

Climate Change and Co-operative Housing in Nova Scotia:
Evaluating Adaptation Readiness, Policy, and Transformative Potential

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Abstract

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Canada faces overlapping crises in both accelerating climate change impacts and the diminishing availability of affordable housing. As governments at all levels respond to these challenges, a critical gap has emerged in our understanding of how different forms of housing tenure are being integrated into Canadian climate adaptation governance, and how decisions around equity and social vulnerability are factored into planning and policy processes. This thesis examines how adaptation plans and policies in Nova Scotia are integrating the needs of the non-profit co-operative housing sector into climate adaptation and assesses the adaptation readiness of housing co-operatives in the province. Two methods are employed: a systematic content analysis of municipal and provincial climate policy documents, and interviews with key informants across the co-operative housing sector and government agencies. Analysis is structured around a modified adaptation readiness framework which includes measures for equity, justice, and inclusion, and considers the potential for transformational adaptation which prompts systemic change and addresses the root causes of social vulnerability. Findings indicate that non-market forms of tenure, including co-operative housing, are largely neglected in adaptation policy and planning for NS. Several barriers which contribute to an overall low level of adaptation readiness for co-ops are highlighted, notably a lack of usable science and funding to facilitate adaptation. There are characteristics which position housing co-ops to be agents of transformational change at the intersection of housing systems and adaptation, as evidenced by emerging models of decommodified development, a propensity for participatory collective action, and professional and grassroots co-operative leadership which is willing to engage with the challenge of climate change. This potential will only be realized if key barriers are overcome through explicit attention to non-profit housing and social justice by adaptation planners and state policymakers.

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Chapter 1: Introduction

While limiting the severity of climate change through mitigation strategies that reduce fossil fuel reliance remains a crucial area of climate change action, the planet is already warming due to cumulative historic emissions (IPCC, 2021). The impacts of this warming are increasingly apparent around the world (Hoegh-Guldberg et. al, 2018). Coastal regions are experiencing increasingly severe risks such as sea level rise, more extreme weather events, greater storm surge, and coastal flooding (IPCC, 2021). In Canada, the need to adapt to these changes is widely recognized, and governments at all levels are adopting policies to reduce risk exposure and vulnerability to climate change impacts (Lemmen et. al, 2014; Reckien et al., 2014; Lesnikowski et. al, 2016). The Canadian federal government has committed to releasing a National Adaptation Strategy, due by the end of 2022, which aims to “unite all orders of government through shared priorities, cohesive action, and a whole-of-society approach” (Government of Canada, 2022).

Many challenges arise in adapting to a changing climate, as in seeking to protect complex human societies, there is more to be concerned about than just physical impacts (Adger & Barnett, 2009). Climate change impacts are regarded as risk amplifiers that exacerbate existing social vulnerabilities and understanding the relationship between climate risk exposure and social inequality is a key focus of climate change adaptation literature (Thomas et. al, 2019). Technical approaches to adaptation are often emphasized rather than those which foreground social considerations and outcomes, yet marginalized groups tend to experience disproportionately high vulnerability due to the interaction of climate change impact exposure, unequal socio-economic status, and lack of access to resources and political and decision-making power (Shi et al, 2016).

The housing sector is a key field in which social vulnerabilities are produced and reproduced, and a lack of adequate and secure housing can limit the adaptive capacity of individuals, households, and communities to cope with climate impacts (Cutter et. al, 2009; Dodman & Mitlin, 2013; UN Habitat, 2011). In Canada, housing prices continue to ascend to dizzying heights (Evans, 2021), while the stock of affordable rental accommodations has been in decline for decades, precipitated by the financialization of housing markets, developers that privilege private market housing, and more broadly, the rise of neoliberal policy regimes, all of

which contributes to a landscape of rising housing insecurity (Morris, 2015; Walks, 2014). This precarious housing market points to a potential ‘twin crisis’ of housing accessibility and climate vulnerability that fails to address key underlying socio-economic drivers if climate adaptation strategies and policies are not implemented with core housing need in mind (Thomas et al., 2019). If a key goal of climate change adaptation policies is to protect those who are most vulnerable in society (United Nations, 2015), it is clear that equitable climate change adaptation cannot occur without equitable adaptation at the level of the housing system. Canada’s housing system has long been premised on the private market as primary means of housing provision, with only marginal roles for social, non-profit, and co-operative housing, with state support for these alternatives waxing and waning throughout the decades. This system, squarely built on policies which privilege homeownership, has contributed to increased marginalization of vulnerable groups (Hulchanski, 2004). In light of accelerating climate impacts on people and residential property, pathways to bolstered housing security and housing justice must be fully investigated as a component of climate justice in order to reduce social vulnerability to climate change. A climate justice lens requires carefully analyzing who is marginalized or disproportionately impacted by the effects of climate change processes, including by any adaptation or mitigation interventions (Sultana, 2022).

The Canadian Mortgage and Housing Corporation (CMHC) now acknowledges that the crisis of climate change and housing affordability are growing concerns that must be simultaneously addressed. The organization instituted its first climate change strategy and dedicated climate change department in 2020. Though still in early phases, CMHC’s overall approach for addressing climate risks in the housing system appears to be focused on financial mechanisms and does not differentiate strategies for differing types of housing tenure, suggesting support to be generally targeted towards homeowners (see Annual Report 2020). That research and policy on adaptation in the Canadian housing system has focused on private property owners is demonstrative of the shift in stakeholder responsibility to homeowners in environmental risk management (Henstra et. al, 2019). There has been little attention to how residents of alternative forms of housing, such as non-profit co-operative housing, experience vulnerability to climate change or how this form of tenure shapes their capacity to respond to escalating climate risks. My research suggests this neglected area is an important one to understand, both for the purposes of protecting existing non-market housing co-ops from climate change impacts in order to ensure

their long-term viability, and as a potential means to reduce social vulnerability through incorporating enhanced opportunities for new housing co-ops as part of a transformative approach to climate change adaptation planning and policymaking. While the principles and positive socio-economic outcomes often associated with housing co-ops help build a case for an enhanced co-operative role at the intersection of climate change adaptation and housing systems, recognizing the shortcomings of Canadian co-ops and understanding barriers to equitable development in the co-operative housing sector is necessary in this regard.

In general terms, housing co-operatives are an alternative to both private market housing and state-owned public housing – they are housing developments that are collectively owned by their inhabitants and democratically controlled by these members as equals in decision-making processes. This unique structure promotes autonomy and social inclusion (Crabtree et. al, 2019). Co-operatives have proven to provide affordable housing solutions that offer greater housing quality and stability compared to state-run public housing, and deliver additional benefits by enhancing physical, mental, and social well-being for diverse and marginalized groups (Crabtree et. al, 2019; Lubik & Kosatsky, 2019). Despite these purported benefits and the growing need to safeguard housing systems from climate change impacts, there has been little peer-reviewed research on non-market housing co-operatives in relation to climate change adaptation, and none in the Canadian context. A 2021 thesis investigates the potential for adaptation to flood risk among Swedish housing co-operatives (Zetterlund, 2021), however Swedish housing co-ops are a rather different form of tenure compared to Canadian co-ops, being typically market-based and since the 1990's connected to neoliberal policies which encouraged the conversion of public housing to for-profit co-operatives (Andersson & Turner, 2014). In the U.S. research has examined the potential for co-operative land ownership to enable transformative climate adaptation for manufactured housing communities, ultimately finding that adaptive capacity for vulnerable, predominately low-income residents is boosted through membership in a network model of resident-owned communities (Lamb et.al, 2022). While housing co-operatives may take varied forms and serve many different functions for different populations, my study will focus on non-profit, non-market housing co-operatives, which comprise the majority of housing co-ops in Canada. These co-operatives are typically geared towards a mix of low and middle-income communities and may have operating agreements with various levels of government to keep costs stable and affordable (Hawley & Roussopoulos, 2019). This situation lends itself to a

grappling with complex governance issues, as housing co-ops constitutionally maintain autonomy over their own affairs while also being reliant on the state via the Canadian Mortgage and Housing Corporation (CMHC) to varying degrees, which can curtail ability of co-ops to deliver services and uphold their guiding principles of autonomy and democratic inclusion (Morris, 2015).

The aim of my research is to investigate climate change preparedness and adaptation opportunities for the co-operative housing sector in Nova Scotia, a province with both high place-based vulnerability to sea level rise and high social vulnerability to climate change (Rapaport et. al, 2015). Nova Scotia also boasts a rich history of co-operative organizing, being the first Canadian province to establish grassroots working class housing co-operatives in the 1930s (Cole, 2008).

My research questions are:

1. How prepared are housing co-operatives in Nova Scotia for adapting to the impacts of climate change?
2. How are the needs of the co-operative housing sector being considered in municipal, provincial, (and federal?) adaptation policies?

My conceptual approach to answering these questions builds upon the adaptation readiness framework proposed by Ford & King (2015), which argues certain conditions are important for successful climate change adaptation planning and implementation, operationalized according to the presence of six readiness factors with respect to a series of customizable, context-dependent indicators. The readiness factors that Ford & King identify as essential for adaptation are political leadership, institutional organization, adaptation decision making and stakeholder engagement, availability of usable science, funding for adaptation, and public support for adaptation. In light of the need for urgent transformational change at the intersection of housing and climate risks and ever-deepening inequality which exacerbates vulnerability, I propose an update to the framework, infusing the criteria with social justice considerations, and adding a seventh readiness factor: equity, justice, and inclusion in adaptation planning. The application of my modified adaptation readiness framework in the context of Nova Scotia will go beyond existing adaptation research in the province, as focused on assessments of outcome vulnerability, adaptive capacity, and governance related to the implementation of technical approaches

(Richter, 2021; Vogel et. al, 2020), to more deeply consider barriers and pathways to equitable, socially oriented adaptation in the housing system. My modified readiness framework, rendered as a preliminary ‘transformational readiness framework’, has potential utility beyond this study, as calls for transformational, equity-focused approaches to addressing climate change grow and continue to go unrealized (IPCC, 2021). My aim is for this framework of transformational readiness to be applicable in diverse contexts, adjusted as needed, and built upon by scholars, researchers, policymakers, and community activists seeking equitable social outcomes in situations where profound, transformational change is required to address differential vulnerabilities to climate change.

The study also explores potential opportunities and constraints for co-operative housing and collective tenure mechanisms to contribute to calls for transformative adaptation which addresses the root causes and systemic nature of vulnerability. This has pertinence for policy makers confronted with the intersecting crises of climate change and affordable housing scarcity. These crises are escalating not just in Nova Scotia, but throughout Canada. I hope to encourage further research into the transformative potential of co-operative housing for climate change adaptation, and how vulnerabilities, opportunities and barriers for housing co-op adaptation are shaped by interconnected environmental, social, and governance factors in different place-specific contexts. The results of the study will increase understanding of climate change preparedness in an understudied, alternative form of housing tenure in a province with increasing climate change risks, highlighting the potential for relevant adaptive responses. As residential adaptation in Canada has been focused on the housing market and targeted to property owners, I will address a critical gap which has emerged into how different forms of housing tenure are being integrated into Canadian adaptation planning and policy.

In the following section of this thesis proposal, I review the literature on fundamental concepts of climate adaptation, how climate change impacts are affecting Nova Scotia, how housing policy relates to adaptation, the potential opportunities and limitations for co-operative housing in the context of climate change adaptation, and the case of Nova Scotian housing co-ops. Chapter 3 provides an overview of my proposed methods, which include conducting interviews with key informants and analyzing government policies to determine how the state supports or constrains co-operatives in responding to climate change and enacting climate

change adaptation. This thesis follows a manuscript approach, with Chapter 4 comprising the text of the paper to be submitted for review and publication.

Chapter 2: Literature Review

Climate change adaptation is focused on responding to current and future impacts of anthropogenic climate change (Smit & Wandel, 2006). Initially seen as ancillary to mitigation goals, adaptation has emerged as a pillar of climate change policy in the 21st century (Schipper, 2006; Lesnikowski et. al, 2017). Studies of adaptation within human dimensions of climate change research aim to understand the complexity of human-environment relations, “lest ill-conceived strategies to reduce vulnerability stimulate social and market responses that create adverse effects of a kind similar to, if not worse than, what might be expected due to climate change” (Adger & Barnett, 2009, p.2801). In a decentralized federal state such as Canada, adaptation governance encompasses a complex, multi-level policy regime (Henstra, 2017). Over the past twenty years, the Government of Canada has been largely successful in generating a broad acceptance of climate adaptation policy ideas and goals, while establishing institutional arrangements to coordinate policy implementation across multiple sectors (Henstra, 2017). However, as one of the few high-income countries without a national-level plan to guide adaptation efforts, Canada is playing catch-up to peer nations, with the federal government set to release its first national adaptation strategy by the end of 2022. The purpose of the national adaptation strategy is to set strategic goals and solutions relating to themes of health and well being, resilient built and natural infrastructure, a strong and resilient economy, a thriving natural environment, and disaster resilience and security, with an implementation plan to be outlined after consultation with a wide array of stakeholders. In Nova Scotia, adaptation policy has been progressing for over a decade, favoring a localized municipal planning approach motivated by the provincial government (See Vogel et.al, 2020).

This literature review will delve into key concepts and areas of concern for climate change adaptation. I argue for a need to consider the role of housing co-operatives within adaptation strategies, and to explore how this might fit with calls for a ‘transformative’ approach to adaptation evident in the literature. Then, I outline specific climate risks pertaining to the province of Nova Scotia that make adaptation policies and strategies necessary before highlighting relevant intersections between housing policy, housing co-operatives, and climate change adaptation. I will conclude with a brief review of the limited empirical record dealing

with housing co-operatives in Nova Scotia, elucidating why the Nova Scotian context deserves attention.

2.1 Climate Change Adaptation: Foundational Concepts and Theoretical Considerations

As a response to anthropogenic climate change, adaptation is broadly defined as a process, action, or outcome in a system, at any scale from household to city to country, that allows the system to better cope with, manage, or adjust to a changing condition, stress, hazard, risk or opportunity (Smit & Wandel, 2006). Within the field of climate change research, practical applications of adaptation typically begin with assessing vulnerability to projected climate impacts and may involve determining the adaptive capacity of a community or region (Smit & Wandel, 2006). The vulnerability of a system or community is defined as the degree to which it is unable to cope with risks and exposures to impacts (ibid.). Adaptive capacity is defined as the ability, capacity or resilience of the system to adapt or recover from the effects or conditions that precipitate vulnerability (ibid.). These two concepts are interrelated and are assessed to determine means for implementing adaptation measures that increase adaptive capacity and reduce vulnerability (Adger, 2006; Smit & Wandel, 2006).

The concept of vulnerability in the climate change literature can be differentiated as either ‘outcome vulnerability’ or ‘contextual vulnerability’ (O’Brien et. al, 2007). These two different framings and their accompanying discourses have implications for the production of different types of knowledge and responses to climate change (O’Brien et. al, 2007). Outcome vulnerability is considered a linear result of projected climate impacts on a given exposure unit which can be offset by climate mitigation and adaptation measures. This is the predominant scientific conceptualization which underpins risk management approaches to adaptation, in which various interventions are introduced to reduce exposure to climate impacts and hazards, and residual vulnerability is measured post-implementation (O’Brien et. al, 2007). Contextual vulnerability on the other hand takes a multidimensional view of climate-society interactions, in which climate change is considered to occur in the context of political, institutional, economic and social structures and changes (O’Brien et. al, 2007, p.76). As this latter approach stresses the need to adapt by altering the social drivers of vulnerability, such as housing insecurity, and emphasizes the need to respond on the basis of equity and justice, contextual vulnerability is the conceptualization foregrounded in my analysis. A vulnerability framing which fails to

acknowledge these complex social dynamics can result in exacerbating social drivers of vulnerability, for example through advancing private sector interests into adaptation projects, using them as tools for wealth accumulation that widen the economic gap between rich and poor, and marginalizing particular groups of stakeholders in the decision-making process (Sovacool et. al, 2015). It is important as such to recognize that ‘not every response to climate change is a good one’ (Eriksen et. al, 2011), and that the potential for ‘maladaptation’ exists, wherein an intentional adaptation policy or measure inadvertently leads to increased vulnerability, shifting vulnerability, or eroding conditions for sustainable development (Juhola et. al, 2016). Adaptation measures may reproduce differential vulnerability, cementing the security of elites already well-positioned to deal with the climate risks while exacerbating the precarity of disadvantaged groups (Thomas & Warner, 2019). For example, a major climate-resilience infrastructure project in coastal regions of southwest Bangladesh provides protection from current climate risks and improves local economic conditions, but this short-term success may encourage socially vulnerable residents to remain in hazardous areas and encourage further in-migration (Magnan et. al, 2016). Long term climate projections estimate sea level rise will permanently impact much of this area in coming decades, risking the relocation of some 35 million coastal residents by 2050 (Magnan et. al, 2016). Another example of maladaptation is in expanding insurance regimes as a strategy of flood risk management and resilience building, which has the effect of crystallizing the status quo, structurally embedding risky behavior and inhibiting the likelihood of adaptative change after disastrous events (O’Hare et. al, 2016). Schipper (2020) argues that maladaptation will continue to be a risk as long as social drivers of vulnerability go unaddressed in adaptation projects.

In light of these concerns, Adger & Barnett (2009) stress that metrics to determine adaptation goals, success, and trade-offs can only be understood in the social context in which adaptation takes place; local values and specificities must be taken into account for adaptation to be effective, sustainable, and equitable. Justice-oriented studies highlight the social drivers of vulnerability, recognizing that marginalized groups tend to experience disproportionately high vulnerability due to the interaction of place-specific climate change impact exposure, unequal socio-economic status, and lack of access to resources and political and decision-making power (Eriksen et. al, 2011; Shi et. al, 2016; Nightingale et. al, 2020). As a feature of contemporary global economic modes of production, existing patterns of development often relegate low-

income residents to high-risk locations where land is cheap; a tendency which intersects with characteristics like age, gender, disability, pre-existing health conditions, and racial and cultural marginalization, exacerbating susceptibility to climate change impacts (Shi et al, 2016). That socio-economic inequality results in uneven vulnerability to climate change has become widely acknowledged in the literature, yet technical approaches to climate change adaptation continue to dominate, leaving the underlying social drivers largely unaddressed (Thomas et al., 2019).

Just as technical conceptualizations of vulnerability may diminish adaptation efforts, studies focused on adaptive capacity can be limited where adaptation implementation is concerned, as the possession of adaptive capacity in itself does not guarantee that adaptive action will actually occur (O'Brien et. al, 2006; Adger & Barnett, 2009; Ford & King, 2015). This difficulty in translating adaptive capacity into action can be the result of various 'barriers' which are fluid, variable, and context and actor specific (Biesbroek et. al, 2013; Eisenack et. al, 2014). Barriers may be broadly categorized as institutional, attitudinal, financial, and political, while examples of adaptation-specific barriers include difficulties in balancing short-term interventions with long term vision in the public and private spheres, uncertainties about the nature and scale of risks and effectiveness of adaptations, and institutional fragmentation (Eisenack et. al, 2014). Governments are considered key in both creating and removing barriers to adaptation: a lack of policy guidance, resources, and coordination between levels of governance may constrain adaptation, though governments remain key actors that can dismantle barriers by changing legislation or providing additional resources. (Biesbroek et. al, 2013). Lack of implementation in contexts with high adaptive capacity may be related to issues around political will, institutional and bureaucratic path dependencies and engrained norms, and how power and politics influence the framing of adaptation policies, practice, and analysis (Eriksen et. al, 2015).

