. Occasionally they

will be added to recipes where "southern" berries might be commonly used, such as pancakes, pies, or jam, but more often they are eaten on their own without processing. Berry picking usually takes place within the immediate vicinity of Iqaluit or a camp out on the land. Women either walk to the spot or are taken there via boat or occasionally an all-terrain-vehicle (ATV). Unlike other land-based activities, such as hunting, berry picking does not necessarily require access to a costly snowmobile or boat, and does not necessitate taking time off work or conflict with childcare duties. Anyone with a spare hour, a bucket and the ability to walk to a nearby berry picking spot can participate in this activity. However, this accessibility was described to be changing.

When asked how the environment has changed since their childhood, 56% (n=24) of women identified berries as having changed. Interviewees explained that "bad" berry years – years when berries were smaller, seedier, and scarcer – had become more frequent in the last two decades. "Good" berry picking spots – defined as areas where berries were plentiful and plump – are now harder to find and located further from town. Berries, which fruit in the late summer and early fall, were described as being particularly sensitive to small climatic variations, with too much or too little moisture during the winter months, and too much or too little heat being identified as resulting in "bad" berry years. These observations are well supported by academic literature, which also finds that moisture variations during the winter and warm temperatures can impact fruiting and flowering cycles (Cavaliere, 2008; Downing and Cuerrier, 2011; Harper et al., 2015; Kellogg et al., 2010).

> "The berries used to be awesome – consistently no problem. Every August, no problem. But in the past years either they're not ready or they're not ripe or not abundant as they used to be in the past. We've been having really strange summers. Either not enough rain or not enough sun." (Interviewee #151649, middle aged, middle income mother).

Indeed, temperature has been noted to impact the fruiting and flowering cycles of Arctic plants, with studies showing that some species may flower and fruit earlier as a result of warming temperatures (Downing and Cuerrier, 2011; Murphy, 2014). High berry yields are also dependent on adequate winter precipitation (in the form of snow) (Kellogg et al., 2010). These observations have also been made in Nunatsiavut, where community members have found that berries are ripening earlier and rotting quicker due to temperature increases (Downing and Cuerrier, 2011; Harper et al., 2015), and in Akutan and Point Hope, Alaska, where the community has noted the quality and abundance of berries to be dependent on climatic fluctuations (Kellogg et al., 2010). Many interviewees expressed that some "good" berry picking areas can still be found across Frobisher Bay, although accessing these areas requires access to a boat. A contributing factor to these geographical differences in berries may be related to the slightly warmer micro-climate which occurs on the southern side of Frobisher Bay which also receives more rain than the area directly surrounding Iqaluit (Hanesiak et al., 2010; M. Thomas, personal communication, June 20, 2014)

Compounding the ecological changes berries are experiencing, many women expressed the loss of good berry picking areas to the expanding infrastructural development of Iqaluit. Many women stated that houses or buildings now occupy their

favourite berry picking spots, as the Plateau and 'Road to Nowhere' neighbourhoods have expanded. As the community has expanded, so too has the population, something consistently stated by interviewees. An increasing population puts further demands on the limited supply of berries. Overall, interviewees expressed great disappointment in the changes occurring in berries. "Last year it was depressing" stated one interviewee when referencing the previous year's berry harvest, while another woman stated that not having berries "made me feel sad."

3.3.2 Sewing

"When you're sewing and you're making something productive and you finish it you feel good about yourself. I'm giving it to the family or relatives that [I] care [for] and love. When you finishing something that you really finish and you're proud of it and you made it perfect, you're proud of yourself in your own way" – Interviewee #130909, low income, middle aged mother

Largely dominated by women, sewing has historically been important to the survival of Inuit communities in the Arctic (Billson and Mancini, 2007; Oakes, 1992). Today, sewing remains a key part of Inuit female identity and an activity that contributes to the family in a multiplicity of ways (Billson and Mancini, 2007; Issenman, 2011). Sewing played a diversity of roles in the lives of the women interviewed, and was described as providing for their family using traditional skills, both in terms of physical items and economic gain. Interviewees often sew clothing for their family, largely focusing on outdoor wear such as parkas, amautiit (traditional coats with space for carrying children on one's back), mitts and kamiks (traditional waterproof boots made of sealskin). At the same time, sewing also provides many women in Iqaluit with income, as they sell their craft items to other members of the community or people passing through Iqaluit. This craftwork was described as providing an important, albeit inconsistent, income for women who are skilled, although some interviewees expressed concern about market saturation.

While many women sell products through word of mouth, at local craft fairs, restaurants, and in other public spaces around town, Facebook is emerging as a space where craft items can be sold to an expanded market. Interviewees described the importance of Facebook groups such as "Iqaluit Auction Bids" and "Iqaluit Sell Swap" to provide women in Iqaluit and other communities with a space to advertise their craftwork and access markets beyond Iqaluit.

Beyond sewing's practical provisional role, the vast majority of women interviewed stated how important sewing is for their mental health and well-being as well as strengthening their Inuit identity. Having the knowledge and skills to create warm, beautiful clothing for loved ones was reported by many interviewees to give them considerable confidence and pride while fulfilling traditional Inuit female roles. Women consistently emphasized the important role Iqaluit's Tukisigiarvik Friendship Centre plays in fostering sewing skills, particularly traditional skewing skills, in the community through their sewing classes. Interviewees also described the pride and appreciation older women in the community had for women who sew, further cementing the importance and status gained by ones ability to sew.

While sewing reinforces Inuit identity it also acts as a method of relaxation and decompression. As one middle aged interviewee described it "[Sewing is] just like meditation. Where you can't think, it's like 'I just want to [focus on getting] this done.' It's like meditation I guess" (Interviewee #134806, middle aged homeowner). The majority of interviewees who sew echoed this sentiment, with one person stating the important role sewing and learning sewing skills can play in healing trauma.

Yet sewing with animal skins was described as being affected by changing climatic conditions. Some interviewees reported skins being thinner and more prone to ripping than they have been in the past. Furs were described as being more delicate than they once were, with the fur coming loose from the skin more frequently; an observation also made by Dowsley et al., (2010) in their paper on the potential effects of climate change on Inuit women. Thus it was described that while the same time and energy is put into a garment it may not last as long due to the quality of the skin which was discouraging for women (Interviewee #183554, low income elder). Studies in the scientific literature on seal skins and climatic factors are limited, although one recent study suggested that disruptions to seal pup development due to sea ice deterioration resulting from warming temperatures may negatively impact the density and length of harp seal (*Pagophilus groenlandicus*) fur (Gmuca et al., 2015). It has also been suggested that increased boating traffic can cause seals stress which may result in fur loss (G. Wenzel, personal communication, July 2, 2015). While interviewees mainly sew using ringed seal (*Phoca hispida*) pelts, some do use harp sealskin although interviewees never explicitly stated if these changes were being noted across all species or just one type.

