Gender and Climate Change Research: Moving Beyond Transformative Adaptation

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Research on how communities in the Arctic can overcome the challenge of climate change have traditionally employed adaptation frameworks. The ability of these groups to continue thriving in the Arctic is complicated by historical, social, economic, and political complexities - issues thoroughly addressed through the postcolonial feminist concept of transformation. This article critically examines contemporary research on climate and gender, and the extent to which feminist transformative concerns are addressed, thereby challenging systems and promoting power structures that recognize or benefit all segments of society. The article adopts an analytical strategy which combines two parallel instances of critical reflection on climate research, specifically, a systematic literature review of climate and gender studies in the Canadian Arctic, and the results of a round-table workshop of international climate experts and researchers on the state of climate change, adaptation and gender research in the Arctic. The article explores the results of these analyses and distinguishes those strategies that represent a continuation of status-quo power relations and climate adaptation processes from those that account for current economic and socio-political factors.

Introduction

Climate change is documented to have demonstrable negative impacts on communities' well-being in terms of health, economic stability, and physical security. These impacts are exacerbated by socioeconomic, cultural and political factors, but also gender, ethnicity, or social class. Moreover, the economic, cultural and social systems that contribute to insecurity and the impacts of climate change are deeply rooted in patriarchal and/or colonial histories. In other words, when it comes to vulnerability and adaptation in the face of climate change, intersectionality matters.

However, it is unclear to what extent these systems are reproduced within social climate change research itself. Hence, it is essential to examine whether such research effectively incorporates strategies that recognize the knowledge and values of marginalized groups to identify local vulnerability, and if this research promotes a reformulation of colonial and patriarchal power

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structures and societal roles. This study provides a critical examination of contemporary research's ability to recognize and account for these complexities in relation to the impact of climate change in Arctic communities.

Combining the post-colonial feminist theory with the concept of transformation, the article argues that society must recognize and accommodate the differences and particularities of individuals and groups in the subaltern in order to develop effective strategies and produce knowledge around climate change. This perspective challenges the dominance of neo-liberal and neo-colonialist processes, arguing that they do not leave space for the most marginalized positions to narrate and define new strategies. In order to face global issues, it is critical to reformulate the socio-economic basis for ethnic, class, and gender divisions. The article is an attempt to bring this critical normative and evaluative perspective to analyze contemporary Arctic research. Are there evidence or support in the research community to argue that society must recognize and accommodate the differences and particularities of individuals and groups in the subaltern in order to develop effective strategies and produce knowledge around climate change?

The study adopts a novel research approach, combining analysis of both a qualitative critical self-reflection report by climate researchers, and the results on a systematic literature review on arctic research. In doing so, the study presents a normative self-critique from within the research community, then evaluates the extent to which climate change research in the Arctic has moved towards this goal, using intersectionality and post-colonial feminist transformation approaches as a normative yardstick. Moreover, the article discusses those strategies that represent a continuation of status-quo power relations and analyzes climate adaptation as processes that are shaped by current economic and socio-political factors (Pelling, 2010). It begins by presenting the theoretical distinction between adaptive and transformative approaches, followed by an overview of the workshop and review methods. The article then discusses the results of the analysis, and concludes, presenting a summary and normative recommendations for future research.

Theoretical transformation: Moving from Adaptation to transformation

The decreasing window for climate action results in a growing urgency to address those dimensions of climate change that impact marginalized groups. Policies, strategies, and programs may be impacted or reinforced by gendered roles, agency, and human well-being (Williams, 2018: 269). The impacts of climate and policy on society are influenced by structural and social inequalities and socially constructed roles (MacGregor, 2010: 235-236). As climate change can be conceptualized as not merely a *cause* but as a *context* of vulnerability, it is important to recognize the social constructivist components of vulnerability and the possibilities for adaptation. It is here where we can see the distinction between adaptation and transformation approaches, and why it is necessary to move towards the latter.

According to authors such as Mark Pelling (Pelling, 2010), Karen O'Brien (O'Brien, 2012) and R. Miller (Miller, 2007), addressing the social challenges of climate change requires addressing the socio-political marginalization of groups in the context of adaptation, while ensuring that strategies and policy outcomes do not buttress interests and paradigms derived from a global hegemonic system. This idea, referred to as *transformational* adaptation, implies a reformulation of both the policies designed to face climate change, but also the perspectives used to define the concepts at

the very heart of research and policy discussion: vulnerability, adaptive capacity, adaptation, and transformation.

Most contemporary definitions of adaptation, according to Pelling, refer primarily to making adjustments in response to challenging conditions, rather than overcoming them by reformulating practices and the underlying institutions that generate root and proximate causes of risk (Pelling, 2010 cited in O'Brien, 2012: 670). He argues that these structures and paradigms are accepted as a given and, in some occasions, modified but scarcely ever critically questioned. Miller argues that these changes are necessary to ensure the emergence of desirable futures (Miller, 2007) which according to Feola (Feola, 2015) are connected to the prescriptive concept of transformation.

Transformational adaptation, by contrast to traditional adaptation approaches, aims to challenge status-quo paradigms centered on economic growth and consumption (Pelling, 2010 cited in O'Brien, 2012). The concept identifies and ascribes value to the patterns that are the result of transformative processes - it defines the process of change not only as a structural change but also focused on a desirable direction. Transformative strategies focus on achieving benefits rooted in the empowerment of those with fewer resources to apply to achieving systemic change (Feola, 2015). It is thus that it addresses not only socio-economic challenges like consumption, but also socio-political power disparities. O'Brien emphasizes that this is difficult as it involves challenging deeply rooted systems and social paradigms that are protected by powerful interests. There are enormous barriers to transformation which are rooted in culture and manifest in economic and social policies (O'Brien, 2012: 669).

Vulnerability, as noted, is exacerbated by underlying social dynamics. Adger and Kelly (1999) argue that vulnerability is socially constructed and determined by contextual variables. Constructivist approaches emphasize strategies that focus on describing vulnerabilities and proposing measures that account for intersectional factors like gender and other social roles/signifiers, like race or social class. As such, vulnerability is influenced by access to and control of material and social resources (West & Hovelsrud, 2010: 343). These resources shape one's adaptive capacity, defined as "the ability to manage current and past stresses, anticipate and plan for future changes, and be resilient to shocks and perturbations" (Smit, Hovelsrud & Wandel, 2008).

To account for these complexities, one must consider the complex historical connection between society and nature, as well as the political dimensions of adaptation emerging from the dominant capitalist and colonial systems. The importance of this historicity stems from Marxist reflections on the absence of a natural ahistorical state of social relationships. Siri Eriksen and Jeremy Lind argue that adaptation processes are conflicting political processes of negotiation, historically anchored and structured by different power theories. Power relations and inequalities should be considered when designing appropriate policies to face climate change (Dietz, 2013: 27-28). If the materiality of nature is socially produced, it is necessary to consider that social production implies that the social relations of power, which structure society, and cultural identities are connected to nature through differences in access, control, forms of appropriation and representations of the environment (ibid).