As a complimentary concept to adaptive capacity, Ford & King (2015) propose a framework to examine 'adaptation readiness', allowing researchers to better understand the magnitude of risks posed by climate change and barriers to effective adaptation policy implementation. While studies of adaptive capacity can be understood as measuring the 'potential' for adaptation, Ford & King define adaptation readiness as, "the extent to which human systems are prepared to adapt, providing an indication or measure of the likelihood of adaptation taking place" (2015). In this thesis I propose an expanded adaptation readiness

framework that considers the potential for transformational change and makes equity and social justice imperatives explicit, moving beyond a conceptual orientation of adaptation as a technocratic exercise which addresses only the proximate causes of climate change vulnerability, such as infrastructure planning. As originally conceived, the readiness framework does not speak to the potential for adaptation to unfold across different pathways, or to the idea that in some contexts a transformational strand of adaptation may be necessary, with increasing calls for adaptation to climate change be taken as an opportunity to address deep-rooted inequities, and social drivers at the roots causes of vulnerability to climate change. As class, race, gender, and other social categories overlap to create unique and differential vulnerabilities, including in access to stable housing (Thomas et. al, 2019), this intersectional reality must be accounted for when considering appropriate responses to climate change. Downplaying the power-laden and contested nature of climate change responses runs the risk of producing or reproducing differential vulnerability to present and future climate hazards embedded in current social structures, and missing opportunities to intentionally redress power imbalances and social drivers of vulnerability.

Considering the characteristics of qualitatively different adaptation pathways when assessing the factors of adaptation readiness, I explore the potential for the readiness framework to be redeployed as one to evaluate ‘transformational readiness’. A transformational response, referring to systemic change, may not always be the desirable pathway for adaptation, but in the context of a housing system widely acknowledged to be in crisis and ripe with inequity, the root causes of social vulnerability are laid bare and point to a need and opening for alternative discourses. While transformational adaptation refers to an outcome in which new rights claims and changes in political regimes arise in response to climate change, I consider ‘transformational readiness’ to be the preconditions and preparedness for such an adaptive response to occur, indicating the likelihood of transformative adaptation to take place.

2.2 Transformative Adaptation and Opportunities for Co-operative Housing

The IPCC states that limiting warming to 1.5 degrees or below requires transformative systemic change, and that such systemic change needs to be linked to complementary adaptation actions, including transformational adaptation (de Coninck et. al, 2018). Pelling et. al (2015) conceptualize transformational adaptation as a non-linear response to climate change; turns in

direction or radical shifts in normative aspects of culture, development, and risk management that support systemic changes with an emphasis on equity and justice. The adaptation literature tends to define transformational adaptation by distinguishing it from more modest ‘incremental’ adjustments that respond to climate change (O’Brien et. al, 2012; Kates et. al, 2012). Some authors dispute this dichotomy, arguing that unrealistic ambitions for transformation may hinder the development of coherent governance frameworks for interventions to facilitate change (Termeer et. al, 2017), and that transformative adaptation can encompass a continuous decision-making process with action-learning cycles of both incremental and transformative change (Park et. al, 2012). Indeed, cumulative incremental changes may coalesce into transformational change, and may only be recognized as transformational in hindsight (Kates et. al, 2012).

Nonetheless, transformative adaptation may be a deliberate and intentional policy goal, highlighting a tension in adaptation research between accommodating change and consciously creating alternatives (O’Brien et. al, 2012). Transformational adaptation becomes necessary when regions and human systems exhibit high vulnerability and face severe climate change impacts, and are more likely to be implemented in contexts where external drivers create multiple stresses and systemic pressures; environmental, economic, and sociopolitical (Kates et. al, 2012). A need for transformational adaptation in urban settings stems from root causes of poverty, failures in sustainable development, and a lack of governance structures to facilitate social justice and equity, which are recognized as core aspects of climate-resilient development pathways (de Coninck et. al, 2018). Intentional transformational adaptation is fundamental change directed at the surrounding context of vulnerable social-ecological systems, pushing adaptation decision-makers and researchers to extend their concerns from the proximate causes of risk to its structural causes: social, cultural, and economic relationships. (Pelling et. al, 2015, pg. 114). Rather than simply accommodating climate change and associated vulnerabilities that are rooted in systemic injustice and inequities, transformative adaptation is an opportunity to challenge systems of oppression, assert agency, foreground inclusion, and secure a more equitable future (O’Brien et. al, 2012).

Pelling (2011) details a typology which distinguishes three main adaptation pathways: resilience, transition, and transformation. I use these conceptual distinctions to interpret the transformative potential of adaptation actions and policy instruments in my findings; to roughly

evaluate an overall level of transformational readiness. Adaptation as resilience acts at the most contained level of the three, seeking to achieve functional persistence in a system with a scope limited to change in technology, management practice or organization that does not question underlying assumptions or power asymmetries in society. Adaptation as transition encompasses changes in governance practices and incremental changes in governance systems, seeking to exercise existing rights within the established regime. Transformation is the most ambitious and deepest form of adaptation, driven by new political discourses and rights claims, leading to sweeping changes in overarching political-economy regimes.

Barriers to transformational adaptation include uncertainties about climate change risks and adaptation benefits, perceived costs, and ingrained institutional and behavioral traits that maintain existing resource systems and policies (Kates et al, 2012). However, transformational adaptations which deliver ‘co-benefits’ for other social agendas are more likely to overcome barriers (Kates et. al, 2012). Despite this tendency for co-benefits for climate mitigation and other societal goals, responses across all sectors and regions reported in scientific literature are dominated by minor modifications, with evidence of transformative adaptation in human systems low. While there is growing consensus in the literature on the need for transformational responses to build adaptive capacity and address root causes of vulnerability, formal adaptation responses to date display negligible evidence of widespread, rapid, and norm– challenging approaches that would adequately reduce climate risk (Berrang-Ford et al., 2021).

With their ability to reduce social vulnerability in the housing system, there is potential for co-operative housing to play a role in transformational adaptation strategies, if existing and future co-operative developments can continue to deliver affordable housing based on their instituted principles of democratic governance and equity, while enhancing foundations of justice and inclusion and incorporating measures to safeguard against escalating climate risks. Co-operative housing developments have proven to be a mechanism to increase the supply of affordable housing by providing non-market alternatives in an increasingly unsustainable housing market, addressing inequities while also providing benefits such as increased social inclusion and enhanced health and well-being for marginalized communities (Crabtree et. al, 2019; Lubik & Kosatsky, 2019). The foundational principles which most housing co-operatives adhere to and the unique democratic governance structure of co-ops appears to overlap with

characteristics identified as necessary for resilience-building in the context of community-based adaptation strategies: community involvement and inclusion of local knowledge, high degree of equity, social capital and values, an emphasis on learning, and effective governance and institutions (Ensor et. al, 2018).

However, there is evidence that in Canada the ability of co-ops to effectively exercise autonomous democratic governance and deliver on promises of social benefits and inclusivity is constrained by state policies, which privilege market forces and have encouraged the depoliticization of the co-operative housing sector (Chouinard, 1990; Morris, 2015). Hawley & Roussopoulos (2019) argue that Canadian co-operative housing, now largely divorced from the grassroots, has become an institution no less at the mercy of global capital and government regulations which deny their radical potential. They distinguish resident-led housing movements which centre on anti-capitalist politics from “institutionalized organizations which tend to prioritize promoting their sector’s workforce of non-profit service providers” (pg. 9). In the Canadian context this implies the Co-operative Housing Federation (CHF), a national co-operative federation which counts the vast majority of housing co-ops as members. Hawley & Roussopoulos characterize the CHF as an agent of state-administration which has crafted a ‘monolithic’ voice for co-operatives in order to achieve success in lobbying. Though downplaying anti-capitalist politics, the CHF has been instrumental in scaling up the resident-led housing movement beyond the scope of local struggles, creating a national platform and support network for co-ops.

Despite their misgivings around the institutionalization of co-operative housing, Hawley & Roussopoulos see the co-operative sector as ripe for revival, pointing to the transformative potential of linking co-ops to the growing movement around Community Land Trusts and other collective tenure mechanisms that decommodify land use and remove land from the private market long-term (Hawley & Roussopoulos, 2019). If fully realized, such decommodification supports affordability in perpetuity, divorcing housing from private market speculation, and supporting sustainability, social cohesion, and racial equity initiatives (Grannis, 2021). Research supports this potential for ‘commoning’ in both housing co-operatives and Community Land Trust projects: the development of collective use and management systems for housing and land through collective action (Aernouts & Ryckewaert, 2018; Aernouts & Ryckewaert, 2019).

Emerging research also suggests that partnerships to develop Community Land Trusts (CLTs) are a solution to advancing climate resilience by tackling both crises of affordable housing and climate change vulnerability (Grannis, 2021). CLT initiatives can reduce social vulnerability and create deep affordability through resale restriction formulas included in the ground lease, thereby increasing household savings for low-income groups, enhancing housing security, reducing displacement and counteracting gentrification while building social cohesion through community-centred governance. Grannis (2021) also provides evidence that CLT initiatives in the United States and Europe effectively engage with sustainability and climate resilience efforts such as disaster-resilient housing construction, incorporating renewable energy, preserving green space, deploying green infrastructure, and even supporting resettlement of disaster-affected and sea level rise-threatened communities. These examples imply that climate change readiness for underprivileged and inadequately housed populations could be bolstered by tenure models which fuse Community Land Trusts and co-operative housing, removing both housing and land from the private market, with multiple layers of protection to reinforce collective ownership and long-term affordability in the face of increasing social vulnerability for marginalized citizens otherwise left to the mercy of increasingly untenable housing markets or overburdened social housing institutions. Community Land Trusts are gaining traction in Canada, with the Canadian Network of Community Land Trusts supporting the growth of a national movement and CLTs established or projects underway in 6 provinces.

This transformative potential - at the intersection of co-operative housing, collective land tenure, and climate change adaptation - hinges upon the opportunities and barriers faced by the co-operative housing sector as embedded in a complex multi-level governance system, with consequential policies originating at municipal, provincial, and federal levels. These opportunities and barriers will be explored in my research through investigating Ford & King's (2015) six factors of adaptive readiness in the context of housing co-operatives in Nova Scotia, along with indicators of equity, justice, and inclusivity which if present would signal readiness for transitional or transformational adaptation activity in the co-operative housing sector.

2.3 Current and Future Climate Change Impacts in Nova Scotia

Nova Scotia has been identified as a province with both high place-based and social vulnerability to climate change due to a confluence of projected climate impacts and

demographic factors (Rappaport et. al, 2015). Nova Scotia faces not only continued sea level rise, but also land subsidence from the retreat of the last ice sheet, making it the Canadian province with the highest projected relative sea level rise compared to average global sea level (Bush & Lemmen, 2019). The Atlantic Canada region on average will experience sea level rise of 75 to 100 cm for high emissions scenarios by 2100 (Bush & Lemmen, 2019). With a combination of sea ice and sea level changes and the sinking of coastlines, an increase in the frequency and magnitude of extreme high-water levels is expected (Bush & Lemmen, 2019). For example, in Halifax, Nova Scotia's capital and largest city, a 20cm rise in relative sea level which is projected to occur within two to three decades will increase the frequency of flooding by a factor of four (Bush & Lemmen, 2019). As with all of Atlantic Canada, annual and winter precipitation is expected to increase, along with daily extreme precipitation, bringing the potential for higher incidences of rain-induced local flooding, including in urban areas (Bush & Lemmen, 2019). Halifax Regional Municipality is also bracing for higher average annual and maximum temperatures, more heat waves, and increases in the intensity and frequency of extreme events, including storms, hurricanes, and wildfires (Sustainability Solutions Group, 2020).

With most of the province's population living along the coastline, a higher risk of coastal erosion, storm surge flooding, and submergence highlights the sensitivity of transport infrastructure, and has led to recommendations for engineered shoreline protection and relocation of certain roads further from the coast (Warren & Lemmen, 2014). Future coastal-erosion rates will likely increase in most areas (Savard et. al, 2016). Climate change is also expected to put increased pressure on Nova Scotia's health care system, and may threaten fresh water supply through greater risk of salt contamination from rising sea levels and pollution from runoff caused by heavy rains and snow. Social drivers of vulnerability in the province include that Nova Scotia has a relatively high proportion of the population defined as low-income (17%, compared to national average of 12.1% for the same year), a relatively high proportion of adults living with disabilities (30% compared to 22% nationally), an aging population (especially in rural communities), and a continually constrained supply of affordable housing, especially affordable rental housing (Rappaport et. al, 2015; Province of Nova Scotia, 2019). Inequality within urban areas like Halifax is a concern, where the gap between low- and high-income households is

growing, with this income polarization increasingly marked in certain areas of the city (Sustainability Solutions Group, 2020).

There are, however, many adaptation measures that promote the resilience of coastal areas, all with their own pros and cons depending on the context, that are being considered and implemented in some areas of Nova Scotia. These include protection and shoreline ‘armoring’; natural measures such as revegetation and stabilization of dunes (often referred to as ‘living shorelines’); maintenance of sediment supply; and land use adaptations like the provision of buffer zones and rolling easements or setbacks that allow the landward migration of the coastline (Savard et. al, 2016). There remains a need to implement adaptation measures with the dynamic social drivers of vulnerability in mind. On the surface, there is no evidence that adaptation interventions have taken equity into account, which is troubling given Nova Scotia’s toxic legacy of environmental racism, whereby Indigenous and African Nova Scotian communities have been disproportionately subject to the effects of environmental hazards, with health issues systematically neglected and narratives silenced (Waldron, 2018). In the HRM, low-income black communities have historically, and up into the 21st century, been the target of planning initiatives to deconcentrate poverty, resulting in gentrification and large-scale displacement, rather than addressing root causes of inequity (Rutland, 2018). These patterns of neglect, violence and marginalization must not be repeated in the extensive planning activities that will occur through climate change adaptation in the province. The potential for maladaptation must be considered, and a contextual vulnerability framing which includes social, economic, political, and housing factors must be centred.

2.4 Housing Policy and Climate Change Adaptation

Though research on how the housing sector relates to climate change adaptation in developed nations is limited (Shearer et. al, 2016), the residential housing sector is a key field in which social vulnerabilities are produced and reproduced, as a lack of adequate and secure housing can limit the adaptive capacity of individuals, households, and communities to cope with climate impacts (Dodman & Mitlin, 2013; UN Habitat, 2011). Poverty and vulnerability are interconnected through the built environment, as cheaper, less-desirable housing sites are often more exposed to climate hazards and impoverished groups have more difficulty recovering from

climate-related disasters due to lower construction quality and financial barriers to relocation and securing safe housing (Thomas et al., 2019). The state bears responsibility as a key actor for the removal of barriers for safe, affordable housing, as the state has played a major role in producing and reproducing social vulnerability in the housing system through various policies which exacerbate inequities. The withdrawal of federal funding for new social housing construction in the 1980's and 90's, and the promotion of housing as an investment vehicle for capital accumulation at the expense of housing as a social good has increased housing insecurity and indebtedness for low-income groups, while enhancing wealth for more privileged property owners (Hulchanski, 2004; Suttor, 2016; Walks, 2014; Walks, 2016).

In investigating the intersection between climate adaptation and housing, it is important to distinguish between different forms of housing tenure, as this influences vulnerability to climate change and related environmental risk factors. There is evidence for multiple interconnected pathways that contribute to social and environmental vulnerability related to housing tenure insecurity, especially for populations who do not own property including: socioeconomic status, socio-spatial inequities, and building condition/quality. Social and subsidized housing units predominantly house lower income groups and have higher proportions of socially disadvantaged inhabitants such as the elderly, disabled, single parents, racialized communities, and/or those lacking stable employment compared to the general population (Kenna, 2008; Buchanan, 2020). Rental tenants are also disproportionately low income relative to property owners and more likely to inhabit housing that is vulnerable to climate change and extreme weather events (Instone, 2014). These social and economic disadvantages exacerbate vulnerability as these residents tend to have fewer financial resources, less political influence, and less access to information to support recovery from extreme weather events or to take preventative protective measures to risks like flooding and sea level rise (Buchanan, 2020). Studies have found that social housing units are disproportionately located in areas with high flood risk exposure compared to market housing, and such socio-spatial inequalities are likely to be continually reproduced through climate change-related disasters which are projected to increase in many cities (Chakraborty, 2021). The extent of damage from environmental hazards such as floods is dependent on the pre-existing condition of buildings, and social housing units tend to be older, poorer quality, and prone to 'deferred maintenance' (Kenna, 2008; Buchanan, 2020). Social housing providers tend to have inadequate flood preparedness measures, and lack

the tools, awareness, and technical skills necessary to apply flood-resilient repairs and manage the specialist process of flood damage remediation (Kenna, 2008). In the private rental market as well, barriers to adaptive capacity arise from disincentives for tenants and landlords to make significant improvements to housing for low-income renters, resulting in rental housing encompassing the lowest quality of housing, and the highest vulnerability to climate change (Instone, 2014). Lower-income populations have restricted choices in housing location, often relegated to poor quality land with higher risk of flooding or erosion, while a lack of affordable rental housing is a pattern seen in disaster areas, through both loss to environmental hazards and rental owners capitalizing on increased demand post-disaster (Cutter, 2020). While these examples in the literature originate from the United States, Australia, and the United Kingdom, they suggest an important relationship between climate change vulnerability, housing security, and type of housing tenure, all of which may interact to increase the vulnerability of certain social groups and exacerbate affordable housing crises. It is likely, but not certain, that the situation is similar in Canada due to an analogous orientation towards a neoliberal private market model as the primary means of housing provision, despite differing histories of social housing policy.

In Canada, the availability of affordable and high quality rental accommodations has been declining throughout the last few decades while incomes for middle- and lower-income earners have stagnated or fallen, housing prices risen, and social benefits have been reduced (Morris, 2015). This has been precipitated by private developers who are able to make faster and larger profits through building for private ownership, the financialization of housing markets, and more broadly, the rise of neoliberal policy regimes (Morris, 2015; Kalman-Lamb, 2017). A pattern of policy has emerged in Canada which primarily privileges homeowners at the expense of social and affordable rental housing, part of a larger trajectory of the withdrawal of the welfare state since the 1980's (Hulchanski, 2004; Walks, 2016). This includes a shift from the direct provision of income supports and social housing to 'asset-based welfare', encouraging individual responsibility for private wealth accumulation, primarily through homeownership (Walks, 2016). This shift has been pursued by governments over time by offering consumer incentives like the first-time homebuyers tax credit, and sets of policies to encourage financial institutions to increase mortgage lending and facilitate equity extraction from the home by loosening regulations to encourage new financial products and the securitization of mortgages

into mortgage-backed securities (Walks, 2016). This policy landscape amounts to the financialization of housing, which represents not just a systemic orientation towards the private market but the treatment of housing as a commodity and asset or vehicle for wealth accumulation, supplanting the conceptualization of housing as a social good or human right. While these policies have led to an increase in homeownership rates, it has occurred alongside rising housing prices, ballooning household indebtedness, and escalating socio-economic vulnerability (Walks, 2014). Ultimately what manifests are ‘Ponzi’ dynamics and the reproduction and intensification of socio-spatial inequities across urban space, characterized by income polarization between neighbourhoods in which profit streams derived from heavy mortgage debt signal a continued transfer of employment income from disadvantaged households to well-established wealthy families, corporations, and financial institutions (Walks, 2016). The clear result of policies from the late 20th century is a precarious housing system: around one third of Canadian households live in an inadequate or unaffordable or unsuitable dwelling (Randle et.al, 2021), while as of 2016, federal and bilateral social housing policy frameworks in the 21st century produced no operating subsidies, weak low-income targeting, and moderate as opposed to low rents (Suttor, 2016).