Interviewees also reported reduced access to skins. With participants reporting less hunting due to increasing hunting costs, and more dangerous ice conditions, the majority of interviewees that sew described having to order skins from southern furriers or buy them in town from northern suppliers, rather than rely on hunters in the family to provide them. Additionally, only four of the 42 women interviewed (two over the age of 70 and two in their early 30s) knew how to clean skins. Many regretted not having this skillset, a sentiment indicative of the broader social changes affecting the role of Inuit women, and in turn sensitivity to a changing climate. Cleaning skins is a time consuming and physically demanding process that many interviewees reported having not learned, or did not have the time or energy to engage in, due to the demands of their roles as providers and caregivers. Older interviewees expressed concern that younger women were not learning how to sew and clean skins. One Elder stated that she feels "kind of angry inside and hurt" by the fact that fewer women are sewing than in the past (Interviewee 183554, low income elder). While there is often a concern in related literature that traditional skills are being lost (Billson and Mancini, 2007; Pearce et al., 2011), many women stated that they had first been introduced to sewing at a young age and then came back to it with renewed interest at a later age, often through a reintroduction to the craft by an older woman in their life.

3.3.3 Time on the Land

Figure 4. Photovoice photo of Sylvia Grinnell River taken by Napatchie. "Just to be out there is soothing"

"It's so comforting to be out there. So quiet and you can do things freely. Spend time with family, hunt." – Interviewee #154335, middle aged mother

Interviewees consistently expressed a strong desire to spend more time out on the land engaging in land-based activities, repeatedly emphasizing the positive impact these experiences had on their mental health. Of the women interviewed, only 15% (n=6) reported going on the land three or more times a month, compared to 31% (n=13) of interviewees who had spent time on the land a few times in the last year, 31% (n=13) of interviewees who had been out only once in the last year and 21% (n=9) of women who reported having not gone out in over a year.

While the majority of women interviewed preferred to spend time on the land in the spring and summer months, any time spent on the land was described as providing space to recalibrate and recharge (Figure 4). One interviewee stated when asked what she liked to do to reduce stress, "[I] really love that. Being away from chaos and craziness, peace and quiet. It really boots [me] up." (Interviewee #225707, grandmother and elder). Women also expressed a desire to take their children out on the land and cultivate in their children the fond memories they have in relation to the land (Figure 5).

The importance of getting out on the land for Inuit mental health and well-being is increasingly being recognized in the climate change literature. Cunsolo-Willox et al.'s work from Nunatsiavut (2012, 2013a, 2013b, 2014), for example, repeatedly highlights how place and interactions with place impact mental health and well-being in the context of climate change, while Durkalec et al. (2015) emphasize the key role sea ice plays in Inuit autonomy, health, culture, and knowledge. While time on the land was identified as having mental health benefits, poor physical and mental health of women and their partners can act as a barrier to the amount of time women spend on the land. Two interviewees grieving the death of family members described feeling too overcome by

their grief and depression to engage in time on the land. Many women noted that they had previously spent much more time on the land but a physical injury (e.g. broken ankle) or chronic health conditions (e.g. asthma) had severely limited their ability to get out. Similarly, if their partner suffered from chronic illness this also reduced the likelihood that the interviewee would spend time on the land.

Weather also impacts the time women spend on the land. Since many women in Iqaluit work, weekends become the most opportune time for trips on the land. If the weather or ice conditions during the weekend are not conducive to travel, weekend trips have to be cancelled or postponed. One woman stated that increases in rain were severely impacting her and her partner's ability to get out on the land. The impact weather can have on trips out on the land is echoed in similar work looking at male hunting experiences (Ford et al., 2013). A few interviewees also expressed concern about safety due to changing weather conditions, sharing harrowing stories of racing skidoos across thinning ice. These concerns were often relayed with commitments to limit trips on the land to times when weather and ice were seen as more predictable.

In regard to the limited time available for land based activities, two interviewees described the impact their employer had on the amount of time they were able to spend on the land; these employers recognized the importance of hunting and other land based activities and were flexible when it came to booking time off. Due to increasingly unpredictable ice break up times, one interviewee's employer allowed her to start her holidays on the first day it was possible to go boating. In addition to being limited by work commitments, interviewees' roles as mothers and engaged community members further constrained the time available to spend on the land. Many interviewees lamented this and it should be noted that the few women interviewed who regularly hunt do not have children living with them at home, freeing up time for hunting activities.

With many women limited to weather dependent weekend trips due to their work, family and community commitments, interviewees expressed a keen desire to spend more time on the land in their retirement. Although interviewees looked forward to this time, many women worried that their physical health may limit the time they would be able spend on the land in their retirement.

Despite the increasing numbers of women working, finances remain a substantial barrier to spending time on the land. Access to working equipment such as boats and skidoos had a large impact on whether women were able to get out on the land, and this equipment is expensive to own, use, and maintain. The majority of women did not have access to a snowmobile or boat, with only 44% (n=18) and 33% (n=14) of women reporting that someone in their household respectively owned a snowmobile or a boat. One interviewee explained the financial and emotional dilemma she faced in deciding to purchase a skidoo: "I couldn't afford it but I couldn't not get it. I wanted my granddaughters to start skidoo-ing" (Interviewee ##101335, University-educated grandmother). The high cost of equipment must be weighed against other purchasing decisions and with high living costs in the North there is great demand on financial resources. A younger interviewee talked about her desire to build a cabin to spend time at on weekends. This large financial investment in and of itself would also necessitate investing in both a boat and snowmobile in order to access the cabin, costs the interviewee was unsure she would be able to afford. While borrowing equipment is not

an uncommon practice, some interviewees expressed hesitation about borrowing, stating they felt shy asking to use equipment or go along on outings.