In this context, power is interpreted as the ability of the actors to control and determine the use of nature. For this reason, strategies should question the prevailing imbalances of power, which constitute the root of the risk, and reformulate processes in order to reduce vulnerability to climate change. For example, while studies may document disparities that environmental changes have on

men and women, McGregor argues they may contribute little to identify the processes which create vulnerability - or rather, social susceptibility to changing conditions (MacGregor, 2010: 235-236). Critiques like this highlight key differences in how climate change differentially impacts social groups, yet fail to elaborate processes which heighten vulnerability or diminish inequalities.

For example, consider when climate is analyzed as a security threat. This approach entails a critical vision about the masculine dominance over concepts such as security and peace. Masculine dominance is hidden behind an objective perception which excludes certain social groups from decision-making processes (Stuvøy, 2013). For this reason, climate change is not a gender-objective phenomenon. Its effects can reinforce structural and social inequalities as well as constructed social roles, thus, distinguishing gender vulnerability (MacGregor, 2010: 236). These imbalances can be extended to other economic, social, and political disparities as well. Recognizing these critiques, a postcolonial feminist framework can be applied to reflect on how gender, race or social class intersect and interact with climate change.

To deconstruct and challenge the status quo of power relationships, postcolonial feminism urges critical reflection on socio-political processes - such as colonialism and globalization. It challenges center-periphery relationships, not by exchanging the margin for the center, but by displacing this distinction (Landry & Maclean, 1996 cited in Oliva Portolés, 2016: 77). It is through critically questioning these structures that the nexus between feminist theory and transformative strategies emerges. Even the production of research must be critiqued as imposing paradigms generated in the center, as researchers may replicate their internalized perspectives, and subsequent norms and values (Zirion Landaluze & Idagarra Espel, 2014) (Crowley, 2011).

Oliva Portolés (2016) argues that confronting problems in a world dominated by patriarchal and neocolonial structures requires comprehensive strategies by marginalized people to reform structures. Not only is it critical to transform the basis of the socio-economic and political systems, but the ways in which knowledge is produced as well - something difficult to achieve from a position of disempowerment (ibid). Gayatri Chakravorty Spivak argues that without a questioning of the basis of the system and deconstructing periphery-center relationships, the most oppressed or the subaltern will not have capacity for development, acts of insurgency, or ability to reach accommodations with those in power (Spivak, 1999: 119). Research must be both cognizant of this disparity of voice, and also attempt to redress the historical, social, and economic factors which contribute to it. In short, research must adopt transformative approaches.

As such, this article applies a normative evaluative framework rooted in transformational adaptation and postcolonial feminist perspectives to analyze the contemporary state of Arctic climate research. It seeks to examine the extent to which Arctic research has been able to move beyond conceptual generalizations generated by liberal and individualist traditions (Zirion Landaluze & Idagarra Espel, 2014) and recognize - and accommodate - the differences and particularities of marginalized communities in order to develop effective policies and leave space for the most marginalized positions to narrate and create knowledge on climate adaptation. (Landry & Maclean, 1996 cited in Oliva Portolés, 2016: 77)

Methodology

The article adopts an analytical strategy which draws together two parallel instances of critical reflection on climate research: firstly, a round-table workshop on climate adaptation and gender in

the Arctic with a panel of international climate experts and researchers (n=17); secondly, a systematic review of literature on climate and gender on a specific case and context – namely, the Canadian Arctic.

Method one: Analysis of a self-reflective workshop report

A workshop methodology is broadly used in academia as it enables an investigation into a research problem through a dialogue with involved actors (in this study the workshop included different researchers and experts on studies of gender) and has a purpose to produce reliable data on the research topic including the participants' understanding of the topic (Farner, 2013: 19-21). The same author underlines that a workshop does not necessarily result in final results but rather outline a direction for research and agreements and/or disagreements about its elements (ibid).

An interdisciplinary workshop "Climate Change Adaptation and Gender in the Arctic" (2013) was a part of the research project Critical Aspects of Adaptive Capacity to Climate Change in the Northern Regions (CAVIAR II). Participants included international experts who have applied a gender focus or tangent in their Arctic and Global South research, and who have applied an Arctic or Global South tangent in their gender research. Studies of climate adaptation and gender in the Global South have a longer history than in the Arctic, and the experts provided valuable lessons from their research. The participants included three contributors to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Participant specializations covered anthropology, human geography, political science, sociology, and economics. The aim of the roundtable was to critically examine the status of knowledge production in relation to issues of gender intersectionality and climate change adaptation.

The discussion was framed by a set of predefined topics developed from a review of literature and media: methodological challenges in gender research, theoretical operationalization of gender, relationship of gender to other concepts in adaptation literature (e.g. vulnerability, adaptive capacity), and other variables (e.g. race, class, ethnicity, age). Detailed notes were taken during the workshop and were synthesized shortly after the event and shared with the workshop participants to secure the quality of the report. The report was initially developed for the Research Council of Norway and later shared with the participants and the research group of the CAVIAR II project. The report highlighted methodological and theoretical perspectives for gender research and relational challenges; these results are reported here (Hovelsrud et al., 2013).

In the workshop, a main focus was on the identification of gendered aspects of adaptation and adaptive capacity and discussion on the use of an intersectionality approach to analyze those aspects as well as the understanding of the consequences for the theoretical perspectives. Given the relevance of the workshop discussions to the objective of this article, the workshop report has been re-analyzed in order to extract the information on gender perspectives in Arctic climate adaptation research. This re-analysis has not been shared with the workshop participants.

Method two: Systematic literature review of Arctic research on climate and gender in the Canadian Arctic

The second component of this analysis is a literature review aimed at examining how transformation has emerged in explorations of the gender dimensions of climate research in the Canadian Arctic. The review analyzed the extent to which the captured literature reflects the concept of transformation to create knowledge and propose policies to face climate change. The

process considered the presence or absence of elements that verify/conform the concept of transformation which is connected to social change. Following Piotr Sztompka and his study *the sociology of social change* the conceptual model being applied in this work, utilizes four general elements to classify processes of social change (Sztompka, 1993, cited in Feola, 2015: 378): System of model, Temporal Range, Social Consciousness and Outcome (Feola, 2015: 377). These criteria entail a description of social change that will be used in the methodology to systematically characterize the concept of transformation.

A number of inclusion and exclusion criteria for article capture were developed based on the theoretical and geographic space for the article, and these were applied within ProQuest Central collection. The first criteria were selected to account for the theoretical mainstreaming of gender within mainstream international relations and security processes. That is, the 1325 UN Resolution on women, peace and security - adopted 31 October 2000 - which calls for the inclusion of the gender perspective in all levels of peace processes and security efforts (Villelas Ariño, 2015), establishing a temporal limit from January 1st, 2000. A second criteria was established in relation to climate change strategies from a human perspective. Thus, papers that had a non-human focus were excluded. A third inclusion/exclusion criteria was the specific inclusion of gender as the key focus of the study. Gender OR Women OR Woman were the search terms. Finally, socio-geographic limitations were applied to limit the scope towards a focus regarding primarily Indigenous communities in the Canadian Arctic. The resulting search term was, *"(Gender OR Woman OR Women) AND ("Climate change") AND (Inuit OR Nunavut)"*

The initial return for this search revealed 186 articles which were examined using the inclusion and exclusion criteria as well as reading of the title and abstract. After a secondary review of abstracts, 24 relevant papers were identified and subjected to a full text review and analysis.