Despite federal efforts to address the growing crisis of affordable housing in the form of 2018’s National Housing Strategy, the burgeoning inequality derived from imbalances in the housing market and high household indebtedness have only intensified in recent years, representing a major source of economic and social vulnerability, with the potential to be exacerbated even further by climate change impacts (Pittis, 2021). The housing affordability crisis is increasingly being felt beyond Canada’s major metropolitan areas; in Nova Scotia the real estate boom throughout the 2020-2021 period has seen housing prices rapidly increase and demand outstrip supply in both urban and rural communities (Laroche, 2021). Unprecedented price appreciations have occurred against the backdrop of spiraling rental shortages as landlords seek to offload rental homes and cash in on the hot market, resulting in more and more low and middle-income households in the province being plunged into precarious tenure situations (Seguin, 2021). Besides demonstrating a need to rethink policies which promote privatized real-estate accumulation in the name of social equity (Walks, 2016), there is a need for the dynamics of Canada’s highly financialized housing system to be understood in the context of accelerating climate risks. In the coastal province of Nova Scotia, these dynamics suggest an understudied

relationship between climate change vulnerability, housing security and affordability, housing tenure, and social and economic policy, all of which may interact to increase the vulnerability of certain social groups and exacerbate affordable housing crises. There has been little research on how residents of non-market co-operative housing, as a distinct form of collective tenure geared towards affordability, experience vulnerability to climate change or how this form of tenure shapes their ability to respond.

2.5 Co-operative Housing: Why Co-ops Matter for Climate Change Adaptation

Canadian housing co-operatives are part of the ‘third sector’ in the sense that they are neither private market-based housing nor public housing under firm direction of the state, though co-operatives frequently enter partnerships with the state to increase access to resources (Crabtree et. al, 2019). Co-operatives are typically non-profit entities but differ from conventional non-profit housing providers in that through the principles which structure co-operatives, residents collectively control and manage the entire development as equal stakeholders in the co-operative, whether it be an apartment building, or a grouping of houses on a plot or plots of land. Most co-operative housing organizations are oriented towards low- and middle-income groups and have proven to provide more security and socio-economic benefits compared to private rental housing and state-administered public housing (Crabtree et. al, 2019). The unique structure of co-operative housing, which emphasizes agency, inclusion, and democratic participation, provides substantial benefits, especially in improving living conditions for diverse and marginalized groups (Morris, 2015; Crabtree et. al, 2019; Lubik & Kosatsky, 2019). From a public health perspective, Lubik & Kosatsky (2019) argue that co-operative and communal forms of housing offer opportunities to combat social isolation and promote physical, mental, and emotional well-being. A review of international literature has identified benefits such as increased social capital, greater housing quality and stability through tenure security and affordability, reduced operating costs, the opportunity to gain skills through social learning, and positively influencing broader economic and development outcomes for the surrounding community (Crabtree et. al, 2019).

The academic record provides scarce entries that touch on the intersection between housing co-operatives and climate change adaptation. A speculative report on market-oriented housing co-ops in Germany suggests that because of higher degrees of participation and internal communication compared to non-co-operative residential developments, co-ops may have a

higher potential to efficiently respond to climate change and engage in climate-protective measures (Wemheuer & Wendorf, 2013). The only significant contribution directly looking at the intersection between co-operatives and adaptation comes from Lamb et. al, who demonstrate how co-operatively owned and governed manufactured housing communities resist displacement and support adaptive capacity, representing a form of transformative adaptation by empowering low-income groups to address the underlying causes of uneven, intensifying climate vulnerabilities (Lamb et. al, 2022). Inclusion in ROC USA, a national network of resident-owned, co-operative Manufactured Housing Communities (MHCs) which provides access to resources and expert advice, has especially contributed to this reduction of physical and social vulnerability.

There is a portion of the adaptation literature which centres on public and social housing, with research in Europe finding that low awareness of climate change adaptation measures, technical complexity, lack of financing, and weak planning and policy arrangements for social housing are significant barriers to adaptation (Kenna, 2008; Roders et. al, 2013; Boezeman & de Vries, 2019). Much of the literature which considers public housing responses to climate change focuses on improving energy efficiency and associated retrofitting, or individual behavior and resource consumption, thus leaning towards mitigation rather than adaptation (Triana et. al, 2017; Hayles & Dean, 2015). Bisaro et. al (2020) explore the potential for land reclamation projects and subsequent real estate revenue as an adaptation tool to finance social housing developments under certain planning conditions in coastal regions. This small thread of literature on public housing and adaptation, on its own insufficient given the scope of the challenge, are all from regions outside of Canada, and are especially concentrated in the Netherlands and the UK. A national-level assessment of affordable housing vulnerability to sea level rise and coastal flooding in the U.S. found significant risk exposure for both publicly funded and market-driven affordable housing, with the amount of units exposed expected to triple by 2050 (Buchanan et. al, 2020). No equivalent research has been published to date in Canada so the impacts of climate change on the supply of affordable housing remain unclear, however a cursory examination of open data mapping of public housing in Nova Scotia reveals many units located near the coast. Though providing a similar service as public housing in offering affordable housing solutions alongside additional social benefits, the unique case of non-market housing co-operatives have so far been neglected in the adaptation literature.

With little literature that explores the potential contributions that non-market co-operative organizations can bring to climate change adaptation, a theoretical overlap is evident in research surrounding progressive approaches to community-based adaptation (Ensor et. al, 2018). Community based adaptation (CBA) is a climate change adaptation method that is community-led and aims to foster adaptive capacity through grassroots development programmes, rooted in Participatory Learning and Action and Participatory Action Research practices. Ensor et. al (2018) test the claim that community-based adaptation can increase resilience through an analysis of CBA initiatives using a framework of social-ecological resilience characteristics stemming from Bahadur et al (2013), asserting that the approach is transferable to the assessment of a broad range of development activities and community projects that aim to build resilience. Six of these characteristics used as measures of social-ecological resilience have relevance for co-operatives: high diversity, effective governance and institutions, community involvement and inclusion of local knowledge, high degree of equity, social capital and values, and an emphasis on learning. These are strongly correlated to the features and benefits on evidence in the co-operative housing literature, suggesting that co-operative housing associations have the scope to contribute to progressive CBA projects that aim to build resilience in communities where both are present, and that the institution of co-operative housing could in itself be considered a community-based adaptation measure, if co-ops are able to live up to their idealized potential, and co-op planning and development occurs with climate change vulnerability in mind.

While local participation, collective decision making, and political mobilization are practices embodied in democratic co-operatives, the potential to increase community resilience in the face of environmental and economic risks requires access to social and political power and the mobilization of resources, which can be hindered by state regulations and economic policies. For roughly a decade in Canada, from the 1970s through the 1980s, federal policy and the CMHC was supportive of co-operative housing construction and autonomous operation, privileging co-operative and non-profit community housing as the main model of social housing delivery (Cole, 2008; Suttor, 2016). However, after the near total withdrawal of funding for all forms of social housing by the federal government in the 1990's, more restrictive policy conditions for co-ops emerged. In many cases the legal and policy framework in which co-operatives operate give provinces final control over key decisions, including aspects of the

budget, and limits amounts and methods of fundraising, resulting in scarce funds for community development, training, and education initiatives (Morris, 2015). The analysis of co-operative housing governance necessitates a multi-level perspective, as the ‘everyday’ politics which produce and maintain housing co-operatives are shaped by wider local, national and international political economies (Vidal, 2019). Vidal (2019) argues that while housing co-ops provide a grassroots housing alternative to private ownership with formally embedded equality, they may have limited tools to offset the broad unequal social structures they are inserted in. For co-operative housing to be rendered as a challenge to neoliberal-capitalist housing systems, it must be considered how co-operatives are interlinked as a sector, connected to the state, and participate in processes of inclusion/exclusion (Vidal, 2019). The question remains as to whether this form of social organization can exhibit enough flexibility and resiliency to withstand risks associated with climate change in practice, which could necessitate adaptation measures as drastic as ‘managed retreat’: the physical relocation of entire communities.

2.6 Co-operative Housing in Nova Scotia

In Nova Scotia, housing co-operatives emerged in conjunction with the broader co-operative and socio-economic movement in the 1930’s known as ‘The Antigonish Movement’ (Harris, 2001). A plan was fostered by the Nova Scotia Housing Commission, in conjunction with the St. Francis Xavier University–based leaders of the Antigonish Movement and American social activist and co-operator-in-residence Mary Arnold, to leverage co-operative principles and grassroots organizing in making home-ownership accessible for low-income families, thus escaping the squalor of industrial company rental housing (Harris, 2001). With a combination of self-help principles, community engagement, and lobbying for provincial subsidies, co-operative housing organizations were building hundreds of houses per year by the late 1940’s, resulting in tangible material improvements for working class Nova Scotians in underdeveloped areas (Dodaro & Pluta, 2012). This program saw housing co-operatives function as building co-operatives – as a legal entity, co-operatives would dissolve upon completed construction of a group of affordably-built houses for its members, or when the subsidized mortgage was repaid. Harris (2001) argues that in many cases, the co-operative aspect of this housing strategy was secondary; a co-operative means to a private end. However, this decades-long transformational activity was foundational in establishing an enduring co-operative housing sector with support

and communication channels from the Nova Scotia government and set the stage for federal and provincial collaboration in co-operative housing governance, for better or worse (Dodaro & Pluta, 2012).

The co-operative house building program associated with the Antigonish movement was legislated out of existence in 1973, and peer-reviewed literature focusing on housing co-operatives in Nova Scotia beyond this period is virtually non-existent. Nonetheless, another wave of co-operative housing development in the province occurred in the late 1970's and throughout the 1980's. This expansion was facilitated by favorable federal policies, especially in amendments to the National Housing Act via bill C-133 in 1973, and a co-op housing program known as Section 56.1 in 1978, which encouraged provinces and municipalities to make leased land available for co-ops, and provided grants for start up funding and subsidized fixed-rate mortgages (Cole, 2008). This wave of development was cut short by budget cuts in the late 1980's. Distinct from the Nova Scotian 'building co-operatives' of the early twentieth century, the majority of co-ops from this period are 'continuing' co-operatives, functioning as non-profit housing to this day, regulated to varying degrees by the province, and receiving fluctuating levels of funding from federal and municipal governments, as well as advocacy and support from the Co-operative Housing Federation of Canada (CHF). The CHF, which includes an Atlantic Chapter operating in Nova Scotia, has been an effective lobby and important education and administrative resource for co-ops since the early 1970's, but also criticized for monopolizing the voice of Canadian housing co-ops and discouraging grassroots participation (Hawley & Roussopoulos, 2019). It is worth noting that housing co-operatives do not necessarily house those populations who are most socially vulnerable, with data from the North End of Halifax in the 1980s demonstrating co-ops tend to favour residents with nearly double the income of those in public housing (Melles, 2003; Larry Smith & Associates, 1986), pointing to a deep need for affordable housing which goes beyond what co-operatives have typically been able to address.

The housing co-operative sector of Nova Scotia is an ideal empirical focus for my exploratory research into the intersection between climate change adaptation and co-operative housing. The province has a rich heritage of co-operative organizing, including a pioneering role in establishing working-class housing co-operatives in Canada, and today encompasses a diversity of different types of continuing housing co-operatives accumulated over the last 50+

years; some smaller and more political collectives, some larger and more embedded in the state system of social housing provision, and some which serve specific populations, such as seniors co-operatives. While the sector here is relatively small in terms of total population, NS housing co-ops inhabit a wide variety of different geographies, from urban to rural areas, large new-build apartment style complexes to dispersed, converted century-old housing stock. These co-ops are likely to be subject to a variety of accelerating climate change risk factors as well. Nova Scotia is a province with high place-based and social vulnerability to climate change relative to the rest of Canada due to a confluence of major risks from particularly high sea-level rise and coastal flooding, extreme weather, high proportions of low-income households, and an accelerating housing crisis. These multiple pressures not only demonstrate the need to understand how existing non-profit housing co-operatives can benefit from current and future adaptation initiatives and be protected to continue delivering affordable housing alternatives, but also the need to explore pathways to systemic change at the nexus of housing and adaptation. Understanding how housing co-operatives can play a role in more transformational adaptation strategies appears as a growing necessity in this context.

Chapter 3: Methodology

The primary intent of my research is to assess the preparedness of Nova Scotia's housing co-operatives to engage in climate change adaptation and examine how the needs of this sector are being considered in provincial and municipal adaptation plans and policies. My approach combines qualitative and quantitative methods, comprising semi-structured qualitative interviews and policy document analysis, including descriptive statistical analysis as well as qualitative investigation of specific policy instruments which pertain to co-operative housing. I seek to explore and describe the situation of co-operative housing in Nova Scotia without any a priori knowledge of how they have engaged with climate change policies or adaptation initiatives. The methodological basis and organizing framework that guides my research is founded on Ford & King's (2015) notion of 'adaptation readiness': a conceptual framework designed to capture the strength and existence of governance structures and policy processes which determine whether adaptation takes place. Applying this framework orients my work as a pragmatic exercise, evaluating readiness at the present juncture. However, my hope is that this research will also shed light on future transformational possibilities at the nexus of housing and climate change adaptation, determining what barriers must be overcome to address the roots of social vulnerability in the housing system.

I will investigate the 'adaptation readiness' of co-operative housing in Nova Scotia by accounting for multiple levels of governance influencing this liminal sector which often falls under the state umbrella of social housing yet retains autonomy in governance. Individual member-run co-operative boards, the Atlantic regional chapter of the Co-operative Housing Federation of Canada (CHF), the Canadian Mortgage and Housing Corporation (CMHC) and municipal, provincial, and federal governments all play a role in terms of regulations and responsibilities. Data collection and analysis comprises 2 main stages: 1) a content analysis of current municipal and provincial adaptation policies, and 2) an assessment of the adaptation readiness of co-operative housing in Nova Scotia through interviews with key informants. Taken together, this multiple methods approach will allow me to understand the adaptation readiness of co-operative housing in Nova Scotia by identifying the needs and concerns as articulated by co-operatives and co-op administrators themselves as well as the constraints and/or opportunities deriving from municipal, provincial, and federal legislation.

3.1 Adaptation Readiness Framework

The concept of adaptation readiness has been applied to empirical studies of adaptation preparedness in diverse contexts like ecosystem-based adaptation in the Seychelles, transboundary river basins, the Canadian Arctic, and the social acceptability of adaptation technologies, and has also been studied in relation to vulnerability status (Khan & Amelie, 2015; Tilleard & Ford, 2016; Ford et. al, 2017; Bellamy, 2019; Sarkodie & Strezov, 2019; Kim et. al, 2021). The ‘generic and flexible’ readiness framework of Ford & King (2015) guides my methods and informs what conceptual threads are centred when gathering and analyzing data. Adaptation readiness is proposed as complimentary to assessments of adaptive capacity but goes a step further in seeking to measure the likelihood of effective adaptation implementation for human systems at various scales, while revealing barriers to do so (Ford & King, 2015). This framework provides a tool which uses the concept of readiness to understand the supportive measures and conditions required for developing, implementing, and monitoring adaptation initiatives. This is relevant for the Nova Scotian context, in which 75% of municipalities have formulated plans for adaptation under the Municipal Climate Change Action Plan (MCCAP) in 2013, but implementation has occurred unevenly (Righter, 2021). The individual characteristics of the communities involved and their planned actions appear to influence this pattern, with municipalities exhibiting more stable long term political leadership and higher degrees of public participation, both characteristics accounted for in Ford & King’s adaptation readiness factors, tending to have had more success following through with adaptation goals (Righter, 2021). Emergency preparedness planning is the most common measure to be completed, suggesting that much work remains to increase resilience, and engage with proactive adaptation strategies to reduce vulnerability. It was also unclear if these adaptation plans and policies achieved a detailed resolution capable of considering individual housing units or organizations, or are primarily enacted through technical, infrastructural, and preparedness fixes on a broader municipal scale. A modified application of the adaptation readiness framework targeted to the case of housing co-ops helped answer these questions, going beyond standard vulnerability assessments, appraisals of adaptive capacity, and proposed actions, to measure the potential for effective adaptation to actually occur, including the identification of systemic barriers to co-op adaptation, and qualitative differences in different adaptation approaches.

The adaptation readiness framework is organized around six overarching factors that are deemed essential for adaptation to take place: political leadership, institutional organization, adaptation decision making and stakeholder engagement, availability of usable science, funding for adaptation, and public support for adaptation. As Ford & King (2015) suggest their framework is generic and flexible, I have created a set of criteria, indicators, and sources of information to measure these six factors, adopting the key components outlined by Ford & King while also incorporating elements tailored to the unique organizational structure and guiding principles of housing co-operatives (Table 1).

In addition, I propose a seventh readiness factor of ‘equity, justice, and inclusivity’, to account for growing calls for social justice-oriented approaches to climate change adaptation (Shi et. al, 2016) which also are integral in the context of housing justice and cooperative housing. As my work is located at the intersection of crises of climate change and affordable housing, both which disproportionately impact vulnerable population groups, this factor is imperative. This is especially relevant in the context of non-profit housing co-operatives, who typically operate according to related principles and have risen out of the need to address socio-economic inequality when the private sector and direct state intervention fail to do so. I add a further qualitative dimension to the framework by considering readiness to imply a state which presupposes adaptation to unfold upon different types of pathways, in order to account for the growing need for transformational adaptation responses (IPCC, 2021). This is also especially relevant at the intersection of overlapping housing and climate crises, where systemic change appears necessary to alleviate multiple drivers of social vulnerability. To this end, I evaluate my findings derived from seeking indicators of the seven readiness factors along Pelling’s (2011) typological range of resilience-transition-transformation.