Figure 5. Photovoice photo of snow bunting eggs between rocks taken by Napatchie "Good memories. Just to see eggs like that as an adult I remember as a kid [being out on the land]"

3.3.4 Mental health and Inuit Identity

Mental health and well-being emerged as cross-cutting themes in many of the interviews, around which impacts of changing climatic conditions, in the context of social changes, were often described. Berry picking, sewing and spending time on the land were all described as having positive impacts on the mental health and well-being of women in Iqaluit; similar findings have been documented in smaller Inuit communities across the North, although not through a gender lens (Cunsolo Willox et al., 2013b; Cunsolo Willox et al., 2012; Harper et al., 2015; Petrasek MacDonald et al., 2013). From providing meditative spaces for contemplation and unwinding, to allowing women to provide for loved ones, to reaffirming women's Inuit identity, these three traditional activities are important aspects of women's lives. Interviewees expressed frustration, disappointment, sadness, and concern about the limited access to or time available for these traditional activities.

Women also emphasized the impact changing climatic conditions are having on the mental health of those around them. As a result of changes on the land, women reported that the men in their lives were increasingly stressed, which in turn causes stress among other family members. As one interviewee noted when talking about the ripple effect of changes to weather, "He['s] stressed, she['s] stressed" (Interviewee # 100711, older low income grandmother). Interviewees identified these high levels of stress being experienced by men as linked to less time spent on the land. Male stress and frustration with being "cooped up" were reported as being particularly high during hunting shoulder seasons (ice freeze up and spring break up) when being out on the land is more difficult

and dangerous, and work with male hunters in Iqaluit has identified a lengthening of these shoulder seasons (Ford et al., 2013). Women also identified that men had a harder time managing their stress in comparison to women. Interviewees stated that Inuit women are more likely to talk about their feelings while Inuit men, in line with traditional Inuit ideals of masculinity, tend not to readily share their feelings (Collings, 2014).

Due to poor ice conditions and unpredictable weather, some women also explained that they worry more when loved ones are out on the land, especially if their loved one is traveling alone (Durkalec, 2012; Harper et al., 2015). As a result, many women explained that they demand partners and other loved ones travel with at least one other person.

Food security also emerged as having an impact on the mental health and well-being of those interviewed. Women consistently described "craving" country food and how not having it, or being unable to regularly feed it to their family, made them feel disconnected from their Inuit identity. Conversely, women described the joy and satisfaction they felt when they were able to eat country food. The majority of women interviewed stated that they ate less country food today than they did during their childhood. Women also expressed concern that environmental changes and economic development were affecting the animals around their community and their access to these animals.

"I don't want [the] animals... to go away. I like to eat country food. It makes me feel sad, like, very sad" (Interviewee #180848, low income life long Iqaluit resident)

The distress caused by food insecurity often went beyond the interviewee and her immediate family: one interviewee began to cry when describing the food insecurity experienced by Iqalummiut and many women described buying and sharing food (both country food and store bought food) outside of family sharing networks. Concerns about food security in Inuit communities in a changing climate have been more broadly noted in the literature (Chan et al., 2006; Furgal and Seguin, 2006; Cunsolo Willox et al., 2014; Lardeau et al., 2011; Statham et al. 2015).

3.4 Adaptive capacity

While Iqaluit women face a number of sensitivities to changing climatic conditions, many interviewees also mentioned coping mechanisms they are using to manage them. In response to "bad" berry seasons, women commonly reported going berry picking earlier the year following an unproductive berry year as they have noticed berries fruiting earlier. This earlier fruiting is consistent with warmer temperatures, which cause berries to ripen earlier. Interviewees also reported going to other areas in search of berries, although this was dependent on the accessibility of those areas. Since many of these "good" berry picking spots are located across Frobisher Bay or further from town, access to a boat, ATV, and/or snowmobile were often described as being necessary to get to these sites. Women reported that by going earlier and to other areas they had greater success getting berries. In one extreme case an interviewee explained that a friend charters an annual weekend flight to Kimmirut (a 35 minute flight) open to her family and friends for the explicit purpose of going berry picking. While other activities, such as

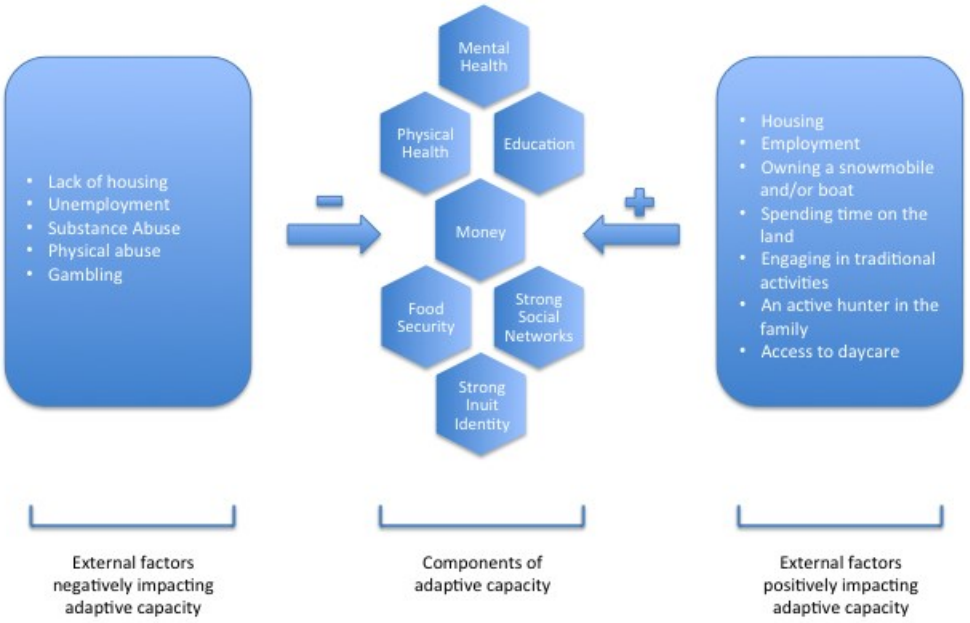
visiting family and friends undoubtedly occur on this trip, the approximately $200 per person group chartered flight is organized for the explicit purpose of going berry picking.

Faced with fragile sealskins, interviewees frequently reported being gentler when working with the skins or purchasing skins from furriers in the south. Women also reported that older female family members recommended simply throwing away sealskin that was overly delicate, as this would not make lasting clothing items. While being careful with skins and throwing away those that would not last may help to a certain degree, many interviewees were resigned to the fact that their sewn items may not last as long as they were once expected to. Other responses have involved developing alternative activities. For example, as spending time on the land has become more difficult for women, many interviewees described a method of replicating the peaceful atmosphere they experience when out on the land by taking walks around town, or a short distance from town, on the tundra. These short walks were accessible regardless of one's work schedule, family commitments, weather and ice conditions, and did not have the economic barriers associated with going further afield. Although these walks were not seen as a replacement for time out on the land, they did allow women to connect with themselves and their environment.