Data extraction and conceptual model

An evaluation matrix was applied to the collected literature, enabling the examination of transformative strategies within the literature about gender and climate change. The articles were coded and graded using a point system tied to the significance of transformation in the gendered analysis of climate change. The grade was calculated based on indicators derived from the components of the concept of transformation and operationalized via a summation question. These components included:

1. System Model (1pt): Change via complex processes that involve all segments of society and spheres of action (Feola, 2015: 382). Includes systems level change, addressing questions of values, beliefs and assumptions about human environmental relationships (O'Brien, 2012: 672).

    Question: *Does the analysis imply a **structural change** of the system?*

2. Historical Change (1pt): Recognizes historical processes with thresholds and ruptures (Geels & Schot cited in Feola, 2015: 382). Historicity requires a rejection of a natural and a historical state of social relationships (Dietz, 2013: 37). Understands relationship between society and nature as influenced by cultural and political determinants, and includes a non-linear transformative strategy (Feola, 2015: 382).

    Question: *Does the analysis show a **historical system** subdued by changes and phases?*

3. Social Consciousness (1pt): Recognizes that transformation may emerge through endogenous and exogenous processes. Understands that transformation involves deliberate consequences, going beyond the deterministic notions of the environment in which individuals are adjusted to their environment (Geels & Schot cited in Feola, 2015: 383). Article analyzes vulnerability and climate strategies as a function of the wider political and economic environment determined not only by climatic factors but also by social, cultural and political factors (Skinner, 2011: 14-15).

    Question: *Does the analysis emphasize a* **deliberate** *process of change?*

4. Outcome (1pt): Recognizes importance of revising political relationships, power structures, social networks, and ecosystems. Transformation can be understood as a deliberate change in various areas of society (Geels & Schot cited in Feola, 2015: 384). Rejects conceptual generalizations through a deconstruction process in which other parameters are considered in producing knowledge and adaptation strategies. Accounts for geographical and cultural particularities within social groups (Oliva Portolés, 2016: 74-75).

    Question: *Is the analysis focused on change based on modifying the patterns and relationships that* **create knowledge and design the strategies**?

Each article was graded according to the criteria above and assigned up to 4 points. Articles were categorized as having low (one point), low- medium (two points), moderate (three points) or high presence (four points) of transformative strategies in their analysis of climate change and gender.

Discussion of results

The following sections present the results of the analysis of the self-reflective workshop and systematic literature review. In general, the literature captured in the review mainly focused on the climate change impacts on lifestyle of Inuit communities in the Canadian Arctic specially in Nunavut. The main findings reflect the importance of social roles, resource access, traditional knowledge, social networks, and collaboration among households within Inuit communities in analyzing how vulnerabilities are shaped by socio-economic, political and demographic processes (Archer, et al., 2017).

Results from the analysis of a self-reflective workshop report

During the workshop the impacts of climate change on communities in the circumpolar Arctic and their relations to gender dimension were examined. The discussions acknowledged that linkages between climate change, adaptation and gender were well-documented in the Global South, and similar gendered disparities would likely exist in the circumpolar North - as is confirmed by the preliminary literature review. One of the main conclusions was that approaches recognizing *intersectionality* might improve our understanding of gendered impacts from climate change. Second, the focus on gender should not be separated from other societal and environmental aspects. Moreover, research on adaptation and gender could be important for understanding the socioeconomic interplay between men and women, the effects of climate change, and the linkages to social phenomena of migration, education, employment, economic development, subsistence practices, and mental and physical well-being.

Furthermore, the workshop discussed the needs for future research on gender and adaptation in the Arctic. The workshop report summarized several methodological challenges and theoretical perspectives in gender and climate change studies (Hovelsrud et al., 2013). For the methodology it was suggested that a research design should identify the unit of analysis (i.e. societal level) and what change we should adapt to, in order to facilitate the examination of how the climate change impacts differs from social or other changes. The goals of research should be both acceptable to policymakers, reflexive to community needs, and meaningful for communities who participate in the research. The importance of interdisciplinary approach was underlined.

For many such studies, this approach is grounded in intersectionality. The report suggested moving from gender-centered approaches toward broader integration of other social aspects like age, class, or ethnicity to understand climatic, socio-economic and political conditions. Nevertheless, a research focus on gender is useful. But the research designs would benefit from adopting intersectionality as a backdrop and aim to integrate other relevant aspects.

Other categories not commonly integrated into intersectionality approaches could be relevant in the analysis. In particular, the workshop noted that the intersectionality theory does not include local knowledge, and no attempts to expand on the list of existing categories of intersectionality were identified in the literature (Hovelsrud et al., 2013). It was argued that local knowledge can be gendered by traditions in the Arctic (e.g. whaling responsibilities, land practices). The workshop experts emphasized that gender roles may also have implications for adaptation strategies and hence present another novel category of intersectionality. That means that in further research on gender and climate change adaptation "*It is not feasible to separate the focus on gender from other societal and environmental aspects, but rather integrate such aspects in research on change*" (ibid). It was recommended that a research focus on gender and climate adaptation should intersect with other aspects that impact society in and outside the Arctic.

The next section will examine how intersectionality emerges throughout literature on gender in Arctic studies using transformation as a vehicle for measuring the recognition of key aspects of intersectionality.

Results from the systematic literature review of Arctic research on climate and gender in the Canadian Arctic

Twenty-four articles were subjected to a complete review and analyzed in regard to the presence of transformation approaches in the context of gender and climate change research. Of the 24 studies, 3 studies [19,22,23] had no presence of transformative elements in their analysis; 2 studies [18,20] had a low presence (1 point out of 4); 10 articles [5-7,9,10,13,14,16,17,21] had a low-medium presence (2 out of 4 points); 6 studies [1,3,11,12,15,24] had a moderate presence (3 points out of 4); and 3 studies [2,4,8] were classified as having a high presence of transformative elements in their analysis scoring 4 out of 4 points. The average presence score was 2.17 showing a low-moderate presence of transformative strategies across the captured literature. While the majority of the studies had a low-moderate transformation score, there were a few papers focused exclusively on structural changes. It is not clear if there was a significant trend or movement within the literature to move away from the established norms and towards a transformative strategy based on a reformulation of socio-political and economic processes.

An important finding that was identified within the articles (this is similar to those in the workshop report), specifically, was recognition of the differing impacts climate change has on gender groups in relation to societal roles. The literature analyzed climate change from a framework in which social, political, cultural, and economic factors determined the impacts of environmental changes on the population. This means recognizing that issues such as living costs, societal activities, and employment opportunities can be exacerbating factors for vulnerabilities associated with climatic change (Archer, et al., 2017: 17). Moreover, many studies adopted strategies rooted in multidisciplinary approaches where community knowledge played an essential role. However, these two findings are not critically analyzing underlying social and economic structures and paradigms.