Readiness Factor	Criteria	Indicators	Sources of information
Political leadership for co-operative adaptation	<ul style="list-style-type: none"> -Leaders to initiate the adaptation process and advocate for the importance of climate change and adaptation at multiple levels of governance - Advocates for co-op specific adaptation or adaptation-related policy 	<ul style="list-style-type: none"> -Statements / policy addressing adaptation as priority - Statements highlighting climate change in relation to co-ops/community housing - Co-op sector engagement in climate change/adaptation events/conferences 	<ul style="list-style-type: none"> - Legislative Assembly Minutes and/or Speeches - CHF speeches or written statements - Interviews
Institutional organization for co-operative adaptation	<ul style="list-style-type: none"> -Specific agencies tasked with implementing climate change adaptation for non-profit community housing -Long term planning for climate risks - Co-op autonomy + supports 	<ul style="list-style-type: none"> - Committees or working groups capable of adaptation work at multi-level - Availability of adaptation planning frameworks - Multi-level governance co-ordination on climate/emergency response planning - Co-op/members have ‘final say’ 	<ul style="list-style-type: none"> - Interviews with key informants - Municipal planning & policy documents -NGO / CHF / housing authority websites
Adaptation decision making and stakeholder engagement with co-operatives	<ul style="list-style-type: none"> - Co-ops as autonomous stakeholders - Democratic principles foregrounded - High member participation in Co-op governance / grassroots participation in sector - Good communication between gov’t agencies, CHF, and individual co-ops 	<ul style="list-style-type: none"> -Adaptation consultation between government agencies, planners and co-ops -Evidence of adaptation involving co-ops - Discussion of climate change / adaptation at board meetings or AGMs - High co-op membership participation 	<ul style="list-style-type: none"> - Interviews with Key Informants - Adaptation plans, documents, toolkits designed for specific locations - Minutes from municipal meetings
Availability of usable science to inform co-operative decision making	<ul style="list-style-type: none"> - Up-to-date impact, vulnerability and adaptation assessments - Risks and policy recommendations with relevance for housing sector / co-ops specifically 	<ul style="list-style-type: none"> - Existence of co-op impact and vulnerability assessments, adaptation assessments - Research on non-profit housing and climate change adaptation - Climate change reports accessed by Co-ops 	<ul style="list-style-type: none"> - Interviews with key informants
Funding for co-op adaptation planning, implementation, and evaluation	<ul style="list-style-type: none"> -Specific funding for adaptation initiatives -Individuals with know-how to access funds 	<ul style="list-style-type: none"> -Accessible funding programs that Co-ops can apply to for adaptation / climate initiatives - Institutions/coordinators to obtain/oversee funding on behalf of co-ops - Diverse funding streams 	<ul style="list-style-type: none"> - Provincial/municipal adaptation strategies - Climate change and social housing programs/announcements - Policy documents
Co-op Membership support for adaptation	<ul style="list-style-type: none"> - Adaptation consciousness - Recent experience with climate related hazards - Opportunities to build awareness 	<ul style="list-style-type: none"> - Perceived importance of climate change - Evidence of co-op members initiating adaptation/CC planning or discussion or attending climate change-related events 	<ul style="list-style-type: none"> - Interviews with co-ops - Grey literature including news bulletins, documentation from CHF conferences etc.
Principles of equity, justice, and inclusion present in adaptation planning	<ul style="list-style-type: none"> -Address racial marginalization and legacy of environmental racism -Identification and alleviation of drivers of differential vulnerability - Planning to minimize maladaptation and undo past policies which contribute to structural inequity 	<ul style="list-style-type: none"> -Well-defined principles of equity, justice, and inclusion in planning and policy documents, explicitly supported by policy instruments -Evidence of equity/social justice/inclusion considerations in all other readiness factors -Willingness to apply novel/transformational approaches for systemic change 	<ul style="list-style-type: none"> -Policy Documents -Interviews

Table 1. Indicators for assessing co-op adaptation readiness (adapted from Ford & King, 2015)

3.2 Policy and Adaptation Document Analysis

In the first stage of research, I identify policies and adaptive measures currently in place in Nova Scotia to protect co-operative housing from climate change. This analysis applies the adaptation policy analysis approach of Lesnikowski et al. (2019), which uses content analysis methods to systematically code adaptation policy documents. This approach, rooted in the ‘policy mixes’ literature, allows for a large number of specific types of policy instruments to simultaneously be identified, classified, and compared, using measurements which capture the totality of adaptation policies being adopted by a given level of government. This also allows me to be attentive to how public policies are layered, accumulating over time, and how climate impacts may be addressed either directly or indirectly through a complex mix of policy goals and instruments. My focus is on municipal and provincial policies, though familiarity of federal policies as they pertain to housing co-operatives was a prerequisite to inform analysis and understanding of multi-level policy landscape.

All policy documents at the municipal and provincial level in Nova Scotia that reference both climate change and residential housing are included in the study. Policy documents were collected from accessible online sources, such as government websites and databases using keyword searches that ensure a wide scope of results (i.e., “climate change”). Documents from local councils, provincial legislature, and relevant government agency websites included reports, planning documents, and legislative acts and statutes. Initially, all documents which reference climate change were collected, whether focusing on risks, impacts, resiliency, or adaptation initiatives. Once collected, these documents were examined, and only included for analysis if they had content referring to both climate change adaptation and housing, either in direct terms or implied through planning instruments like coastal development setbacks etc. A total of 179 documents were collected, and out of these 54 were retained and analyzed. From these 54 documents, 139 municipal and 16 provincial policy instruments with relevance for housing and adaptation were identified. My coding protocol distinguishes between different forms of housing tenure, so any policy instrument which is co-op or social housing specific can be identified and analyzed. I include documents from the time period of January 2005 – August 2021, as this encompasses the lead up to the first major provincial piece of climate legislation, *The*

Environmental Goals and Sustainable Prosperity Act passed in 2007, and there continues to be much activity in the climate change policy landscape of Nova Scotia.

A unique coding protocol was developed to synthesize and classify policy documents, employing content analysis methods to determine how co-ops are supported and targeted, or neglected, directly or indirectly, by existing policies and policy mixes. Individual policies in this context are conceived as policy instruments: tools that governments use to implement their goals. Policy mixes are combinations of individual policy instruments which accrue over time. Collected policy documents that were determined to be included in the study were coded according to indicators based on the ‘Nodality, Authority, Treasure, and Organization’ typology of policy instruments first developed by Christopher Hood (1983) and applied to adaptation studies by Lesnikowski et al. (2019). These represent different types of governing resources that state actors use to implement policy: nodality includes a range of policy instruments related to producing or sharing information, while authority corresponds to regulation, treasure refers to finance, and organization to institutional influence. This coding framework also categorizes policy instruments as either substantive (“hard” policies) or procedural (“soft” policies). Procedural policies are intended to influence the network relationships in a policy system while substantive policies are meant to directly affect the nature, type, quantity, and distribution of goods and services in society. Other indicators accounted for in the coding protocol for adaptation policies include policy aims and objectives, climatic hazards and vulnerabilities addressed, which housing tenure categories and actors are targeted, policy tool design, time horizon, and whether equity, vulnerable population groups, co-operative autonomy, and collective tenure mechanisms are recognized or supported (See Appendix A). The coding protocol was designed in Google Forms, a survey administration tool that is also effective for data organization as it allows for multiple layers of data recording. Each policy instrument document was submitted individually, in separate but identical google forms according to document of origin. When data entry was completed, a spreadsheet was exported, ultimately compiled into a master spreadsheet structured systematically according to key indicators (See Appendix A). This approach allowed for analysis at both the ‘micro-level’ of individual policy instruments and at the document level.

Separately, provincial and municipal governmental meeting agendas and minutes and legislative assembly speeches were collected and analyzed in order to gain insight into the factors of political leadership and decision-making processes. Documents were collected online using the same approach and limitations described above. These were organized as relating to adaptation, housing, and equity in order to paint a general picture of political discussions and planning around adaptation and housing initiatives.

As the majority of Nova Scotian municipalities have drafted adaptation plans, an abundance of policy data and political documentation is available for analysis in my study. In many cases it remains to be seen how and when adaptation implementation will occur, how they address social drivers of vulnerability, and what support they offer housing co-operatives and other non-profit social housing initiatives, as well as what barriers may stymie implementation, implications for monitoring efficacy, and as such the extent to which the province's co-operative housing sector can be considered as exhibiting high 'readiness' for adaptation. Primary, qualitative interview data is necessary as such to gain insight into these questions around tangible actions.

3.3 Interviews with Key Informants

Primary data were gathered through interviews with key informants such as building managers, housing authority officials, and co-operative housing board members. A digital survey was also distributed to all non-profit housing co-ops in the province, however the response rate was very low and only one co-operative opted to participate in the survey. A board member of this co-op participated in interviews, so the results from this survey were considered as supplementary to the interview. Questions for the semi-structured interview and survey are both informed by the adaptation readiness framework proposed by Ford & King (2015), as modified to include the specific case of housing co-operatives, incorporating governance-related factors gleaned from literature on this unique form of housing in a Canadian context. Interviews were used to gauge the presence of the readiness factors adapted from Ford & King (2015), with a particular emphasis on institutional organization, decision-making and stakeholder engagement, availability of usable science, member support for adaptation, and equity justice and inclusion (see Table 1). As peer-reviewed research on Canadian housing co-operatives is few and far between, and there is no peer-reviewed literature discussing housing co-operatives in Nova

Scotia beyond the 1970's, it was also necessary for my study to get a sense of the everyday functioning of Nova Scotia housing co-operatives as part of understanding their experiences and potential to cope with climate hazards and awareness of adaptation needs. Questions of this nature were included in interviews targeted at housing co-ops and informants with knowledge of the co-operative housing sector. In addition, I sought to gain insight into how the embeddedness of co-ops within multiple levels of governance may lead to advantages or constraints for implementing adaptation initiatives, and how this governance system is perceived by co-op members. The qualitative interviews allowed me to explore connections, opportunities, and barriers for co-operative housing in the context of climate change adaptation, addressing gaps (as they pertain to 'readiness') in both the peer-reviewed and grey literature record.

Only non-profit housing co-ops were included in the study as they are most likely to fit the typical definition of housing co-operatives outlined in the literature, in terms of offering affordable housing and operating according to participatory democratic co-op principles. As housing co-operatives are dispersed throughout Nova Scotia, the study area encompasses the entirety of the province in a general sense. However, only certain municipalities contain housing co-operatives, with the majority being in the Halifax region, which is Nova Scotia's capital, most populous city, and largest municipality by area. The following municipalities / local governments are accounted for in my study, listed here according to highest number of non-profit housing co-ops to the lowest: Halifax Regional Municipality (HRM) (43), Cape Breton Regional Municipality (CBRM) (4), Antigonish(3), New Glasgow (3), Pictou (2), Wolfville (2), Yarmouth (2), Kentville (2), Amherst (1), Bridgewater (1), Colchester County Municipality (1), Digby (1), Inverness County Municipality (1), Municipality of the District of Shelburne (1), Port Hawkesbury (1), Region of Queens Municipality (1), Truro (1).

All registered co-operatives are listed on Nova Scotia's open data portal, updated in January of 2021. While some housing co-ops have their contact information listed publicly on this portal or other online directories, dozens are listed under the contact information of their co-operative management companies, of which there are 2 in Nova Scotia: The Community Housing Management Network and Pathways Housing Services.

Between October 2021 and May 2022, I conducted 9 semi-structured interviews targeted at key representatives of co-operative associations and civil servants involved in municipal and

provincial adaptation planning in Nova Scotia. The research was deemed minimal risk, and ethics approval was received from Concordia's University Human Research Ethics Committee, valid from August 13, 2021 – August 12, 2022. Interviews took place remotely via Zoom or telephone and were recorded and transcribed. While the focus of my study is Nova Scotian housing co-operatives, there are a range of relevant actors and levels of governance that must be accounted for as well. Besides individual co-ops, the following groups were targeted through interviews: amalgamated co-ops, the Federal office and Atlantic chapter of the Co-operative Housing Federation (CHF), Co-operative housing management service-providers (Community Housing Management Network and Pathways Housing), the provincial housing authority Housing Nova Scotia, the CMHC climate change unit, and Municipal adaptation planners. Interview guides were tailored to participants based on their institutional involvement. The initial goal was to have a much higher proportion of interviewees from co-operatives included in the study, but recruitment faced barriers such as my lack of personal connections in the co-operative housing community. This potentially could have been overcome by an approach which involved fieldwork and in-person meetings, but this was not an option due to safety concerns throughout the COVID-19 pandemic. One interviewee suggested to me that a lack of responses to my e-mail invitations to participate in the study was likely influenced by the fact that co-operative board members are volunteers, often with limited time and little capacity to take on additional tasks.

All interviews were transcribed and analyzed using a combination of open coding (inductive) and content analysis coding (deductive), based on the seven readiness factors. Deductive coding was relevant because my theoretical framework provides a strong idea of what elements are present in the data, and what indicators are required to satisfy criteria of adaptative (or transformational) readiness for an organization or sector. However, because housing co-operative adaptation readiness is an unexplored avenue of investigation and I take a novel approach to the readiness framework by adding elements of equity justice and transformation, an openness to new themes and categories emerging in the data was necessary. For example, open coding generated codes such as 'co-op growth and development', 'building condition and/or assessment', 'energy efficiency/mitigation', as well as co-op specific benefits and co-op specific barriers for adaptation. While the content corresponding to these themes may relate to and span multiple readiness factors, they are indicative of separate lines of inquiry, useful for establishing a rough understanding of co-operative vulnerability, adaptive capacity, and specificity.

Additionally, examples of potential adaptation initiatives relevant for housing co-operatives which arose in interviews were also noted as indicators of different ‘adaptation pathways’ with characteristics corresponding to either resilience, transition, or transformation.

Chapter 4: Manuscript

4.1 Introduction

Human induced climate change is already affecting weather extremes around the world, as evidenced by intensifying heatwaves, heavy precipitation, droughts, and tropical cyclones (IPCC, 2021). The impacts of climate change pose extensive risks to human systems and wellbeing, even if mitigation pathways are utilized which successfully limit global mean temperatures to warming of 1.5 C (Hoegh-Guldberg et. al, 2018). Climate adaptation is necessary in light of these accelerating risks, yet adaptation responses to date have been frequently inadequate at rising to the scale of the challenge; in adaptation and mitigation pathways alike, transformational and systemic changes in the human-environment relationship and socio-economic processes appear more and more necessary yet have failed to materialize (Berrang-Ford et. al, 2021). It is clear that for adaptation to be effective in the long-term, the root causes of vulnerability must be targeted through carefully designed policies processes and interventions which address specific inequities based on based on gender, ethnicity, disability, age, income etc. (see SPM.C.5.6 in: IPCC, 2022). The latest IPCC report puts emphasis on the need for systemic transformation in order to ensure human health, well-being and social resilience in the face of climate risks.

Housing systems represent an area in which the root causes of social vulnerability meet physical and geospatial vulnerability to climate risks. Social and economic inequality drives differential access to quality, safe housing, and is a major factor in a household's ability to protect and recover from climate related risks and disasters. Addressing the vulnerability of Canada's housing sector is a key concern, yet to date Canadian adaptation research has either framed housing-climate vulnerability under the umbrella of 'infrastructure' or else focused on how adaptation is being implemented in the private housing market, with a general focus on homeowners (Government of Canada, 2016; Henstra et. al, 2019; Ness et. al, 2021). This is perhaps unsurprising as state policy has driven private market housing to comprise the vast majority of Canada's housing sector and through successive waves of financialization has become an integral economic sector for the country at the expense of other forms of tenure (Hulchanski, 2004; Walks, 2014).

Canadian housing research observes that a serious consequence of state policies of neoliberal financialization aimed at the private housing market has been increasing socioeconomic polarization, inequity and tenure insecurity, with home ownership increasingly out of reach or resulting in greater burdens of household debt for marginalized groups as well as the middle class, while rental and social housing sectors become increasingly underdeveloped (Hulchanski, 2004; Walks, 2014; Walks 2016; Seguin, 2021). These factors contribute to social drivers of climate vulnerability, of which housing tenure has been identified as a key characteristic, with renters found to be more vulnerable to climate change impacts than owners (Cutter et. al 2009). But what about third-sector non-owners in the co-operative and non-profit sector? A critical gap has emerged in our understanding of how different forms of housing tenure are being integrated into Canadian adaptation governance, and how decisions around social vulnerability, equity, inclusivity, and housing justice are factored into adaptation planning and policy processes. As climate change accelerates, Canadians face a housing crisis which has reached new heights, with affordable housing in a perpetual state of low supply and high demand, and rising housing costs driving up household debt, housing insecurity, and homelessness in urban and rural areas. The inevitable overlap of these accelerating crises is reason for concern, as the impacts of climate change do not occur in a vacuum, but interact with complex social processes, political, institutional, and economic structures to disproportionately effect marginalized groups across time and space (O'Brien et.al, 2007). The Canadian Mortgage and Housing Corporation (CMHC), a crown corporation which acts as national housing agency mandated to improve Canadians 'access to housing' has acknowledged the need to integrate climate and housing policy with inauguration of a specialized climate change unit in 2020.

The Government of Canada recognizes the need for sustainable affordable housing solutions that address social vulnerability (Government of Canada, 2018). Housing co-operatives have demonstrated promise as a model in this regard but have scarcely been examined in the context of climate change adaptation. Expanded opportunities for co-operative housing are part of the federal government's plan to address the crisis of housing access and affordability, with \$500 million in funding and \$1 billion in loans dedicated to the development of new co-operative housing in budget 2022 (Co-operative Housing Federation of Canada, 2022). Meanwhile, climate change adaptation is a national priority, and the federal government will release Canada's first National Adaptation Strategy in 2022. As efforts to expand the supply of affordable housing and

implement climate adaptation measures accelerate across Canada, adaptation policy-makers and planners need a deeper understanding of how to address affordable non-profit housing goals in a manner that is coherent with climate change vulnerability reduction goals.

This research takes the housing co-operative sector in the province of Nova Scotia as a case study, investigating how opportunities and barriers for co-ops to respond to climate risks are shaped by multiple layers of policy and governance and evaluating its potential role in achieving transformative adaptation.

4.1.1 *Social vulnerability and housing co-operatives in the Canadian context*

The Canadian housing system has long relied primarily on the private market for housing provision, and in the past 30 years has advanced policies which further emphasize homeownership as the end goal, assuming other forms of tenure to be either stops along the way or signs of market failure (Hulchanski, 2004; Walks, 2016). This orientation is reflected in the larger trajectory of the withdrawal of the welfare state since the 1980's, marked by a shift from the direct provision of income supports and social housing to 'asset-based welfare', encouraging individual responsibility for private wealth accumulation, primarily through homeownership (Walks, 2016). While these policies have led to an increase in homeownership rates, it has occurred alongside rising housing prices, ballooning household indebtedness, and escalating socio-economic vulnerability (Walks, 2014). With the housing market and real estate sector perceived by the state as a pivotal engine of economic growth, the social need for non-market housing has been systemically neglected. Growing inequality derived from imbalances in the housing market and high household indebtedness have intensified in recent years, representing a major source of economic, and thus social, vulnerability, with the potential to be exacerbated even further by climate change impacts (Pittis, 2021).