Coping strategies documented in light of mental health burdens often reiterated the importance of previously mentioned activities being impacted by change such as spending time on the land, sewing, and engaging in other traditionally female dominated activities, such as berry picking. Going for walks, reconnecting with family and friends were also commonly mentioned, as were less positive coping strategies identified by interviewees such as drinking and excessive gambling. One interviewee explicitly stated that she prefers to spend time on the land when she is experiencing stress in her life, but when she is unable to go out on the land she will drink instead to release her stress (Interviewee # 104529, older grandmother).

As these examples demonstrate, not everyone is equally able to cope with changes being observed, and during interviews, focus groups and the photovoice workshop, participants were asked to identify and describe what helped them deal with change and stress in their lives, particularly the impacts of changing climatic conditions. Seven key interacting factors were commonly reported to influence adaptive capacity of Inuit women, noting these factors also influence sensitivity to changing climatic conditions: mental health, physical wellness, a strong western and/or traditional educational foundation, money, strong social networks, and a strong connection to Inuit identity (Figure 6). These factors, in turn, are affected by the broader social-economic-political factors over which households have limited control, and either support or impair the adaptive capacity of Inuit women in Iqaluit.

Figure 6. Components of adaptive capacity and the interacting positive and negative factors



As highlighted in section 3.3, traditional activities such as berry picking, sewing, and spending time on the land have positive impacts on *mental health*, but these activities are not as accessible as they once were for women in Iqaluit. Relationships to the land, sea ice, and land-based activities are well established as facilitating positive mental health and well-being (Cunsolo Willox et al., 2015; Durkalec et al., 2015; Petrasek MacDonald et al., 2013). Women with poor mental health, such as those suffering from depression, were less able to manage the changes discussed, with some describing coping mechanisms linked to substance abuse. Similarly to mental health, the *physical well-being* of women impacts all aspects of their lives. Poor physical health, especially chronic health conditions, were regularly identified by interviewees as impacting their ability to earn an income, participate in excursions on the land, and engage in traditional activities. Women identified that having adequate housing, appropriate for the size of their family had a positive impact on their mental and physical well-being. Conversely, those living in overcrowded homes or homes in disrepair expressed high levels of stress. Academic literature also supports this finding, with housing being identified as a determinant of health in Nunavut and overcrowding associated with poor health and well-being (Healey and Meadows, 2007; Minich et al., 2011).

Substance abuse and domestic abuse was clearly shown to have a detrimental effect on women's adaptive capacity as this puts stress of mental and physical health, financial resources, and social networks (Healey and Meadows, 2007). The issue of domestic violence is well recognized throughout Nunavut and has been among the top priority of

Pauktuutit, which represents Inuit women in Canada, since 1984 (Pauktuutit, 2015). Unfortunately domestic violence rates in Nunavut are among the highest in Canada and although no official substance abuse rates exist for Nunavut, anecdotally they are believed to be high (Family violence in Canada: A Statistical Profile, 2008).

Interviewees regularly discussed the impact of *education*, or lack thereof, had on their lives. In terms of western education, many interviewees had not graduated high school, describing the frustration they felt having to learn in English, when Inuktitut was their mother tongue. High school graduates qualified for a wider variety of jobs, as well as positions with a higher income. However, western education is not the only signifier of high levels of adaptive capacity: women with a strong traditional education also showed clear signs of adaptive capacity. These women were able to tap into traditional methods, skills, and activities which could provide income and lead to a variety of opportunities. Having a strong traditional education also resulted in women being more able to engage in traditional activities, subsequently reinforcing mental well-being. Women with a strong background in both western and traditional educations tended to describe a greater number of alternative methods or solutions when faced with environmental and social changes as a result of their dual understanding of both traditional and western systems.

Financial security in terms of access to cash and credit was important in women's ability to manage the impacts of change. Women reported that financial flexibility allows for greater flexibility in multiple areas of their lives. Having access to financial resources allows women to take advantage of unexpected good weather for trips out on the land, with a lack of money for gas, supplies, or equipment often cited as barriers to adapting among those on lower income. For example, one interviewee described renting a boat, despite the high cost, to take her family members out clam digging during good weather (Interviewee #101335, university-educated grandmother). Interviewees repeatedly expressed the barrier they faced in spending time on the land if they did not have access to a snowmobile and/or boat. Yet, as described above, time spent on the land has significant mental health benefits for women and women consistently emphasized their desire to spend more time out on the land, illustrating the interrelationship between various determinants of adaptive capacity.

Access to money helps women support the hunting activities of family members, enhances food security through access to both store bought food and the ability to buy country food if needed, and enables them to buy supplies needed for their sewing (e.g. buying skins from furriers) and other craftwork. Other research from Iqaluit has similarly identified limited access to cash resources as making households more sensitive and constraining adaptive capacity to changing environmental conditions (Statham et al. 2015; Ford et al. 2012). One significant threat to women's financial security in Iqaluit is gambling, which commonly manifests among Inuit women as bingo, games of poker, or patii (a card game), and often provides a fun social atmosphere for women, but can become financially damaging (Billson and Mancini, 2007). Access to cash and credit is dependent on steady employment of at least one individual in the family, if not the woman herself. Having good mental and physical health, and access to daycare for mothers with young children, was consistently identified as being important to women's ability to earn an income. Employment can also positively reinforce the mental health of employed women who were satisfied with their work.

Having a *strong social network* of family and friends to rely on emerged as a key aspect of women's adaptive capacity. Interviewees often spoke of the support they receive from family members and friends with everything from accessing country food, to childcare, to housing. For women who do not own or have access to a snowmobile or boat, social networks played a key role in women's opportunities to spend time on the land. Having family and friends who lent out their equipment or offered to take interviewees and their children out, increased women's ability to take advantage of good weather or access "good" but remote berry picking sites. The importance of social networks in facilitating adaptive capacity to many stressors, both social and biophysical, is well acknowledged, especially among youth and Indigenous populations (Heaney and Israel, 2008; Petrasek MacDonald et al., 2013; Richmond et al., 2007; Wexler et al., 2014).

Social networks also play a particularly important role for women by filling Iqaluit's daycare gap, with many family members and friends taking care of children in lieu of certified daycares. Gaining access to affordable and adequate daycare is difficult in Iqaluit. Despite the large and growing population of children under the age of six, only six licensed daycares currently exist in Iqaluit, all of which have long waiting lists (Omik, 2011). As more women are working, or would like to work, the availability of adequate childcare has a substantial impact on both their ability to work, their mental health, and their financial security. Some woman reported that they were unable to work until their children were accepted into a daycare program or started school.