Despite the general awareness of the different life experiences mediated by factors like gender, much of the literature failed to propose measures or strategies that challenge the paradigms which exacerbate the disparate life experience that climate change entails. Some studies advocated for analyzing situational and political realities with disciplinary and institutional lenses derived from communities in order to design strategies that take into consideration their values, needs and perspectives. Different from the majority of the studies, they have considered how individuals from the communities play the role of intellectual partners as the result of a process of decolonization in the research throughout the reformulation and contextualization of the historical and current forces that influence Indigenous communities (Huntington, et al., 2019: 1220).

The following section analyses and combines insights from the literature review and the workshop results as they relate to the theoretical framework. The reviewed literature is analyzed in terms of three areas, each of them involving a distinct element of the transformation concept. Therefore, this section highlights why research on gender and climate change should consider an intersectionality and transformative lens as a means of augmenting adaptation research.

Climate change as a complex historical and systemic issue

Future outcomes of climate change impacts are inseparable from historical and systemic complexities. In terms of intersectionality, this can be understood by reflecting on issues of colonial legacies, social relationships, and other complicating factors that determine the societal roles and power structures.

Recognition of the historical or systemic factors which complicate climate change were evident in 21 articles {1-18, 20,21,24}. Of these, 9 articles {1-4,8,11,12,15,24} also received an overall moderate-to-high or high level of transformation, with the remaining 12 receiving a low-to-moderate level. These studies analyzed climate change in the context of multiple risks, with examples such as high rates of poverty, suicide, substance abuse and limited medical access. Those factors, together with unemployment rates, were also noted at the workshop (Hovelsrud et al., 2013). This highlights the need to consider political and historical processes, such as colonization, which have generated inequality and power disparity within the Inuit communities. For example, several studies examined food insecurity among women, addressing the importance of cultural practices, such as food sharing, and social and family networks that allow women to improve food security for themselves and their families. Moreover, these analyses included other factors such as type of employment and purchasing power as factors that render adaptation strategies unequal. These findings are similar to discussions in the workshop report where the participants, referring to own studies, suggest women and men can develop different behavior practices and get involved

in different types of activities in response to change, including climate change (Hovelsrud et al., 2013).

On the other hand, there were some studies which did not analyze climate change in the context of multiple factors {19,22,23}, and received no points for transformative elements. These studies focused exclusively on reporting climate change's impacts on Inuit life but did not reflect on the processes that exacerbate these impacts and how they generate different vulnerabilities within communities. There was a lack of interaction between the social, biophysical and technological factors (among others) in the analysis, or as described here, the System Model. As an example, the article *Towards a sustainable future for Nunavik* [22] proposes the necessity to develop economic systems which gives sustainable opportunities to Inuit in Nunavik, strengthening local governance (Rodon & Schott, 2014). However, despite the article showing the traditional activities and jobs of Inuit women and men, it did not analyze the processes that generate different vulnerabilities and the influence that socially constructed roles have on the capacity to face climate change. There was little explanation on how relationships between society and nature are influenced by cultural, socio-political and economic determinants that the transformative element of historical change entails.

These results show that there is room for improvement for contemporary research to incorporate historical contextualization and critical reflection of social, political, and economic systems into their research. Overall, the 21 articles received a point for incorporation of a transformative systems model, and 19 of them {1-17,21,24} for acknowledging historical complexities.

Transformative Social Consciousness in Adaptation Research

Mainstream adaptation research often examines attempts to adjust existing systems to change, instead of focusing on the potential for the reformulation of practices and institutions that generate root and proximate causes of risk (O'Brien, 2012: 672). This process of adjustment implies a deterministic approach, where humans functionally adapt to an environment formulated in terms developed by the current system (Head, 2010: 236-238). Researchers who propose recommendations should be aware that research may inspire future policies, and therefore ought to consider deliberate processes which challenge entrenched systems and are effective at eliminating people's vulnerabilities and reformulating processes and power relationships. In this sense, deliberate processes are connected with the transformative element of social consciousness. The review process highlighted an interesting distinction between those articles which focused on adaptive approaches, and those which rejected them.

Within the collected literature, 19 studies applied adaptation approaches. Of these, 15 articles [5-7,9,10,13,14,16-23] had 2 or less transformative components in their analysis and 4 studies [11,12,15,24] received a 3; however, not one adaptation study included a significant element of transformative social consciousness. This was largely because the studies lacked a deliberate focus on processes of change rooted in culture and cognition and that in turn are shaped by economic, social and institutional practices.

For example, several studies on food insecurity noted that vulnerability was higher for women. These concluded that Inuit women's food security status is influenced by socioeconomic and political factors. While these addressed important socio-economic issues for a marginalized group, the measures proposed in the article to moderate food insecurity were mostly short-term and reactive: policies based on income support and facilitating inter-community sharing. Vulnerability

of women was framed as an intrinsic problem of being a woman - and proposed *symptomatic* treatment, rather than *systemic*. This avoids revealing and questioning the social processes and institutions that create obstacles and exacerbate vulnerabilities. It conceals the drivers that put women in this vulnerable position in the first place, ignoring the reasons that explain it (Bradshaw cited in Tschakert & Machado, 2012: 277-278). The workshop also acknowledged that the adaptation responses are related to social roles in the communities and should be in focus when studying climate adaptation (Hovelsrud et al., 2013).

Interestingly, 5 articles [1-4,8] rejected the dominant discourse about adaptation to climate change, arguing said discourse can imply a technocratic notion, one in which there is a "correct" adaptive strategy that is readily available and possible. The concern being that adaptive strategies do not sufficiently frame the social elements of climate change or the complex behavioral aspects, but instead portray a technical problem with functional solutions (Beaumier, Ford & Tagalik, 2015: 552-553). These 5 articles contend that adaptive strategies are akin to bandaging a wound yet failing to correct the problem and prevent future damages. As such, they consider deliberate strategies that not only recognize the social, political and cultural roots that frame vulnerability, but also promote change through examining socially constructed roles and distinctions in order to identify the disparities within communities and eliminate the differential vulnerabilities to climate change. These studies have performed an average of 3.6/4 showing a high presence of transformative potential in their analysis.

For example, *Gender Justice and Rights in Climate Change Adaptation. Opportunities and Pitfalls* [4] considers that adaptive strategies imply a notion of objectivity that is predominant in the technological perspective of vulnerability and climatic strategies. It argues this perspective hides explicit language of harm and danger "but also purposefully obscure[s] underlying uncertainties" (Alaimo, 2009 cited in Tschakert & Machado, 2012: 277). The non-critical perspective articulated by adaptive strategies does not provide sufficient space to marginalized groups to articulate their needs, rights and responsibilities. They are silenced in the debates concerning their vulnerable position, and in research. In this regard, the description of women as victims and caretakers is a discourse in which women act as a crucial agent in adaptive programs; however, this noncritical approach to women's roles, responsibilities and knowledge, without an explicit consideration of the power analysis, will exacerbate the "feminization of responsibility" (Tschakert & Machado, 2010: 278).

Outcomes and intersectionality: Gender, class and ethnicity as drivers of inequality

The final key component of transformative approaches is connected to the recognition of outcomes as a result of relationships, structures, social networks, and ecosystems. This article argues that the recognition of inequalities in climate impacts are the result of the intersections of multiple social determinants - such as age, race, social class, social role and access to knowledge. This implies the necessity to deconstruct and reformulate the paradigms that dominate the relationship between society and the environment. For this reason, it is important to focus on the result of the strategies and see if they have incorporated the knowledge, needs and values of the receptors of these policies. This connects with the transformative element of Outcome, or the focus on the desirable result of a transformative process.