The housing affordability crisis is increasingly centered not only in Canada's major metropolitan areas; in Nova Scotia the real estate boom throughout the 2020-2021 period has seen housing prices rapidly increase and demand outstrip supply in both urban and rural communities (Laroche, 2021). Drastically inadequate supply, a lack of diversity in different housing options including private rental, affordable rental, social, and non-profit housing, and a lack of rent control in Nova Scotia are among the systemic challenges which increasingly

foreclose access to secure housing for vulnerable residents (Nova Scotia Affordable Housing Commission, 2021). Reversing a decades-long trend, the province is now feeling the added pressure of population growth, especially rapidly in urban centres such as the capital and largest city, Halifax Regional Municipality. This population growth is colliding with a long-standing and increasingly scarce housing supply, driving up demand and costs to record highs, pricing locals out of the market and exacerbating socioeconomic inequities, leading Nova Scotia's deputy housing minister to call for a 'dramatic' expansion of non-profit housing (Gorman, 2022). Amongst a backdrop of accelerating climate risks, these drivers of social vulnerability point to the need for climate change adaptation goals and affordable housing development to be harmonized, as the current housing system both produces disproportionate vulnerability and is subject to disproportionate impacts of climate change.

Housing co-operatives may offer some alleviation as they have been shown to provide long-term affordable housing tenure and improved social and health outcomes for marginalized and vulnerable populations (Crabtree et al 2019; Lubik & Kosatsky, 2019). Though the co-operative housing sector in Nova Scotia is relatively small, it encompasses a diversity of different types of co-ops in both rural and urban areas; some smaller and more political collectives, some larger and more embedded in the state system of social housing provision, and some which serve specific populations, such as seniors co-operatives. Built form varies significantly as well, with some co-operatives contained in apartment building-style large properties with dozens of units, and many comprised of collections of individual houses, row houses, century old housing stock on properties which may or may not be geographically contiguous. There are now 67 active non-profit housing co-operatives in Nova Scotia, containing a total of 1717 units. Most housing co-operatives are the legacy of favourable legislation in the 1970s and 80s, as well as a culture of co-operative organizing dating to the Antigonish movement in the early-mid 20th century that pioneered working class co-operative house building in Canada (Cole, 2008; Dodaro & Pluta, 2012). Nova Scotia's first new co-operative housing development in over two decades is currently under construction, the result of rising demand, a new coalition of the regional Co-operative Housing Federation (CHF) and co-operative members with other non-profits, and new funding opportunities connected to Canada's National Housing Strategy.

Non-profit co-operative housing organizations in Canada are typically oriented towards low- and middle-income groups and provide a stronger security of tenure and socio-economic benefits compared to private rental housing (Crabtree et. al, 2019). The unique structure of co-operative housing, which emphasizes agency, inclusion, and democratic participation, provides substantial benefits, especially in building social capital and improving living conditions for diverse and marginalized groups (Morris, 2015; Crabtree et. al, 2019; Lubik & Kosatsky, 2019). In a typical non-profit housing co-operative, all members are considered equal stakeholders in collective ownership and governance of the entire co-operative. This organizational structure promotes principles of economic democracy: a system of governance in which individuals in a community share ownership and decision-making power equally, foregrounding solidarity and sustainability as opposed to private profit and self-interest. Such principles suggest that co-operative models have the potential to address root causes of vulnerability in the housing sector, build adaptive capacity, and be a supportive space for community-based adaptation initiatives.

Research examining climate adaptation in relation to housing co-operatives is lacking, though a recent study shows the transformative adaptation potential of co-operative, resident-owned manufactured housing communities in the United States. Lamb et. al (2021) observe that these communities can reduce vulnerability through a nationwide network model that leverages financial resources, bridges formal and informal knowledge and skills, and improves social and institutional capacities. In Canada, the national and regionally-operating Co-operative Housing Federation (CHF) could provide similar institutional leadership and access to resources to support co-operative adaptation, for example as the CHF did in the 1990s by lobbying for renewed government funding to the sector after the near-total withdrawal of federal assistance in 1993 (Crabtree et. al, 2019; Cole, 2008).

4.1.2 Adaptation in Canada and Nova Scotia

Canada's climate is changing particularly rapidly as a consequence of accelerated changes in average temperature in northern locations. Canada faces a wide array of intensifying risks, from wildfires, extreme heatwaves, melting permafrost, and extreme precipitation, to new coastal realities such as sea level rise, more extreme weather events, greater storm surge, and coastal flooding and erosion (Bush & Lemmen, 2019). These impacts pose threats to the safety and well-being of Canadian citizens as well as the built environment.

This study takes the co-operative housing sector in the province of Nova Scotia as a case study, a region in which the most populated areas are located on or near the coast and have been identified as highly vulnerable to sea level rise. Nova Scotia faces not only continued sea level rise, but also land subsidence that makes it the Canadian province with the highest projected relative sea level rise (Bush & Lemmen, 2019). An increase in the frequency and magnitude of extreme high-water levels is expected, and along the coastline, a higher risk of coastal erosion, storm surge flooding, and submergence. In addition, annual and winter precipitation is expected to increase, along with daily extreme precipitation, bringing the potential for higher incidences of rain-induced local flooding, including in urban areas (Bush & Lemmen, 2019). Halifax Regional Municipality is also bracing for higher average annual and maximum temperatures, more heat waves, and increases in the intensity and frequency of extreme events, including storms, hurricanes, and wildfires (Sustainability Solutions Group, 2020). The Government of Canada's regional and Atlantic climate change perspectives report emphasizes overland flood risk and erosion as the most immediate threats exacerbated by climate change (Dietz & Arnold, 2021).

The need to adapt to climate change is widely recognized, and governments at all levels are adopting policies to reduce risk exposure and vulnerability to climate change impacts (Lemmen et. al, 2014; Reckien et al., 2014; Lesnikowski et. al, 2016). While adaptation efforts in Canada have been historically under-resourced, initiatives are currently gaining momentum. The federal government is currently preparing its first National Adaptation Strategy, expected to be released in late 2022. Nova Scotia was an early leader on adaptation policy in Canada, and previous research has investigated the province's relative success in building adaptive capacity through a decentralized approach that required municipalities to take the lead in developing their own climate action and adaptation plans (Vogel et. al, 2020). A range of adaptation measures are now being implemented, including infrastructure improvements and nature-based solutions to protect coastlines (Dietz & Arnold, 2021). However, barriers remain, and across municipalities there is uneven implementation of these policies (Righter, 2021). Additionally, research has not examined to what extent these policies address social vulnerability, or consider the need for an equitable, climate-resilient housing system that supports diversified affordable non-market housing solutions, such as co-ops.

4.1.3 *Adaptation Readiness*

This study operationalizes an adaptation readiness framework that builds on the work of Ford & King (2015). Adaptation readiness is proposed as complimentary to adaptive capacity assessment, which is a common analytical approach in adaptation studies that looks at conditions that support adaptation. Adaptation readiness however seeks to measure the conditions that facilitate the likelihood of effective adaptation implementation for human systems at various scales, rather than just its potential (Ford & King, 2015). Empirical studies of adaptation readiness have applied the concept in diverse contexts like ecosystem-based adaptation in the Seychelles, transboundary river basins, the Canadian Arctic, and the social acceptability of adaptation technologies (Khan & Amelie, 2015; Tilleard & Ford, 2016; Ford et. al, 2017; Bellamy, 2019). Various studies have also examined it in relation to vulnerability status (Sarkodie & Strezov, 2019; Kim et. al, 2021). The adaptation readiness framework is a useful tool for assessing the adaptation potential of housing co-operatives because it accounts for barriers to adaptation and the complexities of multi-level governance. The adaptation readiness framework is organized around six overarching factors that are considered essential for effective adaptation to take place: political leadership, institutional organization, adaptation decision making and stakeholder engagement, availability of usable science, funding for adaptation, and public support for adaptation. The framework is operationalized here with a set of criteria, indicators, and data that are tailored to the unique organizational structure and guiding principles of housing co-operatives.

The adaptation readiness framework does not inherently account for difference in potential adaptation pathways, such as transformative adaptation, which is increasingly recognized as necessary given the scope of climate risk and importance of achieving equitable outcomes in contexts where differential vulnerability is rooted in legacies of social, racial, and environmental injustice. I expand the framework with this critical lens, adding a seventh readiness factor of ‘equity, justice and inclusivity’. By adding this justice and social-vulnerability lens and considering readiness to indicate adaptation as poised to unfold via a qualitatively distinct pathway, the possibility is opened for the adaptation readiness framework to be rendered as a ‘transformational readiness’ framework.

This expanded framework foregrounds transformational readiness and is useful for evaluating the potential for adaptive action where transformative systems change is necessary for adaptation responses to achieve equitable outcomes. It is also relevant in the context of justice-oriented organizations like housing co-operatives, which articulate principles of equity, democracy, and concern for community in their core institutional values. A need for transformational adaptation in urban settings and housing systems stems from root causes of poverty, failures in sustainable development, and a lack of governance structures to facilitate social justice and equity, which are recognized as core aspects of climate-resilient development pathways (de Coninck et. al, 2018). Rather than simply accommodating climate change through responding to physical risks, transformative adaptation is an opportunity to challenge systems of oppression, assert agency, foreground inclusion, and secure a more equitable future (O'Brien et. al, 2012). As transformational responses can also have co-benefits for other social goals, a vision of climate change adaptation as transformation is the optimal pathway where non-profit, affordable co-operative housing in Nova Scotia is concerned.

4.1.4 *Research aims*

This study examines the adaptation readiness of non-profit housing co-operatives in Nova Scotia, and whether policy supports are in place to facilitate adaptation among co-operatives. The aims of this research are to determine whether the needs of the co-operative housing sector are being considered in municipal and provincial adaptation policies, and to assess the preparedness of housing co-operatives in Nova Scotia for adapting to the impacts of climate change. In the context of intersecting crises of climate change and housing affordability in Nova Scotia (and Canada more broadly), this research examines whether housing co-operatives are ready to respond to the impacts of climate change, and what supports are needed for both existing and future co-op developments to engage in proactive climate change adaptation. The paper concludes with a discussion on how the housing co-operative model can facilitate transformational adaptation at the intersection of housing and climate change if key barriers are overcome. The following sections describe the methods employed in the study, results on the adaptation policy landscape and readiness of co-ops in Nova Scotia, and the implications of these findings for facilitating transformational adaptation through co-operative housing.

4.2 Methods

4.2.1 *Data collection*

Research methods included the collection of primary data through semi-structured interviews and a systematic content analysis of municipal and provincial climate policy documents. Using keyword searches, every provincial policy and legislative document that references climate change was collected, in addition to every climate change referencing document from the seventeen municipalities in Nova Scotia that contain housing co-ops. All were documents available on public websites, published from the time period of January 2005 – August 2021, encompassing the lead up to the first major piece of Nova Scotian climate legislation, *The Environmental Goals and Sustainable Prosperity Act* passed in 2007. These climate documents were narrowed down to include only those which contained adaptation policies, plans, assessments, or actions which had some relevance for housing. Out of 146 municipal climate change documents initially collected, 46 were included for coding, containing 139 individual municipal adaptation policy instruments. At the provincial level, nine policy and legislative documents were included for coding, containing 16 individual adaptation instruments.

Nine semi-structured qualitative interviews were conducted between October 2021 and March 2022 with municipal and provincial adaptation planners and key informants from the multi-layered system of co-operative housing governance, including co-op board members, professional co-op housing managers, the provincial housing authority, the Co-operative Housing Federation of Canada (CHF), and the Canadian Mortgage and Housing Corporation (CMHC). CHF representatives were interviewed at both the federal and Atlantic regional level. A generic interview guide was prepared, and individually tailored to each participant depending on their position and institutional involvement. All interview guides were organized around the adaptation readiness framework, with similar questions addressing key indicator themes of political leadership, institutional organization, adaptation decision making and stakeholder engagement, availability of usable science, funding, public/member support, and justice, and inclusivity.

4.2.2 *Analysis*

Data collected on the design of specific adaptation policies included policy aims and objectives, climatic hazards and vulnerabilities addressed, which housing tenure categories and actors are targeted, policy tool design, time horizon, and whether equity, co-operative autonomy, and collective tenure mechanisms are recognized or supported. Policy documents included in the study were coded according to a customized protocol, with indicators based on the ‘Nodality, Authority, Treasure, and Organization’ typology of policy instruments first developed by Christopher Hood (1983) and applied to adaptation studies by Lesnikowski et al. (2019). These four categories are defined according to types of resources available to governments to achieve policy goals. Nodality refers to policy instruments based on accumulating or deploying information resources, for example education and training, reports and assessments, monitoring and evaluation, or public outreach campaigns. Authority refers to regulatory instruments, such as land use planning, infrastructure performance standards, strategic and adaptation planning tools, agreements and intergovernmental mandates. Treasure represents financial tools and resource use, like grants, subsidies, loans, direct expenditures and research funding. Organization refers to institutional influence, expressed through instruments like demonstration projects, adapting facilities usage, institutional reforms, and operational updates and adaptations.

This typological coding approach, rooted in the ‘policy mixes’ literature, allows for a large number of specific types of policy instruments to simultaneously be identified, classified, and compared, using measurements which capture the totality of adaptation policies being adopted by a given level of government. A ‘mixes’ approach is attentive to how public policies are layered, accumulating over time, and how climate impacts may be addressed either directly or indirectly through a complex mix of policy goals and instruments. This coding framework also categorizes policy instruments as either substantive or “hard” policies – instruments intended to directly affect the nature, type, quantity or distribution of goods and services - or procedural “soft” policies; instruments intended to influence network relationships among actors in a policy system. All interviews were transcribed and coded through a combination of deductive and inductive methods.

4.3 Results: The Current State of Adaptation Planning and Policy in Nova Scotia

4.3.1 *Policy adoption timeline*

Adaptation policy was slow to start at the provincial level. While the first notable piece of provincial legislation to include climate change adaptation was the Environmental Goals and Sustainable Prosperity Act in 2007, adaptation appears as something of a footnote and no specific adaptation targets were set in the legislation. A more detailed plan was adopted in 2009 (Toward a Greener Future: Nova Scotia's Climate Change Action Plan), which alone contains 50% of the provincial policy instruments with adaptation and housing relevance and laid the groundwork for subsequent adaptation work. Many of the goals in this plan were consolidated into later policies or else are still being pursued today. Additions to the adaptation policy landscape were sparse until three instruments were passed through the legislature in 2019, including the Coastal Protections Act (which the province committed to adopting in the 2009 plan), and an update to 2007's Environmental Goals and Sustainable Prosperity Act in the form of Bill 213 which reaffirmed a commitment to emissions reduction and 'sustainable economic growth' in the context of climate change while adding more references to the importance of pursuing adaptation in tandem. In 2017, Bill 15 earmarked a funding boost for climate change adaptation initiatives, and in 2020 the province created the Flood Risk Infrastructure Investment Program (FRIIP).

Policy development at the municipal level illustrates the influence of the provincial government's agenda-setting role in initiating climate action as a broad policy issue for the province's municipalities. The MCCAP program launched in 2011 is the most prominent example of this, requiring all Nova Scotian municipalities to formulate climate change action plans, including mitigation and adaptation priorities, in order to receive federal gas tax funding. Just over half (53%) of adaptation policy instruments emerged in the five years following the province's first major efforts at adaptation planning and legislation in 2009. Another 19% were adopted in 2020, a year following the province's second most active year for introducing adaptation-related policies. Halifax Regional Municipality, Nova Scotia's capital and largest city with a population just under 450, 000, accounts for the largest share of adaptation policy instruments (21%). However, the number of adaptation policy instruments deployed by

municipalities is hardly proportional to their population. Queens, Yarmouth, Kentville and Wolfville followed HRM with the largest amount of adaptation policies, greatly exceeding that of Cape Breton Regional Municipality, despite having populations of a tenth or less that of CBRM. This uneven distribution of adaptation policy instruments is problematic, potentially leaving significant portions of Nova Scotia's population highly vulnerable to climate change hazards in large urban centres and small rural communities alike.

4.3.2 Policy targeting to housing co-operatives

A total of 16 provincial adaptation policies are relevant for the housing sector. None of those policies directly address housing co-ops or collective tenure mechanisms, nor do they recognize non-profit and community housing groups as relevant stakeholders for climate change adaptation initiatives. From a broader perspective, however, 44% of policies (n = 7) may have some implied relevance for co-ops. These policies take the form of preliminary, high-level strategic planning tools, such as a provincial vulnerability assessment and efforts to incorporate climate change planning across all provincial departments. Interviews confirmed this major goal is ongoing and has not yet reached the housing authority. Two policy instruments related to the implementation of a sustainable coastal development strategy, with a strategic planning initiative proposed in 2009 and specific zoning tools legislated in 2019 which will restrict construction or modification of structures in coastal protection zones. Other potentially relevant initiatives included the creation of a general adaptation fund in 2009 that had unspecified goals or intended outcomes, and a web-based clearinghouse of information and tools to support adaptation, which never materialized; this role ultimately is to be satisfied by CLIMAtlantic, a regional climate data hub created in partnership with provincial and federal governments and NGOs.

Only 10 of the 17 municipalities in the province that contain housing co-operatives have policies with some potential relevance for co-ops. No municipal policy instrument is specifically geared towards housing co-operatives, though 29% of instruments have potential relevance as they institute general requirements, protections, or policies in areas with co-ops. Most often these are land-use planning tools targeted towards future development in the form of coastal development, river and wetland setbacks, coastal elevation requirements, and shoreline buffers. Two policy instruments from HRM seek to ensure that new developments are built to climate-resilient standards and include adaptation plans; this is implemented by providing a developer's

risk management guide which includes information on adaptation practices and a check list to ensure risk assessments are performed and measures to reduce exposure to climate risks are taken. These tools dating to 2007 and associated obligations for developers are not mandatory but are more likely to be utilized and enforced in coastal development proposals. The Province introduced a similar guide in 2011: ‘Guide to Considering Climate Change in Project Development in Nova Scotia’. Besides four proposals to increase access to information about climate risks through publicly available resources and community education campaigns, there is little in the policy landscape to directly support existing non-profit housing providers seeking adaptation in the short-term.

Only one of these local-level policies directly recognized housing co-operatives as a unique, autonomous stakeholder in local housing systems. This policy is from the small but growing university town of Wolfville, situated on a low-lying and flood-prone region on the Minas Basin. The policy does not offer a specific commitment to housing co-operatives, but pledges to support existing co-ops in their efforts to obtain funding, and to entertain community/affordable housing proposals on public land. This policy fits under a strategic goal of expanding and diversifying affordable housing options while broadly harmonizing Municipal Planning Strategy amendments with the Municipal Climate Change Action plan. The 2020 Wolfville Municipal Planning Strategy also pledges to investigate land protection mechanisms ‘other than outright ownership’ such as land trusts, in the context of building resilient neighbourhoods. The Wolfville MPS contains the only two policy instruments (out of 139 analyzed) that make mention of Community Land Trusts in terms of equity or being a potential model for protection of land in the face of climate risks. Rather than firm plans, these signal intent to research their utility for both conservation and social sustainability, while attaining goals of climate action and reforming land use and design principles. Most policy instruments (75%) with potential co-operative relevance did not consider equity in their orientation, casting doubt on whether they will lead to any meaningful support for existing or future co-operative developments.

With respect to affordable housing more broadly, only two adaptation policy instruments addressed social housing. Both were adopted by Halifax Regional Municipality in 2020. Neither of these instruments provide firm actions or commitments but consist of reports: one which

establishes a baseline of climate risks and vulnerabilities, and the other which recommends retrofitting all residential buildings for climate resilience by 2040.