Interviewees repeatedly emphasized the importance of having access not only to *sufficient food*, but also to culturally relevant country foods such as caribou, seal meat, and berries. Having adequate nutritious food leads to better physical and mental health, and if the food is country food, then this was found to reinforce links to culture and mental health, as also noted more broadly in the literature (Cunsolo Willox, 2012; Lardeau et al., 2011; Statham et al., 2015). Connected to food security, the presence of an active hunter in the immediate or extended family was also described as increasing the likelihood of regular access to country food, although the hunter still had to have the time, equipment and resources to go hunting.

Having a robust and strong social network allowed women to make use of Inuit sharing systems for both country food and store bought food. The high cost of store bought food was frequently mentioned as impacting both the mental and physical health of women and their families. Access to a snowmobile and/or boat helped support women's access to country food as well as strengthened their cultural identity, both through increased time on the land and consumption of culturally important food.

Women who expressed a strong *connection to Inuit culture* described feeling more able to respond to changes in climate, and more broadly the stresses facing their lives, while interviewees that expressed feeling distant from their Inuit identity reported struggling to cope. This finding mirrors that of Healey and Meadows (2007) who found tradition and culture to be a key determinant for the health of Inuit women. Engaging in traditional activities, such as sewing, spending time on the land, and going berry picking, was consistently reported by interviewees as strengthening their identity as an Inuk woman and their mental health. In some cases, engaging in traditional Inuit activities facilitated stronger social networks, opportunities, and financial resources, through the selling of artwork, participation in cultural activities like throat singing, or engagement in

Inuit community organizations. In turn, having a strong connection to one's identity was consistently associated with greater confidence in one's abilities and decisions.

4. Discussion and Conclusion

Research focusing on the gendered nature of climate change impacts is relatively recent, and studies to-date have largely examined the experiences of women living in the global South (Bunce and Ford, in review). Based on this research there is an emerging discourse based on the generalized experiences of women (and occasionally men) that asserts that women are more vulnerable to climate change than men (Arora-Jonsson, 2011; Bunce and Ford, in review). There is also a common narrative that women's climate change experience is solely mediated through women's relationship to agriculture. The experiences of Inuit women documented here, however, differ from the generalizations found in the scholarship in a number of ways.

Firstly, the contemporary gender role of Inuit women typically involves earning a regular income, with the amount of country food they regularly procure being less than that of men, who typically take on a hunting role. This finding contrasts to the scholarship from developing countries, where women often take on agricultural responsibilities while men in the community migrate to cities in search of work, resulting in women in these communities to be directly affected by changes to agricultural systems (Masika, 2002; Canadian International Development Agency (CIDA), 2002). Subsequently, the impacts of changing climatic conditions are experienced in a more indirect manner for Inuit women compared to women in the global south or Inuit men. Indeed, the global narrative of the relationship between women and climate change is seemingly closer aligned with the experience of Inuit men who, in general, spend more time engaging in land based activities than women and therefore experience climate change impacts in a more direct fashion. These differences further indicate the need for more place-based research on gender and climate change vulnerability that focuses on contextually relevant socio-economic, historic, cultural, and health related factors that influence how gender affects sensitivity and adaptive capacity to changing climatic conditions.

While the climate change experience of Inuit women is different from that of Inuit men, it is noteworthy that the factors that influence the adaptive capacity of Inuit women are largely consistent with those that have been identified for Inuit communities generally. The importance of access to financial resources, constraints on time, substance abuse, mental and physical health, education, food security, traditional skills, and social networks have all been well documented before (Ford, 2009; Ford et al., 2006, 2008; Furgal and Seguin, 2006; Prno et al., 2011; Pearce et al., 2010, 2011, 2015; Smit and Hovelsrud, 2010). Although this scholarship examines the Inuit experience without explicit reference to gender, the male experience is typically central, stemming from the focus on the impact of climate change on hunting. As a result, it important to note the lack of discussion around sewing, the role of daycare, berry picking, women's desire to spend more time on the land, and the impact of male stress on families in previous work on climate change and Inuit.

Despite the rapid changes in climatic conditions being observed in Iqaluit—and consistent with changes being documented across the Canadian North—climate change is

not the most immediate or pressing issue Inuit women face on a daily basis. In communities experiencing high suicide rates, food insecurity, and housing shortages, climate change is a more distal stress. Yet it is also clear that climate change acts as an exacerbating factor, or a threat multiplier, for many socio-cultural issues facing Canada's North. The intersectionality of these overarching multi-dimensional issues is highlighted by the variety of factors impacting the adaptive capacity of Inuit women. It is noteworthy herein that adaptation efforts in northern communities need to go beyond just focusing on responding to specific impacts, to also consider the broader underlying human determinants of sensitivity and adaptive capacity to climate change.

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Chapter 4
Conclusion

As the impacts of climate change become increasingly felt, the global understanding of the ways in which different genders experience these changes must continue to develop. There is a clear recognition that mitigation cannot be our only approach to climate change; we also need to invest in adaptation (Costello et al., 2009; Moss et al., 2013; Pielke et al., 2007). However, adaptation cannot occur without a clear understanding of what makes human systems vulnerable and resilient to changing climatic conditions (Adger, 2006; Ford and Smit, 2004; IPCC, 2014). By understanding the environmental, socio-economic, and political context in which vulnerability occurs, decision makers can move towards adaptation. However, effective policy measures and adaptation planning risk ineffectiveness by failing to examine the full gender spectrum of the climate change experience (Ahmed and Fajber, 2009).

By critically examining the ways in which climate focused research engages with issues of gender and highlighting the unique experiences of specific groups through in-depth case studies, we can further this understanding. The two manuscripts that comprise this thesis aimed to examine both global and local conceptions of gender and climate change.

The global conversation regarding gender and climate change is largely based on the experiences of women in the global south, and has some way to go to develop a more nuanced understanding of how vulnerability and adaptive capacity will differ by and across gender. Geographically, this thesis has highlighted the need to examine issues of gender and ARV in a North, Central, and South American context. Currently, very little research exists which focuses on these regions, and what little does exist scores low on the engagement index developed in this thesis. In response to this gap, chapter 3 aimed to further our understanding of Inuit women and ARV in a manner with engaged with gender at a high level.