Seventeen of the captured studies included a transformative outcome element as a result of applying interdisciplinary approaches, and nine of these received an overall score of 3 or higher

{1-4,8,11,12,15,24} in the overall presence of transformative components. These studies worked to highlight how the consideration of gender as a sectorial category implies the rejection of its connotations of power imbalances between women and men and consequently their differences between their roles and social positions. Moreover, the analyses include gender as a transversal category, since climate change impacts have a repercussion on different social aspects such as health, security, and wellbeing. This is exemplified by the fact that being Indigenous women translates into lower incomes, greater food insecurity, and potentially higher unemployment rates. These articles also show that environmental degradation entails a risk for the physical well-being but also for the cultural survival of Inuit culture and identity. Similar to the workshop report, the literature review shows that the higher level of depression, domestic violence, substance abuse and suicide within Inuit communities is associated with the expectations that young generations (men especially) have of their future. They do not see a future as hunters and consequently contributors to their community for themselves, and at the same time they feel that they do not fit into the cash employment structures that are becoming the dominant lifestyle (Greaves, 2016: 667). These kinds of results suggest a complex, robust, and detailed interdisciplinary analysis.

The use of a critical approach that addresses gender, race and social class in order to determine the security threats is also a characteristic of interdisciplinary studies. A critical approach rejects the division of the concept of security in different sectors such as military, political, social and environmental, suggesting that security has to incorporate all the factors that influence the population's security. This approach will entail an opportunity to promote economic activities that support the priorities and traditions of Inuit communities. An example to illustrate the critical approach is the one included in the article *Securing sustainability: the case for critical environmental security in the Arctic* {5} regarding the "energy security" in the communities of the Arctic. Inuit communities are considered energy insecure because they rely on expensive imported diesel and they suffer periodical fuel shortage that is essential for transportation and heating. However, these problems are omitted in the policies framework focused on the state security that prioritizes the intensive extractions of fossils fuels. Despite this, extraction activities can imply economic benefits, but it also entails pollution threats and a greater dependency of these communities on the fossil fuels that cause climate change (Greaves, 2016: 667-668).

However, dominant analyses maintain that a functioning environment is an essential condition for providing security in the Arctic but implies a compromise with a development strategy shaped by hegemonic processes. This compromise strategy may exacerbate climate change impacts on Inuit populations. This again connects with the transformative component Outcome, when strategies developed can entail potentially undesirable consequences for vulnerable groups. A critical and interdisciplinary approach is coherent with a transformative conception based on the rejection of any process that presupposes that climate change will entirely reorganize societies and ecologies of Inuit communities. Transformative strategies reject the continuity of consumption and industrial processes that promote climate change, which represent a pathological approach to security rooted in the tension between catastrophic climate change and the perpetuation of activities that are causing this threat (ibid).

Of the articles which did not take an outcome approach {16-20,22,23}, only articles number 16 and number 17 scored more than 1 (0.86). These articles did recognize the social, economic and cultural components in their analysis of climate impacts, and how the traditional policies and

strategies exacerbate the social, gender and race inequalities; however, their proposed solutions focused on models in which established growth paradigms, such as extractive activities developed in some communities of Nunavut, should coexist with the promotion of other subsistence activities which are essential for the culture and identity of Inuit. For example, they presented discussions on the necessity of incorporating the needs, and knowledge of Inuit communities through the creation of advisory boards that consists of elders, youth representatives, representatives from the local institutions and what the study calls "selected outside experts" (Rodon & Schott, 2014: 275). However, the consideration of people from outside as experts who are going to "guide" and "assist" the Indigenous communities towards a sustainable future implies the acceptance of the principles and paradigms from outside of the Arctic playing for the Arctic inhabitants the role of advisors. This approach involves local experts as intellectual partners, not merely as information sources to be analyzed by other persons in other places (Huntington et al, 2019: 1220). It connects with the theoretical aspect of rejecting generalizations and deconstructing western paradigms that are imposed to analyze different contexts and at the same time to cause perpetuation of the colonial relationships. The workshop experts also expressed a need for research to be inclusive and meaningful for communities. They also noted that the concept of gender and gender theory are applied differently in different contexts and research traditions (Hovelsrud et al., 2013). This creates a conundrum for analysts when disentangling whether climate adaptation and transformation are gendered.

Concluding remarks

Transformation supports not only a change of beliefs and loyalties, but also a questioning of certain general assumptions about the relationship between people and environment. It is here where the concept of transformation connects with the nature of postcolonial feminism including the option of challenging the growth and economic consumption paradigms. In this way, this article has explored the extent to which elements of transformation are found in research exploring social change.

Therefore, this article identified the number of ways the concept of transformation represents an approach to systemic change, specifically that transformation entails:

- Change that involves socio-technical and socio-ecological systems (System Model) considering climatic strategies as a function of the wider political and economic environment, shaped by socio-political, economic and cultural factors in order to deal with a complex issue such as climate change.

- Change that is defined by historical processes which explain the factors that are behind the current power structure (historical change) and the importance of considering that the materiality of nature is socially produced and consequently the social relations of power are connected to nature through differences in access, control, forms of appropriation and representations of the environment.

- Change which has a deliberate intention of eradicating barriers rooted in culture and cognition, and expressed through economic, social policies, and institutional practices (social consciousness). As such, it is critical to develop strategies that go beyond incremental adjustments to deliberate processes which challenge entrenched systems maintained and shaped by power relationship.

- Change that implies achieving benefits through the empowerment and inclusion of all types of knowledge, values and concerns (outcomes). This implies the deconstruction and reformulation of the hegemonic paradigms and the inclusion of gender, race and social class in the analysis, in order to eliminate the limitations that subalterns have to promote any change in a globalized system which margins are designed from the center.

However, in a globalized world where unified strategies are more effective in combating global issues such as climate change, the debate about the analytical pertinence of postcolonial feminism has emerged (Oliva Portolés, 2016: 93-95). The approaches that encourage reflection on diversity, intersectionality, individuality, and contextual responses have a place in addressing issues which require unified and coordinated global responses. These variants on feminist theory are focused on the particularities and differences among feminism through the rejection of conceptual generalization and the confrontation to the dominant analyses that marginalizes other realities that women experience around the world (Zirion Landaluze & Idagarra Espel, 2014: 36). However, as it is said throughout the article, women from different geographical areas does not always have the capacity to challenge the current system.

Applying interdisciplinary strategies would entail a reformulation of the concepts developed by the complicity between the capitalist exploitation and the colonial values. The complicity relationship is designed on the basis of the neoliberal world economic system. As such, globalization entails a recognition of the superiority of certain postulates generalizing them as proper solutions for all types of communities. The reformulation of the hegemonic processes is indispensable to combat class, race and gender divisions and consequently creating the conditions for the most vulnerable groups to allow them to create knowledge and design strategies that promote change. For this reason, the postcolonial feminist framework is analytically pertinent in a globalized world only if it gives certain unity for a subject who needs to be defined as a collective actor in a globalized context, but at the same time recognizes the subjects' unique cultural and geographical realities.