4.3.3 *Policy instrument type*

An analysis of the proportion of different types of policy instruments provides an overall portrait of how climate change responses are typically structured in the province, rather than to evaluate how effective particular policies are. This approach offers insight into how climate change policies frame adaptation in relation to housing and asserts that a balanced mix of policy types is optimal for a robust and effective adaptation framework. Both the Province of Nova Scotia and its municipalities rely heavily on the regulatory authority of government to implement adaptation. More than half of provincial and municipal policy instruments have an authoritative orientation (55% and 52%, respectively). At the provincial level these include strategic planning initiatives related to coastal development, setting new regulations for climate resilient construction and infrastructure, and establishing guidelines for the municipal Climate Change Action Plan process. Municipal-level policy instruments commonly consist of land use planning amendments, such as increased minimum building grade elevations, watercourse and shoreline setbacks and buffers, and development restrictions in sensitive areas. Municipalities also had examples of updating building codes to withstand more extreme weather conditions and setting broad strategic and adaptation planning directives such as using climate change action plans to inform and amend municipal planning strategies. The second most common type of policy instrument deployed by municipalities are information-based instruments (36%), which include local reports and assessments (22%), pointing to the initial priority to create baseline knowledge and data for municipal civil servants to understand climate risks and formulate potential responses.

Governments can employ either direct means of compelling change (substantive policies), or indirect means of encouraging change (procedural policies). At both the municipal and provincial level, more than 70% of policy instruments were substantive rather than procedural. At the provincial level, strategic planning and grants and subsidies account for 22% of substantive policies, respectively, followed by land use planning & by-laws, building regulations, and expert advice at 11% each. Of the five procedural tools at the provincial level, inter-governmental agreements were used twice, related to guiding municipalities through the

Municipal Climate Change Action Plan (MCCAP) process and establishing adaptation priorities. Other provincial procedural instruments used were research funding (1), institutional reforms (1), and a legislative provision to ‘establish or participate in programs to carry out the purpose of the Environmental Goals and Sustainable Prosperity Act’, which includes adaptation goals. The most common substantive policy instruments used by municipal governments are land use planning & by-laws. Strategic planning is also an important element of municipal planning policies (12%), including the provincially mandated MCCAP, Municipal Planning Strategies, and Integrated Community Sustainability Plans (which in the case of several municipalities were supplanted by MCCAP or updated MPSs).

With respect to adaptation financing, the provincial government provides the majority of funding, and/or directs it from the federal government, while stipulating the conditions by which municipalities can access it. A total of 27% of provincial policy instruments are mechanisms for adaptation financing. Municipalities appear generally reluctant or unable to allocate consistent and specific funding streams for local adaptation initiatives. Only 3% of municipal policy instruments are mechanisms for adaptation financing.

At both government levels there is a notable lack of substantive ‘organization’ tools (combined 2%), perhaps signalling a general desire to preserve operational ‘business as usual’ while simultaneously pursuing climate change related goals. Organization-type instruments were more common in the form of 13 municipal ‘consultation and collaboration’ instruments that reflects relatively soft, non-committal attempts to pursue potential adaptation options through outside partners, or to assert the municipality’s position as a stakeholder in adaptation plans already initiated by a higher level of government, or regional neighbouring municipalities. With regards to policy type, 57% of documents were strategic planning documents, including MCCAP, MPS, ICSP etc., and the remaining 30% were reports or assessments.

The types of policy instruments prioritized in Nova Scotia suggest that adaptation is predominately approached through a lens of land use planning, with reliance on building and development sectors to implement adaptation plans originating from municipal planners. This reflects that across Nova Scotia the tendency is towards a mainstreaming approach to adaptation, integrating climate change considerations into existing regulatory frameworks and government operations, like zoning bylaws and development approval processes.

4.3.4 *Policy instrument targeting and implementation status*

The climatic hazards addressed in Nova Scotia’s policy instruments reflect strong concerns regarding sea level rise and storm surges. Sea level rise is the only climatic hazard directly addressed through provincial adaptation policies; 69% of policy instruments target this hazard, while 31% do not specify any hazards and target climate change risks more generally. Municipal policies address a more diverse array of climatic hazards than provincial policy documents. While sea level rise was still the top hazard addressed, accounted for by 34% of municipal policy instruments, extreme precipitation and inland flooding (25%), storms (including hurricane force winds) (16%), and erosion and landslides (10%) are also commonly addressed.

Most policy instruments target civil servants as the agents of adaptation implementation and rarely consider households or housing organizations to be relevant actors or stakeholders. Nearly every policy instrument at the provincial level was targeted towards government actors: 64% target the provincial level and 20% target the local level. Most of the actors targeted through municipal policy instruments are municipal departments and personnel themselves (56%). The private sector, often referring to developers, is the next most common target (16%). Only 6% of municipal adaptation policies are intended to reach households directly, and 5% are intended to encourage broad engagement from the general public. Both of these resident-targeting aims usually took the form of education and outreach campaigns about climate change risks and potential adaptation actions for property owners in at-risk areas or the community at large.

A large majority of provincial policy instruments (79%) did not specify any form of housing tenure; those that did targeted the private sector, including owner occupied homes, private rental, and property investors. Similarly, at the municipal level 82% of policies do not specify any form of housing tenure, which reflects the fact that NS municipalities tend to frame responses to climate change in terms of broad ‘development’ or ‘infrastructure’ issues, either not seeing a role for themselves in facilitating adaptation at the level of the housing system or connections between climate change and overall housing need, accessibility, security of tenure, and socioeconomic factors. Where specific forms of housing tenure are noted in municipal policy instruments, they tend to be references to private ownership: owner-occupied, private rental, and property investors are each noted in 4% of policies. That few policies specify any form of

housing tenure suggests that housing and climate change issues are largely considered separately by policymakers.

A few municipal strategic planning processes sought more active public participation in their adaptation initiatives, with HRM's HalifACT 2050 plan inviting a broad range of 250 community stakeholders to inform adaptation planning. None of those stakeholders officially represented the co-op sector, however. The proposed HalifACT 2050 residential retrofit policy is perhaps the most direct instrument targeting housing vulnerability, alongside considerations of planned retreat in Queens municipality and redrawn watercourses and shoreline buffers also directly invoking coastal homeowners. Cape Breton Regional Municipality also proposed to create a database of climate risks and impacts based on community and staff knowledge.

Less than half of municipal policies have been fully implemented in municipalities which contain housing co-operatives. A total of 49% municipal policy instruments are completed or underway, while the implementation status of nearly 21% remains unclear. Provincial policy instruments demonstrated more uptake, though with far fewer policy instruments overall, and implementation pace has still shown to be modest with 56% completed, 19% underway, and a remaining 26% shelved or having unclear implementation status.

4.3.5 Consideration for equity in policy design

Equity is recognized in some form in five provincial policy instruments (31%); however, no policy instruments recognize or address linkages between equity, housing, and climate change risks. All five provincial policies that consider equity only do so implicitly through discussion about groups with heightened vulnerability; there are no explicit actions proposed to offset the disproportionate impacts of climate change. Of policies that contain an equity lens, 80% acknowledge disproportionate climate vulnerability for the elderly, 60% for youth, 20% for low-income households, and 20% for persons with disabilities. There are no mention of racialized groups, Indigenous peoples, immigrants/newcomers, gender, or people experiencing homelessness in provincial adaptation policy documents.

At the municipal level, equity is recognized in 14% of policy instruments (n = 20), while only 12 of these policies recognize equity in the link between housing and climate change. Those policies were adopted by HRM (5), Wolfville (1), Kentville (1), Bridgewater (3), Antigonish (1),

and Shelburne (1). The majority of municipal policy instruments that recognize equity only do so implicitly by raising discussion of differential vulnerability. Of the 20 municipal policy instruments that raise equity considerations, 16 do so by recognizing the vulnerability of low-income individuals or households, 13 recognize the vulnerability of the elderly, 8 recognize people with disabilities, and 7 recognize youth. Only two policy instruments define vulnerability or equity in relation to race, and three instruments refer to Indigenous peoples specifically. Four policy instruments more tangibly include equity in their design, although these policies are somewhat limited in scope and detail. The Halifax plan for climate-resilient retrofits will prioritize most vulnerable communities when arriving at residential phase, but there is no clear timeline or description for how decisions will be made regarding which areas or residents are prioritized. Queens Regional Municipality proposes a public education campaign about how to prepare for extreme weather risks, with an eye to ensuring support for elderly and disabled residents. A Yarmouth policy pledges support for Emergency Management Organizations in developing an emergency response plan which minimizes impact on most socially vulnerable areas, and a Bridgewater policy seeks to lobby the provincial government to do more on reducing socio-economic inequities considering increasing climate risk and potential for the exacerbation of social vulnerability.

While policy instruments with potential or indirect relevance for housing co-operatives rarely consider principles of equity, even fewer of these recognize a link between equity, climate change, and housing. Out of the 40 policy instruments with potential co-operative relevance, only 15% consider the link between equity, climate change, and housing (n = 6). This represents only 4% of all adaptation-relevant instruments. Two of these instruments are from various stages of Halifax Regional Municipality's latest major climate change planning push in 2020 and echo each other. The HalifACT 2050 plan implements an earlier recommendation to retrofit all existing residential and non-residential buildings by 2040, with priority given to most vulnerable residents. The plan offers little in the way of specifics for the implementation of this ambitious goal, but the technical report on which this policy is based mentions social housing as a priority and identifies vulnerable groups including low-income individuals/households, people experiencing homelessness, elderly, immigrants/migrants, youth, persons with disabilities, Indigenous peoples, and visible minorities. Few details are provided however, on how decision-making processes will prioritize which groups or residents, or what criteria will be used for

determining who is most vulnerable. As of yet, there has been little to no movement on this long-term goal, though the adaptation department is set to receive more resources and staff members to improve capacity for reaching adaptation goals generally (Adaptation Specialist Interview).

Two policies from the Bridgewater 2013 Municipal Climate Action Plan aim to incorporate climate change considerations and regulations into planning documents, and collaborate with the province to reduce social inequities, with mention of ‘affordable housing’, broadly defined. A strategic planning goal from the 2020 Wolfville MPS aims to ensure that ‘no development results in threats to the safety of Wolfville residents’ through land use planning measures, with special attention given to elderly residents and persons with disabilities. The sixth policy that considers the link between equity, climate change, and housing is from the MCCAP of Antigonish. It seeks to update the building code to ensure that buildings can withstand stronger winds, with special consideration given to low-income households.

Because none of these six policies lay out specific action plans targeting housing co-operatives (nor do they typically contain detailed plans of how to alleviate vulnerability of specific population groups), it is highly unlikely that co-operatives stand to benefit or if these policies can be considered as offering support to housing co-operatives in light of accelerating climate change risks. Given limited information on implementation processes and the overall scarcity of policy instruments which directly target key social vulnerabilities in the housing sector, especially where different forms of tenure are concerned, any attention to equity, climate change, and social, co-operative or non-profit housing appear as an afterthought at best in contemporary adaptation planning and policymaking in Nova Scotia.

4.4 Results: The Adaptation Readiness of Nova Scotia Co-operative Housing

Analysis of the adaptation policy landscape in Nova Scotia reveals a very limited focus on the relationship between housing and adaptation, and almost no attention to adaptation of co-operative housing. The following section examines the adaptation readiness of housing co-operatives through the lens of political leadership, institutional organization, decision-making and stakeholder engagement, availability of usable science, funding, co-operative membership support for adaptation, and equity, justice, and inclusion.

4.4.1 *Political leadership*

The government of Nova Scotia has demonstrated leadership on climate change adaptation policy development by setting the agenda and prompting municipalities to engage with strategic adaptation planning through the MCCAP agreements. Though priorities and proposed policy approaches may differ, the importance of acting on climate change appears as a non-partisan issue in legislative assembly minutes, with representatives from all political parties calling attention to climate change risks and advocating for consideration of various adaptation actions. However, at both provincial and local levels there is no evidence of leadership from elected officials on climate change adaptation for non-profit co-operative housing, or for approaching climate change adaptation in a way which recognizes connections between climate change, equity, and the housing system. When addressed as separate issues, there are examples of political leadership regarding co-operative housing support and development proposals for new units in municipal council meeting minutes and recordings of provincial legislative proceedings, as well as lengthy discussions of climate change concerns, but the two issues never overlap.

With respect to concrete climate actions, more leadership is evident in programs and partnerships to advance mitigation and energy efficiency goals for residential housing than for adaptation. Political leadership directly related to specific climate change adaptation supports for non-profit, social, and co-operative housing appeared to be lacking in all official government channels. However, Nova Scotia was described as a leader in co-operative governance compared to other provinces: “we would love to have all the other provinces be like Housing Nova Scotia” (CHF Canada Interview). This assessment was made in reference to the productive relationship between Housing NS and co-operatives under the purview of CHF Atlantic in creating funding programs for initiatives like Building Condition Assessments and strategic planning development. The strength of this relationship may be owing to the historic legacy of co-operative leadership in the province, which built up the credibility of the sector over the 20th century. At the federal level, the National Housing Strategy and emerging National Adaptation Strategy may be seen as indicators of political leadership for adaptation and housing equity separately. It remains to be seen if they will overlap adequately to address adaptation for the housing system, let alone if specific adaptation supports for non-profit housing providers will be considered by policymakers.

The co-operative sector appears to be moving towards stronger leadership on climate adaptation, even if the focus has been oriented towards mitigation thus far. The CHF has internal sustainability policies, including an environmental code of practice, carbon offset program for employees, and policies committing to promote strategies to help member co-operatives to reduce waste and conserve energy and water. There are signs that nationally the sector is increasingly considering moving on climate change adaptation as risks become more apparent. In British Columbia for example, the provincial co-op housing federation set up a climate change task force, whose vice-chair has stated that given their principles of resource sharing and collective decision-making, housing co-ops are well-positioned to tackle climate change mitigation and adaptation projects. CHF Canada's new director of public affairs publicly stated that increasing supply of community and co-op housing needs to be paired with climate policy. That CHF is increasingly engaging with climate change issues in general across Canada and increasingly demonstrating awareness of risks to existing and future co-op development suggests that leadership on co-op adaptation will grow, including in advocacy for adaptation interests of co-op sector at large to federal and other levels of government. At the community level in Nova Scotia, at least one co-operative has exhibited grassroots political leadership on climate action, establishing an internal committee to examine and address issues of climate change mitigation and adaptation.

4.4.2 Institutional organization

Housing co-operatives in Nova Scotia are both independent micro-democratic entities, and affordable housing contributors in a 'third sector' social ecosystem, operating through an intricate web of government and non-government actors and partners. While not specifically devoted to climate risks, long-term planning for the viability of the co-op was an important part of the collective operations of both co-ops interviewed. CHF and provincial government programs like the Community Housing Capacity Building Program both encourage housing co-ops to further engage in long term planning. This long-term planning typically involves considerations of sustainability, which includes ensuring that building repairs and upgrades are of robust quality. The CHF has no staff capacity for dedicated climate change adaptation personnel, and most co-ops are volunteer-driven and do not have resources or labour to tackle large adaptation projects directly. Nonetheless, current co-operative practices of long-term

planning with an eye towards sustainability could contribute to building climate resilience. Beyond the example of the co-operative which has established a climate change committee however, there are no agencies or working groups in Nova Scotia specifically tasked with implementing or supporting climate change adaptation for non-profit community and co-op housing.

As housing co-operatives tend to be enmeshed in a complex multi-level governance system, there are a wide variety of stakeholders implicated in potential adaptation initiatives for co-ops. The majority of housing co-operatives in Nova Scotia employ the management services of one of two management organizations: Pathways Housing and the Community Housing Management Network. The former is a private (non-profit) enterprise, while the latter is a co-operative in itself, closely aligned with the CHF. Some smaller co-ops are self-managed, but still tend to be members of CHF, which acts as sectoral liaison to various levels of government and occasionally pursues partnerships with NGOs. CHF works with multiple partners both regionally and nationally who have capacity for climate change and potentially adaptation work. The NGO Clean Foundation of Nova Scotia and NS Power partner Efficiency Nova Scotia are two organizations in the province who have been involved in collaboration with local co-ops, though for households they currently only provide funding for mitigation-related activities, such as EV charging station deployment, energy audits and renovations to improve energy efficiency. The Halifax-based Ecology Action Centre is a well-established NGO with an increasing focus on adaptation and environmental justice that has some loose ties to co-ops and offers community education events, workshops, and other information-based supports.

The state has erected stiff barriers to co-operative development and resilience-building, owing to existing mix of community housing policies and/or a lack thereof. Co-operative sector employees described the process to acquire more substantial funding and support programs for non-profit housing as a multi-level quagmire that is inaccessible to most co-operatives without the support of experts to navigate complex application processes or seek out necessary partners. The slow pace of provincial government action was also identified as a barrier that has separately hampered consequential climate adaptation efforts as well as initiatives for co-operative and non-profit housing development and addressing the current affordable housing crisis in general. This tended to be described as a lack of timely decision-making, or a long gap between discussions

about strategic directions or specific proposals and active implementation for both affordable housing provision and climate adaptation, in a variety of domains such as establishing funding streams and programs, incorporating principles of equity and inclusion, determining adaptation priorities, and building institutional capacity to focus on delivering climate adaptation goals.

Resources and staff capacity for adaptation is historically low in municipalities and within the provincial government. In Halifax Regional Municipality (which accounts for about 45% of the population of NS), more adaptation-dedicated planning staff are being brought on board as the city seeks to implement the HalifACT plan. At the provincial level, a senior adaptation official expressed the expectation that staff capacity for adaptation would increase as well in 2022 as the new administration announces the details of its climate plan, which should provide more stability for adaptation planning that for years has relied on just a handful of permanent staffers (2-3) bolstered by short-term contract positions.

4.4.3 Decision making and stakeholder engagement

To date, deliberate climate change adaptation initiatives in Nova Scotian municipalities have not involved any consultation with co-operative housing stakeholders. The formulation of HRM's HalifACT plan involved community engagement and multiple workshops and meetings with stakeholder groups. A total of 250 internal and external stakeholders were consulted including Housing Nova Scotia and Affordable Housing Association of Nova Scotia, but no housing co-operatives, housing co-operative management companies, nor CHF Atlantic were among those invited. The plan touts the importance of collaborative solutions and community action to achieve success in climate change mitigation and adaptation, yet the role of co-ops as residential communities with a predisposition for collective action is overlooked. Representatives from co-ops and CHF suggested that they would be amenable in instituting or supporting climate change adaptation actions if they were to receive pertinent information and expert advice on the topic.

For both co-ops and municipal adaptation planners in NS, decision-making processes overlap considerably with funding considerations. From a municipal adaptation planning perspective, the importance of retaining flexibility to change priorities was described to capitalize on different funding opportunities as they become available. Financial viability is a key decision-making consideration for co-operatives, with any project that would approach

budgetary limits tending to require extensive discussion and deliberation involving all members, as it may threaten the future affordability of the co-op. Poor decision making and financial management previously led to the failure of some housing co-ops in the province, though several were salvaged from liquidators by the new sector-led Compass co-op; a co-operative comprised of former small co-ops from around the province. At the risk of overemphasizing a lens of economic determinism however, the desire for co-operative community longevity and sustainability can be seen as what motivates decision-making as much as market logic. One co-op representative interviewed for this study described long term planning within the co-op as a careful and flexible process, with continual tweaking to suit the needs, wants, and changing values of members. This is underpinned by an awareness that as climate change advances and social and economic factors change, the co-op must be prepared to respond.