While the strong focus in gender and climate change ARV literature on the female experience intends to balance the conversation which privileges male experiences, the literature needs to expand beyond the experience of women and girls. Although some research examines the climate change experience of men from an explicitly gendered lens, few studies discuss the experience of boys and seemingly no work exists exploring transgender experiences. This global phenomenon is mirrored in the academic literature available on the Canadian Arctic. While a significant amount of research has investigated the climate change experiences of Inuit communities as a whole, they tend to focus on the way climate change will impact male-dominated activities.

The examination of adaptation, resilience and vulnerability (ARV) literature at a global scale also highlighted two generalizations that have emerged in the gender and climate change discourse: i) the assumption that women are more vulnerable than men, and ii) an tendency to focus on agriculture in discussions surrounding women's climate change experience.

As outlined in Chapter 2, there is a tendency throughout the literature, particularly in health-focused articles, to state that women are more vulnerable than men without explanation as to the causes of this vulnerability. This assumption is similar to the pervasive belief that women, particularly indigenous women, are 'closer to nature' (Nelson, 2009). This oft-unjustified statement results in a global narrative that frequently fails to critically examine the assumption that women are more vulnerable or uncover the structures and determinants underpinning this. As is emphasized in Chapter 3 through the discussion of the experiences of Inuit women in Iqaluit, Nunavut, women are not necessarily more vulnerable than men in all cases, but do experience climate change in a different manner.

The second assumption, that women's climate change experience is solely mediated through women's relationship to agriculture is rooted in the experience of many women worldwide. With the majority of academic research into gender and climate change focus on developing nations, there is an emerging discourse based on the generalized experiences of women (and occasionally men) living in these nations. For instance, in developing nations women are more likely to work in the informal sector than men, while men are more likely to migrate to large cities in search of work (Masika, 2002; Canadian International Development Agency (CIDA), 2002). Consequently women's workload increases largely due to agricultural or livestock responsibilities that now rest solely on them (FAO, 2011; Lambrou and Piana, 2006; Masika, 2002). Changing resource regimes, environmental degradation, and unpredictable and/or extreme weather are described as affecting women more directly than men who are distanced/removed from these effects as a result of their out-migration (Denton, 2002;

Nelson, 2009). As a wealth of literature exists examining indigenous women and agriculture, it is perhaps unsurprising that the female climate change experience is dominantly portrayed as it relates to agriculture (Nelson, 2009). This narrative, while capturing the experience of many women globally, lacks nuance and space for the experiences of women who are not engaged in agricultural or livestock related work. By remaining solely focused on how women interact with climate change through their economic role, often presumed to be agricultural in nature, the diversity of climate change experiences is overlooked.

The experiences of Inuit women, as documented in Chapter 3, diverge from this global discourse. Given the hunting and gathering tradition of Inuit, agriculture and livestock herding has never been a part of Inuit life. With its origins in colonization, the importance of the cash based economy has increased throughout the Canadian Arctic and with it the workload of Inuit women has also increased. Because of the nature of the work women are engaging in this has resulted in a distancing of Inuit women from the environment (Billson and Mancini, 2007). Consequently, women have less time available to spend on the land and engaging in traditional activities. Subsequently, climate change impacts are felt in a more indirect manner for Inuit women compared to women in the global south or Inuit men.

The global narrative of the relationship between women and climate change is seemingly closer aligned with the experience of Inuit men who, in general, spend more time engaging in land based activities than women and therefore experience climate change impacts in a more direct fashion. This significant divergence from global narratives further illustrates the need for more place-based research on gender and climate change vulnerability.

While this thesis identifiers and characterizes the current exposures, sensitivities and adaptive capacity of Inuit women, it does not examine future vulnerability, which is a function of future exposures and sensitivity as well as future adaptive capacity. Given the uncertainty regarding which future climate change regime global policies will embark upon it is difficult to state with certainty how exactly climate change exposure, sensitivity and adaptive capacity will change. That said, all future scenarios project continued temperature rise at a global scale, with the IPCC projecting a temperature increase by 2100 of somewhere between 2°C to 9°C depending on the model and forcing scenario (IPCC, 2014). This will have significant implications for the Arctic and the exposures and sensitivities outlined in chapter 3. There is evidence that duration and timing of Arctic growing seasons, along with plant productivity will change, although the IPCC states these will be regionally variable (IPCC, 2014). It is reasonable to expect that Arctic berries, with their sensitivity to temperature and rainfall, will continue to undergo change, necessitating the continued development of coping mechanisms and adaptation strategies surrounding berry picking. Reductions in sea ice extent are expected to continue as temperatures warm, with sea ice loss greater in the summer months than winter (IPCC, 2014). Given the seals dependence on sea ice, especially during their early life stages when their pelt is developing, sealskin quality may also be affected into the future (Gmuca et al., 2015). Finally, if uncharacteristic weather continues, as some studies suggest (IPCC, 2014), women's access to the land during safe times may continue to be reduced, unless there is significant support for women allowing them to get out on the land during safe conditions. Similarly, as the environment continues to change more must

be done to support the strengthening of women's mental health as it relates to the environment.

This is not to say that the future for Inuit women will necessarily worsen as temperatures increase – as Chapter 3 illustrates Inuit women are highly adaptive. Supporting the seven factors which contribute to their adaptive capacity increases the ability of Inuit women to cope with climatic and socio-cultural change. If greater support of these factors happens in tandem with changing climatic conditions, Inuit women will be better able to adapt to the changes they experience. In conjunction with future adaptive capacity, future vulnerabilities will be determined by the ways in which future exposures and sensitivities affect the livelihood conditions of women and their families. This further emphasizes the role climate change can play in compounding the diverse socio-cultural challenges Inuit women face, and underpins the need for future work explicitly focused on examining future vulnerability in-light of multiple stresses, climatic and non-climatic.

The unique climate change experiences of Inuit women in Iqaluit, Nunavut provide an interesting contrast to the global narrative of women and climate change. Due to contemporary gender roles and socio-economic realities, the experience of Inuit women is notably different from the generalized portrayal of the climate change experiences of indigenous women. By highlighting the unique experience of Inuit women through this case study we aimed to add nuance to the larger conversation regarding climate change and gender.