As shown by the self-reflective report and the literature review, there is support or evidence for the importance of transformative adaptation approaches to better address complex issues relating to intersectionality and social structures when examining climate change impacts. This study supports a recommendation to the research community to further consider applying transformative adaptation approaches. While a focus on adaptive strategies was sufficient in the past, postcolonial feminist perspectives have illuminated that addressing these complications requires more than simple recognition of intersectional realities. Transformative approaches have the potential to challenge established systems in such a way that such issues are addressed through more complex systemic change. As shown by the review, evidence for this is born from the evolving nature of Arctic research, and the increasing recognition of strategies that don't merely attempt to adjust to the system but also refute it to deal with a global security threat such as climate change.

In concluding, we point out that there is a conflict between the theoretical feminist framework and transformative approaches. Theories such as postcolonial feminism offer solutions based on the recognition of cultural and social diversity among women in different realities, cultures, and regions around the world. However, this theoretical framework struggles to find strategies that could move different people towards a common goal in order to achieve practical transformative approaches. The current system implies the replacement of the concept of diversity into

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atomization creating a market where different individuals compete against each other. Assuming that we are all a mixture of many factors and that these factors affect each other. This is reflected in intersectionality where we are all affected by social class, our position in the productive system and everything that derives from it. Therefore, it is essential to highlight diversity connected from the material conditions, and in this way post colonialism needs to develop strategies to reach unity of action, not as an opposition to diversity but as a solution to reduce atomization. This in turn would likely promote transformative strategies to face global problems such as climate change.

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Appendix

Table: Summary and Scoring of Articles

Article	Summary	Evidence of Transformation Approaches	Score
1. Natalia, K. (2011). Climate change effects on human health in a gender perspective: some trends in Arctic research. *Global health action*, *4*(1), 7913.	Examines age and gender in current arctic research. Highlights gaps in knowledge/challenges in research trends on climate change, health, and gender. Explores how multidisciplinary approaches are effective in Arctic gender research, and represent a challenge to academic homogeneity by including all types of knowledge.	**System Model:** Promotes structural change through recognition of the influence of socio-political factors in environmental changes' impacts. **Social consciousness:** Takes into consideration the widest context in which climate change occurs - uses gender perspective to analyze its impacts. **Outcome:** Includes particularities of different geographic and social realities to design climatic strategies.	**3 / 4** **Moderate**

| 2. Williams, L. (2018). Climate change, colonialism, and women's well-being in Canada: what is to be done? *Canadian Journal of Public Health*, 109(2), 268-271. | Examines evidence for how climate change and resulting policies/strategies may worsen gendered social and economic inequalities.

Article rejects evaluations of vulnerability as a descriptor, seeking to identify causes of inequality between genders. Study promotes agency throughout the participation process. | **System Model:** Recognizes how capacities to face climate change differ between gender positions, resulting from socio-political, economic, and cultural processes.

Historicity: Analyzes situational impact on women's well-being in the context of the historical marginalization of Indigenous women.

Social consciousness: Proposes strategies to question acritical scientific frameworks used in analyzing climate change's long-term impacts and adaptive strategies.

Outcome: Focuses on necessity to both consider gender perspectives/participation in decision-making, and also promote critical changes to neocolonial conceptualizations of economic growth and anthropocentric world views. | **4 / 4**

High |

3. Bunce, A., Ford, J., Harper, S., Edge, V., & IHACC Research Team. (2016). Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Natural Hazards*, *83*(3), 1419-1441.	Presents a community case in Iqaluit (Nunavut) connecting vulnerability and adaptive capacity of Inuit women to environmental conditions. Analyses impacts of climate change on women's traditional activities and well-being. Findings suggest climate change is not gender-neutral, that culturally shaped gender roles influence human/environment interactions, and therefore livelihoods and well-being. Suggests climate change will exacerbate gender differentiated vulnerabilities.	**Historicity:** Recognizes that different vulnerabilities of Inuit women are shaped by socially construed roles that reflect disparities of power as a result of a changing process. In this way, the social relations of power in te community that structures society, determined the differences in access, forms of appropriation and representation of the environment. **Social consciousness:** Focuses on factors which influence women's capacity to face climate change, such as access to financial resources, substance abuse, mental and physical health, food insecurity, social network, and the necessity to adopt strategies that go beyond small adjustments. **Outcome:** Argues for necessity to include discussion about traditional women's activities not previously or typically discussed in another research.	**3 / 4** **Moderate**

4. Tschakert, P., & Machado, M. (2012). Gender justice and rights in climate change adaptation: Opportunities and pitfalls. *Ethics and Social Welfare*, *6*(3), 275-289.	Examines research indicating that gender, social class, and ethnic inequalities undermine the potential of communities, societies, and individuals to be have significant roles in transformative processes. Aims to adopt transformative strategies based on a human security, challenging neoliberal thought in order to identify causes of material, political, and power inequalities.	**System Model and Historicity:** Argues that social gender roles shape by cultural and historical norms result in women and men experiencing environmental changes in different ways. **Social consciousness:** Establishes that vulnerability and capacities to face climate change are determined by work gender division, labor mobility, and structures in decision-making processes. **Outcome:** Questions acritical acceptance of scientific frameworks of climate change through the inclusion of women's knowledge and concerns.	4 / 4 **High**
5. Greaves, W. (2016). Securing sustainability: the case for critical environmental security in the Arctic. *Polar Record*, *52*(6), 660-671.	Article argues achieving sustainability requires that, "Arctic security must me based on a critical understanding of human-caused environmental change." Research aimed to develop a critical approach of security that allows insecurity to be conceptually linked to global processes of production, consumption, militarization, and fossil fuel extraction.	**System Model:** Analyses environmental change as caused by human action and the socio-political impacts across the region. Argues that no conception of security which fails to address the relationship between human well-being and anthropogenic environmental change can be sustainable. **Outcome:** Alternative futures require questioning existing structures and envisioning how they might change or be changed.	2 / 4 **Low - Medium**

6. Blangy, S., Bernier, M., Bhiry, N., Jean-Pierre, D., Aenishaenslin, C., Bastian, S., ... & Gibout, S. (2018). OHMi-Nunavik: a multi-thematic and cross-cultural research program studying the cumulative effects of climate and socio-economic changes on Inuit communities. *Éco science,* 25(4), 311-324.	Uses participatory-action research to identify priorities of the Observatory of Human–Environment Interactions (OHMi) in Nunavik. Priorities included elder-youth knowledge transmission, northern agriculture, preserving Inuit culture, language and identity, protected areas, mining employment, natural hazards and risks, and wildlife vulnerability. Aimed to develop a program that integrates local and scientific knowledge between sectorial teams, supporting interdisciplinary synergy enabling researchers to respond to the diverse challenges of environmental change.	**System of Model:** Research aimed to study the accumulative impacts that environmental changes have on the socio-ecosystem. **Outcome:** Research is based on systemic, holistic, cross-disciplinary, participatory research oriented toward local and sustainable solutions with gender and social equality.	**2 - 4** **Low-Medium**
7. Healey, G. K., Magner, K. M., Ritter, R., Kamookak, R., Aningmiuq, A., Issaluk, B., ... & Moffit, P. (2011). Community perspectives on the impact of climate change on health in Nunavut, Canada. *Arctic,* 89-97.	Research contributes to literature on perceived health effects of climate change in Inuit communities by identifying community priorities surrounding this issue. Highlights importance of participatory research to obtain community perspective and promote social action from individual to national levels.	**System Model:** Argues that climatic impacts affect economy, culture, and life-style of Inuit communities, and effects are exacerbated by the current system processes. **Outcome:** Promoting community participation and social capacity, thereby empowering communities to gain a sense of control, is essential to managing the health effects of climate change.	**2 / 4** **Low-Medium**