Both co-operative housing representatives that were interviewed reported a high level of membership engagement in decision-making processes and strict adherence to democratic principles. These co-ops tackled issues like climate change and building maintenance through an array of member committees which then bring proposals to the board, ultimately allowing for every member to have a say before actions or taken or funds are spent. However, both co-ops are perhaps best described as small ‘activist co-ops’ and not necessarily indicative of decision-making culture in NS co-operatives generally.

The amalgamated Compass Co-operatives Limited, which may well represent the future of housing co-ops in NS as the only co-operative to successfully build new capacity for the sector in the province in decades, has a unique governance structure in which only a handful of members from across the 111 units and eight localities in the province sit on a board with non-member housing experts, thus potentially limiting direct access to decision-making power for members. Nonetheless, this new governance model allows the co-operative to engage more effectively with and benefit from outside partnerships through direct access to sector expertise and leveraging CHF backing. This requires less reliance on member volunteerism and opens possibilities for development. The large Compass development underway in Halifax, for example, has leveraged the federal lands initiative, multiple funding streams (municipal, provincial, and federal), engagement and consultation with local community groups, CHMN Management, and a BC-based design and development partner to construct 57 units on 2

adjacent lots on Maitland Street in Halifax’s North End. Compass is also exploring a potential partnership with community-based construction company in Meteghan, NS to build climate-resilient housing out of recycled materials.

Federally, the Canadian Mortgage and Housing Corporation describes the importance of stakeholder engagement in decision-making processes, increasingly so since the adoption of the National Housing Strategy and prioritization of climate change planning. Despite active communication channels however, housing co-operative representatives identified a lack of engagement with co-operative stakeholders on the part of CMHC and the federal housing department when creating new strategies, programs, and funding streams. Interviewees identified this as an impediment for co-ops, and especially for small co-ops in Nova Scotia trying to access funding and take advantage of programs kickstarted by National Housing Strategy. There appears to be optimism within the sector, however, that CMHC is becoming more responsive to co-operative lobbying over time.

4.4.4 Availability of usable science

One of the most significant barriers referred to in interviews was a lack of data to inform climate adaptation planning and decision-making for the co-operative sector. In the case of most co-operative actors, this meant no direct availability of usable science at all, while for provincial and federal government housing agencies, available science currently takes the form of general data on climate change risks which is not ‘fine-grained’ enough to determine risk at the unit or co-op level. The CHF has acted as a provider of information and workshop facilitator to inform member co-ops of actions they can take to enhance energy-efficiency and address climate mitigation goals, indicating that the CHF could play a similar role as conduit for advice and information supports related to adaptation as well, if and when usable and relevant scientific information is made available to the organization.

As noted above, both policy analysis and interview data suggests a lack of communication between municipalities and co-operative housing entities, and that co-ops are not considered as unique or relevant stakeholders. While nearly every municipality has conducted risk assessments and identified adaptation options as part of the MCCAP process, no individual co-operative, co-operative management professional, or CHF Atlantic representative reported

any interaction with municipal planners or policy-makers to discuss climate change hazards or adaptation responses and advice. While government-led research in NS identifies climate impacts, vulnerabilities, and adaptation options, these reports and policy documents are not provided in a usable format for non-profit housing providers and decision-makers looking to proactively reduce specific climate risks. Strategic planning initiatives that come out of these assessments are generally aimed at civil servants or elected officials with the intention of informing decisions at the planning and policy level, rather than providing information to residents or community groups seeking to assert agency in reducing climate risks. The CHF reported some limited availability of what could be used as proxy climate data from their sister organization, the financial co-operative Co-operators Insurance, in the form of claims related to flooding and other accelerating ‘environmental disasters’.

At the provincial level, a lack of available data was also reported to be a barrier to adaptation planning across departments. The recent onboarding of a climate data specialist and inauguration of CLIMAtlantic, a regional climate information hub, is expected to address this dearth of accessible climate data in the province and offer targeted support to a wide array of stakeholders. CMHC’s new climate unit is working on improving access to climate data in order to better understand detailed housing risk for the entire country, and to build a housing-specific database of climate risk to inform adaptation and decision-making in the housing sector.

4.4.5. *Funding*

All interviewees working directly in the co-op sector described funding as their biggest barrier for development in general, and for any potential major adaptation project. The goal of most co-operatives in Nova Scotia is to maintain the affordable housing stock that they have, rather than expand, upgrade, or build new capacity, as attaining funding for necessary renovations and basic capital improvements can prove challenging enough. Co-ops have been able to take advantage of federal-provincial bilateral funding agreements such as the Social Housing Assistance and Repair Program (SHARP) and its successor, the Community Housing Infrastructure Repair Program (CHIRP). However, even with support from CHF and Housing NS, applying for additional funding streams is a difficult task for co-ops that requires navigating bureaucracy and meeting tight stipulations attached to funding agreements. For example, funding programs for co-ops tend to be limited to renovations to replace existing assets, rather than any renovation

which would be perceived as an upgrade. Available funding for growth and development of new co-ops is available from municipalities, the province, and CMHC, but it is difficult to attain funding from multiple levels simultaneously, which is likely necessary for any significant non-profit development project: “All have good things to offer, they just don’t offer them in a very compatible way” (CHF Interview). Criteria such as what counts as ‘affordable housing’ tend to not be harmonized between different levels of government, complicating application processes for funding. NS co-ops pointed out that many federal funding programs available through CMHC and the National Housing Strategy appear to be designed for large urban co-operatives in central Canada and Ontario and are not accessible to rural or small self-managed co-ops, or to co-ops with old building stock, all which exist in higher proportions in Nova Scotia. A federal-level CHF informant stressed the need for co-operative-specific funding streams from the federal government and CMHC, as most development programs force co-ops into competition with private developers or NGOs to build affordable or community housing. CHF offers a one-time green micro-grant to its member co-ops, which several NS co-ops have taken advantage of for small projects like gardens, clotheslines, and bike racks. While sustainability-oriented, these micro-grants (up to \$5000) are not a large enough sum for most adaptation projects, nor are they intended to be. Though proactive adaptation-specific funding is lacking, the bilateral Investing in Canada Infrastructure Program (ICIP) is one existing potential source of funding for adaptation initiatives, their mitigation sub stream currently identified by Compass Co-operative as a vehicle for accelerating the creation of new sustainable and climate-resilient affordable housing, though relatively inaccessible to grassroots co-ops.

There are examples of actions so far that provide additional indications for the current trajectory of co-operative housing adaptation in Nova Scotia, evident in financial mechanisms and investment choices. Co-operators Insurance, a longstanding financial services co-operative which works closely with CHF, is leading adaptation efforts in the sector by pioneering overland flood insurance policy in Canada and providing data to the co-op housing sector. This initiative will support improved risk assessment and financial compensation to offset climate change-induced losses but does not help co-ops to proactively implement adaptation solutions, and thus may be considered as a financial measure contributing towards resilience of the sector rather than indicative of a transitional or transformational adaptation pathway. Despite its acceptance in resilience discourses however, studies have shown the potential for insurance regimes to be

maladaptive by structurally embedding risky behaviour and inhibiting adaptive change after disastrous events (O’Hare et.al, 2016).

Unlike conventional private rental markets, the co-op housing model incentivizes investments to enhance quality and safety while maintaining affordability of units. Decision-making processes at the co-op level are not yet fully engaging with adaptation, but financial imperatives already orient them towards sustainability and long-term viability, in examples such as co-ops choosing to invest in high quality building materials to ensure sturdy building envelopes that stand the test of time and deliver cost-benefits long-term. Most other examples fall into this category of resilience-oriented pathways and tend to be ‘incidental’ adaptations; a response to pressures beyond climate change that nonetheless have significance for exposure, susceptibility, or adaptive capacity (Pelling, 2011). The current funding streams and working relationship between CHF, Housing NS, and individual co-ops are illustrative of this, having been successful at initiating BCAs, operational reviews, asset management plans and strategic planning sessions, carried forward by contemporary resilience-building programs such as the CHCBP. More efficient heating and cooling systems such as heat pumps, and solar-powered backups to energy supply are being considered by a few co-ops but tend to be “on the very outskirts of discussion” among NS co-ops (Co-op Manager Interview). A prominent co-op management organization in the province is responding to increased instances of high winds in certain areas, encouraging the implementation of better quality tacked down roof shingles and higher-grade siding.

With respect to adaptation-specific funding provided by the government, a planner at the provincial level described the situation as one in which funding was available for small projects and risk assessments, but not for sustained long-term capacity which effective adaptation requires. This observation is borne out in the policy landscape described above, resulting in uneven and stalled implementation of adaptation interventions for municipalities, and a lack of large-scale interventions or commitments in most municipalities outside of HRM. While legislation in 2017 committed to increasing funding for adaptation, the only clear outcome to date of this commitment is the relatively modest Flood Risk Infrastructure Investment Program (FRIIP), which may fund up to 50% of municipal project costs for infrastructure which reduces flood risk and community vulnerability. With the provincial government as gatekeeper, the slow

flow of funding to municipalities for targeted adaptation projects appears as a significant barrier for local adaptation. There is no specific funding earmarked or proposed for non-profit or co-operative housing adaptation.

4.4.6 Membership support

While there is no evidence to suggest a widespread member-driven push for adaptation specifically, co-operative housing members described a culture of participation and activism, in which individuals involve themselves with various internal committees geared towards the governance and long-term viability of the co-op. One co-op interviewed through the course of the study declared a climate emergency and established a climate action committee focused on reducing emissions with adaptation initiatives included in the form of climate-resilient retrofits. A member of a different co-op expressed that their entire co-operative membership exhibited high climate change awareness, concern over impacts, and willingness to pursue sustainability and measures for climate resilience, if not formal adaptation at this stage.

Within the sector at large there is growing recognition of the importance of acting on climate change. The 2019 AGM of CHF Canada included a ‘Global Climate Emergency Endorsement’, originating from the Co-operative Housing Federation of British Columbia. Interview subjects in co-op sector administration expressed that most co-ops and co-op sector professionals would support adaptation if they had the capacity or had more awareness or education about its importance or relevance for their community, but in the words of one prominent manager, “it’s just never come up”. This may be partially owing to an existing focus on mitigation and energy efficiency when it comes to climate change action, with adaptation not yet on the agenda. This reflects the relative prioritization of mitigation and adaptation at local and provincial levels; adaptation tends to be prioritized less than mitigation in policy discussions.

4.4.7 Equity, justice, inclusion

While considerations of equity, justice, and inclusion are present in 14% of municipal policies, in most cases these are not tied to specific actions to address structural inequities but tend to only acknowledge the concept of uneven social vulnerability to climate change. All those individuals interviewed however, including an adaptation planner; CMHC, Housing NS, CHF

representatives at federal and regional level; and individual co-ops expressed that equity, justice, and inclusion are increasingly becoming part of planning discussions and operational practice. In Halifax, a planning professional reported that though equity-oriented adaptation actions are a key pillar of strategic climate goals, principles of equity expressed in the HalifACT climate plan are not yet ‘baked in’ to processes. An example of an adaptation project in Halifax which demonstrates lack of equity considerations is the implementation of the National Disaster Mitigation Program (NDMP), which addressed flood risk only in the central part of the municipality (Adaptation Specialist Interview). Basing the adaptation response on data originating from resident phone calls to the municipality, and prioritizing residents in the downtown core at the expense of more marginalized minority communities historically pushed to the urban periphery of the HRM fits with a long-running pattern of anti-black displacement and neglect by planners in the city (Rutland, 2018). Currently, principles of justice and inclusion are carried forward only by certain staff members who engage directly with vulnerable communities and aim to be responsive to needs, resulting in some tangible developments in the domain of emergency management. For example, the city has purchased refrigeration trucks for use in low-income neighbourhoods when extended power-outages threaten food security. The most bold and concrete equity-oriented policy action found is contained in the HalifACT plan’s commitment to prioritize vulnerable residents in its proposed climate-resilient retrofit for all housing by 2040, but the plan provides no specifics on how operational decisions will be made, who exactly will be prioritized, or when work will begin. No other adaptation policy instrument in the study area commits to direct action to address social vulnerabilities in the housing system, and a dearth of policies which connect equity, housing, and climate change in NS suggest justice-oriented approaches to adaptation which support non-profit and alternative forms of housing tenure will remain marginal.

Individual co-ops are encouraged by the CHF to develop policies and practices related to equity, diversity, and inclusion, primarily through education tools and workshops. Interviewees expressed that most co-ops endeavor to advance equity and create inclusive housing communities but one noted that some co-ops are prone to discriminate on a financial basis, preferring to offer membership to middle-income or older well-established families for fears that if government rent subsidies are withdrawn, the viability and affordability of the entire co-op would be jeopardized (Co-op Manager Interview). While co-ops are often portrayed as agents of

social justice that help to reduce marginalization and inequality through affordable and democratic housing access, not all co-operatives live up to principles of equity and inclusivity. In 2021 media attention was drawn to a Halifax-area co-op after it was accused of discrimination and a pattern of harassment towards racialized co-op members (Renic, 2021). This emphasizes the importance of the CHF continuing to advance the work of helping co-ops mediate conflicts, offer sensitivity training, and promote the development of policies of inclusivity.

At a more structural level, co-ops are far from guaranteed to help the most-marginalized marginalized members of society, and data from the North End of Halifax demonstrates that co-ops tend to favour residents with considerably higher income than those in public housing (Larry Smith & Associates, 1986). In 1970's this neighbourhood saw money withdrawn from public housing developments and put towards construction of new non-profit and co-operative housing organizations, contributing to displacement of low-income, predominately black residents (Melles, 2003; Rutland 2018). Some housing co-operatives have been successful in housing low-income and vulnerable residents, but individual co-ops are highly variable in the societal impact they have on alleviating vulnerability. Through decades of sound financial management, one co-op interviewed has been successful at providing an internal rent subsidy for members in need, operating completely independently of government funding, though this is likely an exception in the Nova Scotian context, for a co-op that has been described as 'unique', politically active, and benefits from a long-serving member with professional experience in finance. The role of the state is significant in understanding these discrepancies between co-ops, as consistent availability of income-g geared rent subsidies for co-ops allows highly vulnerable community members to access stable co-operative housing without placing the responsibility for creating deep housing affordability on co-op residents who govern their housing organizations as volunteers.

4.5 Discussion

There is little evidence that adaptation policy in Nova Scotia is targeting non-profit affordable housing, or housing co-operatives specifically. Most adaptation in NS is designed to be government-implemented and relies on municipal planners to impose modified land use regulations that take climate change impacts into account. This is typically meant to address new development along coasts and rivers, and as such implies targeting to the private sector as the vast majority of residential development occurs in the private market. Provincial and local

adaptation policies in Nova Scotia are currently missing opportunities to work with the non-profit sector and co-op housing organizations on adaptation projects that ensure the needs of Nova Scotia's more vulnerable populations are addressed, and that climate risk exposure is addressed beyond the private housing market. It is also worth noting that even existing policies which may indirectly benefit and protect co-ops face barriers to implementation. I found roughly 50% of policies in all 17 municipalities containing co-operatives to be completed or underway. If all 21% policies which I deemed to have unknown implementation status were imagined to be completed or underway, this would be within range of Righters findings, which examined a sample of 20 municipalities, half of which overlap with mine, and found nearly 75% of proposed actions to be completed or underway (Righter, 2021). Even if such a generous margin were applied however, the results from my sample suggest that communities containing housing co-operatives on average have less likelihood of successful adaptation implementation. This highlights a landscape of differential adaptation in Nova Scotia and raises questions about relevant barriers and connections to inequity; Righter (2021) notes that communities with higher-than-average municipal revenues, and/or more developed coastlines were more likely to have a high rate of adaptation policy implementation success.

Overall, housing co-operatives in Nova Scotia have low adaptation readiness. There are no personnel with adaptation expertise currently dedicated to guiding co-operatives through the adaptation process, and provincial and municipal policies take no responsibility for facilitating or encouraging this. The co-operative sector itself is capable of generating both grassroots and administrative leadership that is willing and able to address climate change concerns, but in the absence of government support targeting non-profit co-operatives, proactive adaptation is struggling to gain momentum. Both provincial and local government decision-makers have not included co-ops as stakeholders in adaptation planning processes, nor have they provided information on projected climate change impacts or potential adaptation actions to local or regional co-operative housing organizations. A lack of usable science hinders the ability of co-operative decision-makers to identify appropriate adaptation actions and identify what resources will be needed to reduce hazard exposure. A lack of targeted adaptation funding and a legacy of uneven funding to the co-op sector leaves little room to act independently towards any larger adaptation projects.

However, there is evidence to suggest that Nova Scotia's housing co-operatives could be well-positioned to pursue a pathway of resilience to climate change if these key barriers are overcome, through a mixture of self-help principles, organizational structures which promote collective action and democratic decision-making, and a network of support from a patchwork of non-profit and state entities largely mediated by the CHF. Most activity and discussion related to environmental organizing has so far focused on mitigation and energy efficiency, but that co-ops have been successful in leveraging partnerships to support these efforts indicates adaptation readiness could significantly improve if education, targeted scientific information, and policy support is in place. The state can facilitate the removal of key barriers by ensuring training and support for adaptation planning within co-ops, targeted information on climate change risks and adaptation options, and funding opportunities that can be leveraged together for larger adaptation projects that are accessible for a wide variety of co-ops at different scales.

I use Pelling's (2011) resilience-transition-transformation typology to interpret my results and evaluate whether adaptation readiness in the Nova Scotia Co-operative housing sector is poised to follow a 'transformational' adaptation pathway, relative to other pathways. Adaptation as resilience is characterized by actions which seek to maintain existing functionality in the face of climate risks, not necessarily to realign the relations which drive development. Adaptation as transition involves intervention in governance regimes and the full realization of rights within existing systems, but falls short of directly challenging dominant political, cultural, and economic regimes. Pelling et. al (2015) conceptualize transformational adaptation as a non-linear response to climate change; radical shifts in normative aspects of culture, governance, development, and risk management that support systemic changes with an emphasis on equity and justice.

When taken together, adaptation policies identified with potential relevance for Housing Co-operatives and the legacy of housing policies which shape co-operative readiness are at best supportive of a pathway of resilience-building in the face of climate change. This pathway is one to be wary of, as successful resilience-building can suppress deeper changes in institutions and values, seeking to manage risk rather than challenge the status quo which produces an unequal distribution of risk exposure (Pelling, 2011). There is some evidence of transition in policies which prohibit development in coastal areas with exposure to sea level rise, especially when

taken in context of increasing calls for expansion of affordable housing and the recent influence of the Nova Scotia Affordable Housing Commission in urging government to act broadly and deliberately to address the housing crisis (Housing NS Interview). ‘Mainstreaming’ of climate change action across all government departments is advancing at both the provincial level and in Halifax Regional Municipality, where ‘right to housing’ and justice-oriented adaptation discourses have space to meet at the policy table.