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Appendix

Chapter 2

Table 4. Performance of studies according to components of the conceptual model examining the level of gender engagement

	High (3 points)	***Moderate (2 points)***	***Low (0-1 point)***
Gender mainstreaming	44%	23%	33%
Experience of Gender	36%	12%	52%
Degree of Action	2%	51%	47%

Table 5. Overall engagement scores of ARV literature by attribute

	Gender-Mainstreaming Average Score	***Experience of Gender Average Score***	***Degree of Action Average Score***	***Overall Average Engagement Score***
Adaptation	1.84	2.25	1.61	5.69

Vulnerability	1.55	1.91	1.52	4.87
Resilience	1.40	1.60	1.50	4.50

Table 6. Gender mainstreaming performance of ARV literature by attribute

	Gender-Transformativeness	***Gender-Responsiveness***	***Gender-Sensitivity***
Adaptation	57%	85%	83%
Vulnerability	46%	70%	69%
Resilience	38%	50%	50%

Table 7. Performance of the experience of gender component of adaptation and vulnerability studies

	Practical Needs	***Strategic Needs***	***Both Practical and Strategic Needs***	***Neither***
Adaptation	27%	15%	43%	16%
Vulnerability	25%	13%	34%	29%

Table 8. Performance of studies according to components of the conceptual model examining the level of action

	Statements of Recognition	***Groundwork***	***Action***
Adaptation	39%	57%	3%
Vulnerability	49%	45%	3%
Resilience	50%	50%	0%

Note: The remaining percentages are made up of articles that were coded as being unclear

Table 9. Performance of different sectors across each index component

Sector	***Gender-Mainstreaming Average Score***	***Experience of Gender Average Score***	***Degree of Action Average Score***
Health	**1.03**	**1.17**	**1.28**
Environmental Management	**1.12**	**1.68**	**1.48**
Hazards Research	**1.06**	**1.25**	**1.38**

Codebook

Code	**Description**
1) I.D. Number	Identification number ascribed by alphabetical output of endnote citations
2) Year	Year the article was published

Chapter 3

3) Geographic Focus	The geographical region, at a country or continental level on which the research focused
• **Global Scale**	Article researched gender and climate change at a global scale, not looking at one particular country, countries, region or group of regions
• **No specific geographic focus**	Article did not have any particular focus on a country, countries, or geographic region, but instead spoke about gender and climate change in a general manner
• **Other (fill in the blank)**	This option allows the coder to input the country or continental region of focus
4) Gender Focus	The gender which was emphasized in the article
• **Female**	Research pertained exclusively to women and/or girls
• **Male**	Research pertained exclusively to men and/or boys
• **Both Genders**	Research pertained to both women, and/or girls and men and/or boys
• **Other (fill in the blank)**	This option allows the coder to input any other genders of focus
5) Overall Research Focus	
• **Health**	Research which focuses on the physical or emotional well-being of humans
• **Hazards Research**	Research which focuses on physical hazards such as floods, mass wasting,
• **Development**	Research which pertains to projects focused on general economic or social development of a population
• **Livelihoods**	Research which focuses on how individuals earn an income to support themselves/their families
• **Agriculture**	Research which focuses on farming practices, (this includes animal husbandry)
• **Policy**	Research focused on the actions or series of actions an organization, government, or business implements or plans to implement
• **Environmental Management**	The management of the interaction and impact of human societies on the environment (water management, drought, forestry)

• **Energy**	Research which is focused on the production of a variety of energy sources, be they small or large scale. This includes fossil fuels, solar, wind, bio-fuel etc.
• **Food Security**	Research focusing on the availability of food in a community or among a population
• **Climate Change**	Research focused on contemporary global warming and the implications of this warming.
• **Other (fill in the blank)**	Open ended space where any research foci not mentioned above can be filled in
6) Adaptation /Vulnerability /Resilience Focus of the Article	
• **Adaptation**	Article exhibited a focus on adjustments made by human systems in response to immediate or anticipated climatic changes which either moderate harm or exploit opportunities
• **Vulnerability**	Article exhibited a focus on the capacity of a population to be wounded
• **Resilience**	Article exhibited a focus on one's ability to rebound from adverse conditions
7) If adaptation focused, what is the type of adaptation occurring	
• **Hard Adaptations**	Article had evidence of adaptations primarily focused on infrastructure
• **Soft Adaptations**	Article had evidence of adaptations primarily focused on capacity building, policy change
• **Both**	This option was chosen if there was evidence in the article of both hard and soft adaptations
8) If adaptation focused, is the adaptation anticipatory or reactionary?	
• **Anticipatory**	Anticipatory adaptations occur when there is evidence of planning ahead for changes that may take place in the future and preparing to adapt to them now
• **Reactionary**	Reactionary adaptations occur when adaptations are developed in reaction to immediate changes being experienced
• **Both**	Chosen when there is evidence of both anticipatory and reactionary adaptation
9) Was gender a main focus of the article?	

• **Yes**	Gender was the main, or one of the main foci of the article
• **No**	Gender was not the main, or one of the main foci of the article
10) If no to question above (9) how was gender expressed?	
• **A demographic addition**	Article treated gender as a distinct characteristic which helped define and specify demographic information
• **A vulnerable sub-group**	Article expressed one of the genders as a distinct group within the population who experience a greater potential capacity to be wounded
• **An area recommended for consideration in future work**	Article expressed gender as a potential foci for future research
• **An function of the problem**	Article expressed gender as being a contributing factor to a problem described in the article
• **Other:**	
11) Focuses on the Practical needs or Strategic needs of gender(s) discussed	
• **Practical needs**	Describes the response to an immediate perceived necessity relative to ones gender (usually addressing living conditions).
• **Strategic needs**	Describes the needs of a gender related to division of labour, power and control. Usually recommends the transformation of gender roles, redistribution of power and re-evaluation of legal rights and social responsibilities.
• **Both**	The article had evidence of focusing on both practical and strategic needs
• **Neither**	The article did not have evidence of either a focus on either practical or strategic gender needs.
12) Evidence of Gender-Transformativeness	Gender-Transformativeness refers to gender-specific evaluation of programs and their implementation; process involves rethinking social values, organizational practices, policies and program
• **Yes**	Article had evidence of gender-transformativeness
• **No**	Article did not have evidence of gender-transformativeness