8. Huntington, H. P., Carey, M., Apok, C., Forbes, B. C., Fox, S., Holm, L. K., ... & Stammler, F. (2019). Climate change in context: putting people first in the Arctic. *Regional Environmental Change*, 19(4), 1217-1223.	Article promotes a reformulation of climate change treatment in policies and research, developing an approach based on decolonization, emphasizing importance of indigenous voices in climatic strategies. Research aimed to develop contextual approach that insists climate change, strategies, and policies can only be designed effectively if climate is analyzed from both historical and contemporary contexts, in which the many forces and issues affecting people are recognized.	**System Model:** Aims to identify climate change in the context of multiple risks such as poverty, substance abuse, and limited medical access amongst others. **Historical change:** Adopts decolonized framework, implying a deep research contextualization within historical and contemporary issues affecting indigenous communities. **Social consciousness:** Aims to develop strategies to reframe processes dominated by colonization processes which exacerbates social inequalities. **Outcome:** Demonstrates how reports/policies by official institutions privilege certain actors and countries instead of developing strategies recognizing the local context.	4 / 4 High
9. McClymont Peace, D., & Myers, E. (2012). Community-based participatory process–climate change and health adaptation program for Northern First Nations and Inuit in Canada. *International journal of circumpolar health*, 71(1), 18412.	Study identifies elements of participatory research which should be normatively included to study impacts of climate change on health. Study seeks to develop suitable tools for the local context in which these strategies will be applied. Research aimed to promote community action as well as strategies and policies that include indigenous knowledge to combat the impacts that climate change has on the health of Inuit communities.	**System Model:** Focuses on perceptions of Nunavut inhabitants about impacts that climate change has on their subsistence activities, culture, and well-being. **Outcome:** Promotes a multidisciplinary methodological approach to describe the social and environmental conditions of Inuit communities. Focuses not only on climate change and health, but on taking community approaches into consideration.	2 / 4 Low-Medium

10. Archer, L., Ford, J. D., Pearce, T., Kowal, S., Gough, W. A., & Allurut, M. (2017). Longitudinal assessment of climate vulnerability: a case study from the Canadian Arctic. *Sustainability Science*, *12*(1), 15-29.	Presents a longitudinal assessment of climate change vulnerability, examining a case population in Ikpiarjuk, Canada. Focuses on risks of subsistence activities in indigenous communities. Research adopts a vulnerability approach, characterizing climate change in the context of socioeconomic drivers, such as marginalization, inequality, exploitation, and exclusion	**System Model:** Argues that changes in both environment and socioeconomic context have exacerbated risks in the subsistence activities of indigenous communities. **Outcome:** Adopts a new approach to go beyond traditional knowledge transmission, allowing a broad characterization of key trends and factors affecting exposure and adaptive capacity to changing climatic conditions.	**2 / 4** **Low-Medium**
11. Beaumier, M. C., Ford, J. D., & Tagalik, S. (2015). The food security of Inuit women in Arviat, Nunavut: the role of socio-economic factors and climate change. *Polar Record*, *51*(5), 550-559.	Explores how food insecurity has become a critical element of the human dimension of climate change, examining how socio-economic and cultural factors shape food security in the Arctic. Examines how food insecurity is connected to women's purchasing power and an emerging trend of hunters selling harvests to community instead of sharing.	**System Model and Historicity:** Analysis demonstrates that food insecurity is connected to numerous issues: poverty, inequality, addiction, and the high costs of hunting. **Outcome:** Focuses on importance of analysis in which gender is not considered a sectoral category, and that being an indigenous woman entails unique security threats and climatic impacts.	**3 / 4** **Moderate**

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12. Pearce, T. D., Ford, J. D., Laidler, G. J., Smit, B., Duerden, F., Allarut, M., ... & Goose, A. (2009). Community collaboration and climate change research in the Canadian Arctic. *Polar Research, 28*(1), 10-27.	Presents research derived from a collaboration between researchers, northern research institutes, and community partners. Community-research analyzes experiences and adaptive practices of northern communities to environmental and socio-cultural changes. Focuses on need to incorporate experiences of communities, as well as the social, economic, political and cultural environment in research to expand knowledge of climatic impacts on and in Inuit communities.	**System Model and Historicity:** Reports how experience of and capacity to face climate change varies within and between regions and communities with differing social, political, economic, and historical contexts. **Outcome:** Demands active collaboration with community members. Argues that developing a research project with an Arctic community is a shared process, evolving from mutual trust and understanding of the cultural context in which the research is being conducted.	3 / 4 **Moderate**
13. Andrachuk, M., & Smit, B. (2012). Community-based vulnerability assessment of Tuktoyaktuk, NWT, Canada to environmental and socio-economic changes. *Regional Environmental Change, 12*(4), 867-885.	Study characterizes vulnerability in the western Canadian Arctic (Tuktoyaktuk) in the context of ongoing socio-economic and environmental changes. Describes multiple impacts of climate change on Canadian arctic communities, specifically, how environmental changes have affected employment, municipal services, infrastructure, and the loss of traditional knowledge and practices.	**System Model:** Climate change is analyzed as a complex issue which impacts the economy, general well-being, culture, and social areas. **Outcome:** Research focuses on the participation of the local institutions and organizations in the design of the climatic policies.	2 / 4 **Low-Medium**

14. Collings, P., Marten, M. G., Pearce, T., & Young, A. G. (2016). Country food sharing networks, household structure, and implications for understanding food insecurity in Arctic Canada. *Ecology of food and nutrition*, *55*(1), 30-49.	Examines the cultural context of food insecurity among Inuit in the Northwest territories. Focuses on how food access and is connected to household contexts. Article establishes that single woman households are more likely to experience food insecurity due to socially constructed gender roles. Presence of a male hunter in households is linked to greater access to country food, which is important to Inuit food security and cultural need.	**System Model:** Establishes that issues such as food insecurity, linked to environmental changes, are exacerbated by social constructed roles. **Outcome:** Research aims to construct a concept of security derived from correlations between social issues and cultural and environmental changes	**2 / 4** **Low-Medium**
15. Beaumier, M. C., & Ford, J. D. (2010). Food insecurity among Inuit women exacerbated by socio-economic stresses and climate change. *Canadian Journal of Public Health*, *101*(3), 196-201.	Study identifies and characterizes determinants of food insecurity among Inuit women via an in-depth case study from the community of Igloolik, Nunavut, focusing on how multiple stressors affect access, availability, and quality of food. Research connects food insecurity to social problems such as poverty and addiction, which contribute not only to food insecurity but to poor health.	**System Model and Historicity:** Shows how food security and status of Inuit is influenced by social, economic, political and environmental conditions and processes which interact over multiple spatial and historical scales. **Outcome:** Focuses on consideration of gender as a transversal category. Recognizes that being women and indigenous entails greater likelihood of food insecurity.	**3 / 4** **Moderate**

16. Pearce, T., Smit, B., Duerden, F., Ford, J. D., Goose, A., & Kataoyak, F. (2010). Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada. *Polar Record, 46*(2), 157-177.	Article documents and describes exposure sensitivity to climate change and the adaptive strategies employed in the community of Ulukhaktok, Northwest Territories. Highlights need to include experiences of local communities in research to ensure relevance for Arctic communities adapting to environmental changes.	**System Model:** Demonstrates that socio-economic factors, such as financial access, time limitations, and changes in traditional knowledge among young people are affecting the capacity to face environmental changes. **Historicity:** Argues that assessments of community vulnerability to climate change require knowledge of and past experiences with climate conditions.	**2 / 4** **Low-Medium**
17. Laidler, G. J., Ford, J. D., Gough, W. A., Ikummaq, T., Gagnon, A. S., Kowal, S., ... & Irngaut, C. (2009). Travelling and hunting in a changing Arctic: assessing Inuit vulnerability to sea ice change in Igloolik, Nunavut. *Climatic change, 94*(3-4), 363-397.	Connects local vulnerability to environmental changes experienced in the Inuit community of Igloolik, Nunavut. Attempts to identify who is vulnerable, to what stressors, and reasons that explain this vulnerability. Research includes a vulnerability perspective that explores climate change in the context of socio-economic drivers such as marginalization, inequality and exclusion	**System Model:** Argues that capacity to face climate change in Nunavut is both enabled and constrained by social, economic, and cultural factors. **Historicity:** Said factors emerge from the erosion of traditional and historical knowledge, and abilities/skills that have been passed down through generations of Inuit.	**2 / 4** **Low-Medium**

18. Crowley, P. (2011). Interpreting 'dangerous' in the United Nations framework convention on climate change and the human rights of Inuit. *Regional Environmental Change*, *11*(1), 265-274.	Argues environmental changes have fundamentally altered the Inuit way of life, and that changes to means of subsistence, property, and cultural heritage could constitute human rights violations. Research uses targets set by the United Nations Framework as a tool to analyze vulnerability and proposing strategies to face climate change and to consider the impacts of climate change on Inuit communities as a human right violation.	**System Model:** The mentioned targets have a global nature and do not take into consideration the particularities, and geographical context of Inuit communities, imposing responsibilities in a general way without considering gender, class or race as factors that imply differences in capacity to face climate change. However, despite the article not taking into consideration these particularities, it focuses on the impacts that climate change has in particular on Innuit human rights focusing on the concept of human security in which climate change threats are exacerbated by socio-economic processes.	**1 / 4** **Low**
19. Rapinski, M., Payette, F., Sonnentag, O., Herrmann, T. M., Royer, M. J. S., Cuerrier, A., ... & Guanish, G. (2018). Listening to Inuit and Naskapi peoples in the eastern Canadian Subarctic: a quantitative comparison of local observations with gridded climate data. *Regional environmental change*, *18*(1), 189-203.	Focuses on how environmental changes affect subsistence activities in Inuit communities in the eastern Canadian Subarctic. Employs a quantitative approach to compare the observations made by Inuit in the northern communities of Canada and to see the level of agreement between them. However, the article does not reflect on the multiple processes that exacerbate the impacts of climate change on Inuit communities and the reasons why they generate different impacts within communities. There is a lack of interaction between the social, biophysical and technological factors (among others) in the analysis, or as described in this article, the System Model.	**Non-presence.**	**0 / 4** **No Presence**

20. Ford, J. D., Bolton, K., Shirley, J., Pearce, T., Tremblay, M., & Westlake, M. (2012). Mapping human dimensions of climate change research in the Canadian Arctic. *Ambio*, *41*(8), 808-822.	Presents systematic review of mapping current research trends on human dimensions of climate change in the eastern and central Canadian Arctic. Scope is in analyzing the impacts of climate change on communities and understand how impacts might play out elsewhere. Results suggest there is a lack of analysis on socio-economic and ecological implications of adaptive strategies and their long-term viability and cost, given multiple stressors and competing policy priorities.	**System Model:** Highlights necessity for research to address how processes operating on multiple scales affect vulnerability and constrain or enable adaptation.	1 / 4 **Low**
21. Ford, J. D., Bolton, K. C., Shirley, J., Pearce, T., Tremblay, M., & Westlake, M. (2012). Research on the human dimensions of climate change in Nunavut, Nunavik, and Nunatsiavut: a literature review and gap analysis. *Arctic*, 289-304.	Analyzes interaction of future environmental and socioeconomic changes, and how they affect experiences of and responses to climate change. Focuses on discussing the widest determinants of vulnerability and adaptation of the communities of Nunavut, Nunavik, and Nunatsiavut.	**System Model:** Reports gap in literature in identifying socioeconomic determinants that shape vulnerability and capacity to face environmental changes. **Outcome:** Focuses on developing more comprehensive knowledge based on local studies in which local inhabitants could lead future research.	2 / 4 **Low-Medium**

22. Rodon, T., & Schott, S. (2014). Towards a sustainable future for Nunavik. *Polar Record*, *50*(3), 260-276.	Assesses existing socio-economic and living condition data to evaluate social well-being in Nunavik. Scope of research is to discuss possible sustainable development directions for Nunavik. Focuses on proposals to develop a transitional period in which extractive activities can coexist with subsistence activities which are essential for the Inuit culture and identity.	**Non-presence.**	**0 / 4** **No Presence**
23. Lambden, J., Receveur, O., & Kuhnlein, H. V. (2007). Traditional food attributes must be included in studies of food security in the Canadian Arctic. *International Journal of Circumpolar Health*, *66*(4), 308-319.	Focuses on how food insecurity is contingent upon access to certain foods. Results show how traditional food has many meaningful attributes that contribute to the health and cultural life of Arctic indigenous people.	**Non-presence.**	**0 / 4** **No Presence**

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| 24. Pearce, T., Ford, J., Willox, A. C., & Smit, B. (2015). Inuit traditional ecological knowledge (TEK), subsistence hunting and adaptation to climate change in the Canadian Arctic. *Arctic*, 233-245. | Focuses on necessity for approaches where Inuit communities can exercise leadership in research.

 Addresses importance of adopting traditional ecological knowledge (TEK) and designing climate strategies for and by Inuit. | **System Model:** Physical and socio-economic changes are exacerbating challenges in the capacity of Inuit to practice cultural and economic activities.

 Historicity: Historical and colonial legacies influence relationships between communities and the government, and shape Inuit capacity to face environmental changes.

 Outcome: Argues that the role of TEK is not recognized in most adaptation policy processes. Argues for the necessity to stop using western paradigms to analyze the climate change's impacts on Inuit communities. | **3 / 4**

 Moderate |