• **Unclear**	Article did not clearly have evidence or lack of evidence of gender-transformativeness
13) Evidence of Gender-Sensitivity	Gender-Sensitivity refers to the awareness of gender issues; is explicit about the different needs/experiences of both sexes; has clear/specific objectives/indicators/actions to reduce gender disparity
• **Yes**	Article had evidence of gender -sensitivity
• **No**	Article did not have evidence of gender-sensitivity
• **Unclear**	Article did not clearly have evidence or lack of evidence of gender-sensitivity
14) Evidence of Gender-Responsiveness	Gender-Responsiveness refers to conveying collection(s) of sex-disaggregated data and tracking indicators that measure impact of interventions on women and men; advises women's and men's equal participation in decision making
• **Yes**	Article had evidence of gender – responsiveness
• **No**	Article did not have evidence of gender-responsiveness
• **Unclear**	Article did not clearly have evidence or lack of evidence of gender-responsiveness
15) Does the article make statements of recognition, lay groundwork or describe action taken (/currently being taken)?	
• **Statements of Recognition**	Notes a relationship between gender and climate change
• **Groundwork**	Makes recommendations about how to reconcile gender and climate change
• **Action**	Describes actions taken or being taken to reduce gender related vulnerabilities, improve gender resilience and overcome gender based barriers to adaptation
• **Unclear**	There was not clear evidence in the article of either statements of recognition, groundwork or action
16) Main finding/recommendation in relation to gender	Open ended box where notes on the main findings/recommendations made by each article

Interview Guide

17) Other notes	Open ended box where additional notes about the paper (not pertaining to the articles main findings/recommendations) could be made

Preface interviews with:

- I'm interested in learning about how women in Iqaluit are experiencing and dealing with changes, changes in the environment, and in day-to-day life and how change is impacting you life as an Inuit woman
    - how men are important but I'm more interested in hearing what women have to say
- I'm really interested in hearing about your life – I'm going to ask you questions but there's no right or wrong answer to any of the questions I ask you. I'm asking you the questions because I'm interested in hearing about what **you** think. You're the expert.

Demographics:

- **Do you mind me asking how old you are?**
- **How many people live in your home?**
    - **What are there ages?**
- **Do you own your home or is it a rental**
    - If they own the home: Did you get a beneficiaries loan when you were buying your house?
- **Does anyone in your home work full time/part time?**
    - What sort of work do they do?
- **Does anyone in your house own a snowmobile/boat? Have a cabin?**
    - If no: do ever borrow someone's or go with a friend?

Warm up questions:

- **How long have you lived in Iqaluit?**
    - Where did you live before?
    - Where did you grow up?
    - When did you move here?
- **What do you do on a regular weekday?**
    - Work:
        - What sort of work do you do?
        - How long have you been working there?
        - Do you enjoy that work?
    - Home:
        - What keeps you busiest at home?
        - What do you like to do with your spare time?

Part 1: Change

- **[Preface with changes in my life: moving away from family, big city, friends, etc.] "What have been the biggest changes in your life in the last**

year, 5 years, 10 years/ since before your children were born/ since you before your grandchildren were born"

- **[Preface with change in Nanaimo: logging, less salmon, more farmed salmon, hotter summers] "What are some changes you've noticed <u>on the land</u> in the last year/5 years/since you were a teenager/ since before your children/grandchildren were born?**

Environmental Changes

- How often were you able to get out on the land this last winter?
    - Were you able to get out on the land more or less in the past?
- In other communities people have noticed that:
    - Animal skins are thinner
    - Berries ripen at different times of year (dried out berries, more berries than before)
    - Changes in wind direction
    - Sea ice breaking up earlier and forming later
    - Changes in the bugs
    - Sun burning skins that are being tanned

Social Changes

- What things did your mother or grandmother do when they were your age that you do differently? (prompts: making your own money, preparing food, time on the land, raising children)
    - Do you think it was harder to be a working woman/prepare food/be out on the land/raise children (Altered for what they talk about being different) for your mother/grandmother or for you today?
        - If answer is "Yes it's harder":
            - What makes it harder?
        - If answer is "No it's not":
            - What makes your life easier than your mother or grandmother's?

Changes related to Food:

- Do you eat much country food? (do you eat more or less country food now than you did when you were younger?- bracketing time period issue)
- From who/where do you get your county food? Is this different than it was 5 years ago, 10 years ago?
- What sort of changes have you noticed in in the last year, 5 years, 10 years, when it comes to country food?
    - Store food?

General Change Question:

- What has changed in on the land that you are sad about?/ that you don't like?
    - Happy about/that you like
    - OR: What are the changes/the change that bother you the most?

Part 2: Change specific questions

- "**Can you tell me more about X and what you do when X happens?**"

    - Possible **Who** Questions:
        - **Does X impact your common law/children/parents/siblings?**
        - **Who** helps you deal with X change?
            - What is your relationship to that person?

    - Possible **When** Questions:
        - **Is that a big change from a couple years ago?**
        - **When does X happen?**
        - **Did this happen in the past?**

    - Possible **Where** Questions:
        - Where does/doesn't this happen?
        - Have you heard of this happening outside of Iqaluit?
        - Where did this happen in the past (if it happened in the past)?

    - Possible **What** Questions: - maybe rearrange order
        - What happens when X happens
        - What happened when X changed
        - **What did you do when X happened**
        - What do/did others do when X happen(s/ed)?
        - What has changed that resulted in X happening/not happening?
        - **What do you do to take care of yourself/your family**

- **If they don't do anything in reaction to a change**:
    - Is there something you wish you could do about change X?
    - If you had a magic want what would you do about change X?

    - Possible **How** Questions:
        - **How do you think X happens?**
        - **How does change X impact your relationship with your family members?**
        - How does change X impact your role in your household?
        - **How long have you been doing X (changed method)**

    - Possible **Feeling** Questions:
        - **How did you first feel when you noticed change X?**
        - **How do you feel about change X now?**

        - How does X make you feel?
        - **Are you concerned about these changes?**

Coping Strategies and Adaptations:

- Pretend I moved up here next spring, and came to you and asked you how to deal with X (thing that has changed). What would you tell me to do?

- **What helps you deal with X change? / What makes it easier for you to deal with X change?**
    - **What sort of things make a household strong/able to deal with change X?**

- **What makes it difficult for you to deal with/manage X change?**

- Do you think that there are any organizations in Iqaluit, or Nunavut, or Canada that might be able to help you deal with change X/ should help you manage change X?
        - If yes:
            - Which organizations?
        - If no:
            - What makes you think there aren't any organizations that could help or should help?

Change generally

- **What are the changes that bother you the most?**
- **What are some good things that have come from change?**
- **[Preface with Anna/Alita example] How does change make you feel?**
- **Do you think there are changes which women experience differently than men do?**
- **Do women react differently to changes than men do?**

"Warm down":

- Are there any questions you think I should ask other people I talk with about this topic?
- Were there any questions that seemed strange to you?
- Is there anything else you think I should know about (women and change)?
- Do you have any questions for me?
- Do you know of any other women who you think might want to talk to me about change?
- If you want to talk more – let me know (give contact information including cell number, on little sheet of paper)