There remains significant untapped potential for co-ops to play a role in achieving transformational adaptation pathways. Co-operative housing has been identified as offering significant socio-economic benefits for marginalized populations, such as increased social capital, greater housing quality and stability through tenure security and affordability, reduced operating costs, the opportunity to gain skills through social learning, as well as positively influencing broader economic and development outcomes for the surrounding community (Crabtree et. al, 2019). From a public health perspective, Canadian research has also identified benefits of co-operative housing for reducing social isolation and promoting physical, mental, and emotional well-being (Lubik & Kosatsky, 2019). Research in the U.S. provides evidence of transformational adaptation through co-operative governance of resident-owned Manufactured Housing Communities (MHCs), empowering low-income communities to autonomously reduce their differential vulnerability to climate change (Lamb et al., 2022). This suggests that in the right context, housing co-operatives can be a powerful model to address root causes of social vulnerability in the housing system, while creating spaces for inclusive, community-driven adaptation. The NS co-ops examined in this study have enhanced capacity for inclusive collective action with potential to mobilize even beyond immediate membership, with one HRM co-op’s initiative to foster a network of pollinator gardens in their community as a recent example. Bold and innovative policy instruments would be required to enable the co-operative sector as a whole to achieve a level of adaptation readiness capable of producing transformational change in the housing system. As discussions around equity and inclusion become more prevalent in adaptation processes as well as in housing policy and housing co-operatives in NS, a path may be opened to equity-oriented transition through exercising new rights claims within the existing multi-level governance structure, or to transformational change in the form of new governance regimes at the intersection of housing systems, social justice, and adaptation planning. The adaptive actions currently evidenced which support resilience and

transition can also represent incremental change which paves the way for more transformational responses.

While there is currently no evidence of policies to support transformative adaptation at the level of the housing system, renewed momentum around co-operative housing offers a space to deliberately address social vulnerability, translating the transitional potential around equity and justice issues described above into tangible policies for transformation. With the first federal investment in new co-operative housing development in decades, there is an opportunity for the construction of new climate resilient co-ops which can also reduce housing insecurity; a key driver of social vulnerability to climate change. This activity can contribute to transformational change if done at a large enough scale and through the introduction of new regulatory tools to usher in novel and equitable housing regimes. There is a push for this within the co-operative housing sector in the form of Community Land Trusts to protect the affordability and long-term viability of decommodified, democratically governed housing. CHF Atlantic is exploring the development of a CLT model that would work in the context of the region (CHF Interview) and Housing NS has begun offering funding to preliminary CLT development through the CHCBP program. Hawley & Roussopolous (2019) argue that working in tandem with Community Land Trust (CLT) initiatives offers the potential to revitalize a stagnant Canadian co-operative housing movement, with more radical potential for grassroots political organizing to achieve growing communities premised on foundations of sustainable economic democracy. Emerging research suggests that partnerships to develop CLTs offer benefits for climate preparedness by tackling both affordable housing and climate risks in diverse urban contexts (Grannis, 2021). As CLTs are a mechanism to create collectively owned land in perpetuity, removed from the speculative market in a similar manner as non-profit co-operatives do for housing itself, the fusion of these two models offers potential to solidify collective tenure and further protect non-profit housing from destabilizing and inequitable market forces, while bolstering community access to decision-making power, resources, and social capital that increases adaptive capacity. Lamb et. al's work has shown how co-operatively owned and governed manufactured housing communities resist displacement and support adaptive capacity, representing a form of transformative adaptation by enabling low-income groups to address the underlying causes of uneven, intensifying climate vulnerabilities (Lamb et. al, 2022). Especially important in this capacity is access to a national network of co-operative MHCs – Resident Owned Communities USA (ROC USA) – for access

to resources and expert advice. In a similar manner, the CHF has given early consideration around the potential to increase adaptive capacity if individual co-ops are combined into larger portfolios, allowing more access to resources, potential for growth, and movement of residents within co-ops in event of displacement. A flourishing of community-owned land that anchors future affordable housing co-operatives could change the trajectory of housing system adaptation to be more transformational and enhance capacity for equitable responses to climate change if these projects take careful scientifically based planning for accelerating climate risks into account while adhering to principles of justice and inclusivity.

This transformational and equitable vision of housing co-operative and collective tenure adaptation is of course not a given. Co-ops in Canada can be seen as contested spaces, their governance occupying a site of perpetual tension between citizen control and social service (Hawley & Roussopolous, 2019). The ability of co-operatives to deliver on their purported benefits can be stifled by state policies and macro-economic conditions. In some cases, co-ops are vulnerable to, or actively participate in, processes of exclusion and gentrification (Vidal, 2019). Growth of the sector is highly contingent on state funding, which tends to be inconsistent; the withdrawal of direct federal policy supports for co-op housing throughout the late 20th century until recently led to near total decline in new co-operative construction (Cole, 2008). In addition, critics argue that though the Co-operative Housing Federation of Canada (CHF) has been a successful advocate for co-operative interests, the federated organization has crafted a monolithic voice for co-ops which further facilitates a top-down approach to co-operative governance in which housing professionals and governments maintain authority (Hawley & Roussopolous, 2019). How power is distributed in the housing system and among co-operatives will shape the adaptation readiness of co-ops and their capacity to be agents of resilience, transition, or transformational change in the face of accelerating climate risks.

4.6 Conclusion

In light of accelerating climate risks and pressures on the Canadian housing sector, there is an urgent need for governments to deliver adaptation support for non-profit co-operative housing. In general, political leadership in Nova Scotia has emphasized greenhouse gas mitigation; a greater push on reducing a variety of social and physical risks associated with climate change through adaptation is needed which asserts the importance of collaboration with a broad range of civil

society actors. Political institutions need more staff dedicated to adaptation planning and long-term monitoring in order to identify evolving needs as well as build capacity for targeted support to non-profit organizations so they may be empowered in understanding climate risks and appropriate adaptive responses, moving beyond a paradigm of top-down expert-led interventions to account for community-based needs. Policies need to ensure that decision-making processes are more inclusive, and that regional housing agencies are engaged at the provincial level, and individual co-operatives are engaged at the municipal level.

To overcome financial barriers, simplification of bilateral funding program criteria would render them more accessible to grassroots co-ops. There is also a need for funding programs that are specifically designed to support adaptation planning in non-profit housing co-operatives, from assessment of current and future climate risks, to identifying adaptation options and pursuing implementation in collaboration with qualified planners. Funding programs need to take into account contextual differences between co-ops, including large urban co-ops, small rural co-ops, and sector-led and self-managed co-ops, which tend to different capacities and needs.

To support co-op adaptation processes, there is a dire need for more usable, fine-grained scientific information that is designed specifically for co-ops and produced in co-operation with stakeholders to ensure that both the data and user interfaces are accessible and relevant. In general, more research is required into where social and physical vulnerabilities overlap in the housing system – there is a clear gap in our understanding of how to address climate change vulnerability in the non-profit and affordable housing sector, including how to increase housing supply that both reduces exposure to growing climate hazards and alleviates socio-economic pressures.

While equity, diversity, and inclusion are becoming an implicit pillar of state-led adaptation policies and planning, tangible actions are needed to reduce systemic causes of differential social vulnerability to climate change. Realizing the capacity for co-operatives to reduce social vulnerability and be agents of justice in the housing system requires more consistent long-term funding streams for low-income rental subsidies to reduce the tendency for co-op decision making regarding new member inclusion to be dictated by financial imperatives. Beyond improved funding incentives from the state to ensure the most vulnerable members of society can gain access to the benefits of co-operative housing, a more deliberate push from CHF

is required to encourage co-ops to develop robust inclusivity policies. Transformational change at the intersection of climate change adaptation and the housing system is possible with careful and deliberate planning if principles of equity and inclusivity are enshrined along with innovative collective tenure and housing governance mechanisms, such as Community Land Trusts. CLTs and other means of decommodified housing must be given opportunities to expand in ways which minimize climate vulnerability to solidify sustainable, safe, affordable housing development. Additionally, to address social vulnerability in the housing system, renewed investment must be made not just in the co-operative sector but in traditional public housing; co-ops alone cannot solve the housing crisis or alleviate social vulnerability to climate change. A housing system with more diversified tenure options and a greater proportion of alternatives to private market housing is necessary to create spaces for transformational change that achieve a vision where climate justice includes a right to safe and affordable housing.

Chapter 5: Conclusion

Accelerating climate change, population growth, and socioeconomic inequality will continue to put pressure on Canada's housing system, necessitating adaptation approaches that tackle social vulnerability and encourage transformational change. Housing co-operatives are an important type of non-market housing tenure that reduces social vulnerability while providing an alternative to the dominance of private market housing and the paradigm of commodification that it represents. The co-operative housing movement in Nova Scotia was born in the early 20th century out of principles of self-help and mutual aid, and with provincial government backing empowered thousands of impoverished working-class citizens to construct their own affordable housing communities (Harris, 2001). From the late 1970s to the mid 1980s non-profit and co-ops became the standard Canadian approach to social housing (Suttor, 2016) and favourable federal policies enabled the creation of many co-ops which are the foundation of the democratically governed co-op housing supply continuing to benefit low- and moderate-income groups in NS today (Cole, 2008). Now in 2022 the federal government has pledged its biggest investment in building new co-operative housing supply in over 30 years as part of an effort to address the rampant crisis of affordable housing, while new co-operative development is already underway in Nova Scotia. In the 21st century, co-operative housing development must also incorporate climate change adaptation planning to be socially, environmentally, and economically sustainable in light of accelerating future risks. My research assessed the extent to which local and provincial adaptation policies in Nova Scotia support adaptation for housing co-operatives and examined whether non-profit housing co-operatives in Nova Scotia are 'ready' to adapt to climate change.

Housing co-ops in Nova Scotia have the potential to address underlying drivers of climate change vulnerability by reducing housing insecurity and building local capacity for community-based adaptation, but they are nearly entirely overlooked in current adaptation policy and planning approaches. Nonetheless I observe fledging climate change action and planning on the part of self-managed, grassroots co-ops, which points to the potential of co-operatives to mobilize for collective action and address complicated socio-ecological challenges. To achieve transformational adaptation pathways with co-op housing, multiple levels of government must foster a policy landscape which carves out considerably more space for non-profit, co-

operatively owned, and public housing alternatives in adaptation policies and programs. Currently, adaptation efforts where housing is concerned seem poised to follow a ‘resilience’ path at best, with policies in place to protect the core economic functions of the housing system through steering new development away from identifiable flood risk and enhancing insurance regimes. However, in addition to a new injection of funding for housing co-operatives federally and growing staff capacity for adaptation work in NS, there are threads of more ambitious and sub-systemic adaptations which engender transformative possibilities, most notably through growing momentum around Community Land Trusts, openness from Housing NS to support their development, and CHF Atlantic researching their potential in attempts to design a relevant, scalable model of land-based collective tenure for the region. The growing momentum around housing co-operatives, CLTs, and adaptation opens a space for transitional and/or transformational change at the intersection of housing systems and climate change. Through my research the seeds of such a shift are observable in Canada’s co-op sector, and this trajectory could influence the future role of co-ops as actors in the adaptation space in NS. To varying degrees, I found evidence of characteristics amenable to capacity for Community-based adaptation initiatives identified by Ensor et. al (2018) within NS housing co-operatives, including: community involvement and inclusion of local knowledge, equity, social capital and values, an emphasis on learning and educational opportunities, and effective governance. But the mere presence of these characteristics without access to funding for adaptation, usable science, and inclusion in decision-making processes at the state level suggests low ‘readiness’; under present conditions it appears unlikely that adequate adaptation will actually occur.

My findings raise important questions. Who is responsible for facilitating adaptation among housing co-ops? Who must hold the burden? This research highlights the tension between the central co-operative principle of autonomy and self-determination, and the need for government support and regulation to facilitate and scale-up adaptation action at local and regional levels. This tension between state-regulated social service and citizen-controlled grassroots movement is a recurring thread in the co-operative housing literature, and the issue of climate action lends a new urgency to this tension. Any discussion about the role of co-operative autonomy in achieving transformative climate action must not be an excuse for absolving the State of responsibility for both ensuring the right to safe, affordable housing and the right to safety from the perils of climate change. This debate intersects with critiques about the legacy of

government housing policies that have neglected affordable housing. The lack of adaptation policies targeting non-market housing tenure that I observed here reflects how market-based housing is considered the default housing model in Canada and remains clearly privileged in both housing policy and climate change planning. To reduce the social drivers of vulnerability, this structural imbalance must be remedied; as Hulchanski reminds us, “A housing system based on the market mechanism cannot adequately – if at all – respond to social need” (Hulchanski, 2004, p. 223). Social need, in today’s context, includes equitable climate change adaptation to respond to escalating environmental risk exposure; a geography of vulnerability shaped by longstanding social and spatial inequities. The largely top-down approach to adaptation that is currently operating in Nova Scotia does not adequately question or challenge power imbalances precipitated by planning practices or housing policy, and so appears incapable of enabling transformative climate governance that marshals non-market housing as a mechanism to achievable equitable adaptation outcomes. Advancing adaptation policies and programs for the co-operative sector can support opportunities for community-based adaptation that build on traditional co-op models of democratic governance. Investing in existing and new co-operative development has co-benefits for housing insecurity and climate vulnerability reduction and makes for good policy in both domains. Vulnerability within the housing co-operative sector is still not adequately understood and appears to be highly differential, while the transformative adaptation potential of housing co-operatives remains theoretical and is as yet unfulfilled. My study interview sample consisted of activist co-ops and progressive co-op sector experts that may be better positioned to engage as actors in the adaptation space but are likely not representative of the majority of co-ops in Nova Scotia. This further emphasizes the importance of considering how to meet the needs of different types of co-operatives in inclusive adaptation policy and planning.

In this thesis I tested the application of the adaptation readiness framework of Ford and King (2015) in the context of the co-operative housing sector while expanding its conceptual lens to include social justice-oriented calls to theory and praxis in the adaptation literature (Shi et. al, 2016). This also involved investigating the potential of housing co-operatives as third sector actors to achieve transformative adaptation, another increasing demand in the adaptation literature which has begun to be examined with co-ops in mind (IPCC, 2021; Kates et. al, 2012; Lamb et. al 2022; Pelling et.al, 2015). Pelling’s (2011) distinction between resilience, transition,

and transformation as distinct and consequential adaptation pathways provides an analytical link for examining adaptation readiness in the context of transformational change. There is much scope for further development of this framework and for its application in other contexts where transformational change in the face of climate risks becomes relevant. Future research is needed to explore the potential dynamics of co-operative based adaptation, with more immersive qualitative approaches to determine how co-ops can participate in justice-oriented adaptation planning and implementation to inform evidence-based best-practices. In addition, future research in this domain must further draw out issues related to equity, justice, and inclusion, deploying intersectional approaches to co-operative analysis which paint a fuller picture of social vulnerability and specific actions that must be taken to avoid reductionist solutions and address overlapping systemic injustices applicable to both housing and climate change (Sultana, 2022).

Focusing on co-operatives in the context of adaptation to climate change is an instructive exploration of decentralized grassroots adaptation models which also have the capacity to advance economic democracy. On the other side of this potential, such a focus also provides insight into how adaptation where the housing system is concerned is couched in uneven development and inequitable socioeconomic governance regimes, with adaptation implementation and its aftermath generally reinforcing or capitulating to the norms of late capitalism. Co-ops with strong democratic, participatory principles, values of social inclusion, and robust financial management practices in Nova Scotia demonstrate an organizational capacity and willingness for socially-just community-based adaptation and their independent action to date suggests the potential to be more proactive and effective than government actors alone, despite a limited set of tools. However, co-ops with the aforementioned characteristics that could be at the forefront of this challenge are currently a minority; community-based co-operative adaptation will not occur at an adequate scale or depth to address widespread differential vulnerability if the sector is under-resourced or tied down by state regulations. A broad network of residential collectives currently lies largely dormant where climate action is concerned. The inaction of the state and private sectors on the challenge of climate change adaptation adds urgency to Hawley & Roussopoulos (2019) call for a revival of the co-operative movement through re-politicization. There is momentum to be gained through new demands; the growing momentum around Community Land Trusts is key, as they suggest, but so is

considering how right-to-housing and environmental justice narratives and activists can be unified.

That funding and access to information to facilitate adaptation in the non-profit and social housing sectors is virtually non-existent speaks to deeper questions around climate justice and the state's role in actively or complicitly shaping differential vulnerability through policy instruments which influence distribution of or access to resources, whether directly pertaining to adaptation or not. Despite occasional references to social vulnerability and inequities in adaptation planning documents, there is no evidence that state-driven planning and policy favors alternatives or will create space for systemic change, which by all accounts is needed when one examines the intersection between the crises of affordable housing and climate change. Though there is ample data detailing climate risks and known practices to enhance resilience in the built environment, there remain many cases provincially where “development is being prioritized over future adaptation” (Adaptation Specialist Interview). While adaptation planning itself may not fixate on private wealth accumulation, neither does it consider the potentially maladaptive influence of corporate interests and market forces in the consequences of adaptation interventions. This is a perilous void, readily apparent when looking at sectors such as housing which shape social vulnerability, health, safety, and security.

For more equitable adaptation regimes at the intersection of housing and climate change to flourish, there are at least two major areas of action to be pursued: one epistemological, and one related to governance practices and policy. Regarding the former there is a need for political economy theories of adaptation; while attention in the literature has been given to issues of justice, inequality, and the importance of transformative approaches to address the root causes of social vulnerability, scholars tend to stop short of direct and thorough critiques of capitalist economic systems which create these conditions, the political regimes which enable them, and the power these forces have in influencing the form that adaptation projects ultimately take. There is a need for state policy to empower marginalized and socially disadvantaged groups in the adaptation process; to dismantle the barriers to adaptive readiness for social justice-oriented organizations and diffuse the concentration of adaptive power. Policies must encourage and support grassroots local climate leadership, the inclusion of marginalized voices in adaptation decision-making, and funding streams must be accessible to those communities at the forefront

of this activity. A new suite of policy tools must emerge which support systemic transformation, exhibiting a willingness to put social and environmental justice ahead of private for-profit markets. Where housing is concerned, some tangible examples include funding a major expansion of non-market housing and Community Land Trusts in areas determined to be low climate risk, the development of adaptation governance models which ensure democratic control and inclusion of marginalized groups in planning and policy processes, and special attention to communities coping with the legacy of environmental racism. There are less radical and transformational steps which are crucial as well, such as consistent subsidies for climate-resilient building materials and renovations for non-profit housing.

The case of non-profit co-operative housing in Nova Scotia, Canada reveals a need for more ambitious adaptation governance to ease differential vulnerability in the overlapping crises of climate change and affordable housing. Neglecting the broader social context of vulnerability can result in maladaptation, which further exacerbates socioeconomic inequities. However, responding to climate change can be a transformative opportunity to restructure society and social-ecological relationships to be more equitable and harmonious (O'Brien 2012). Growing interest in Community Land Trusts as a model to shelter affordable and co-operative housing from corporate attrition and competition with private interests offer a doorway to such transformation, as do adaptation processes that encourage widespread democratic, community-based participation. There are signs that the governance of adaptation in Nova Scotia may move in this direction as the seeds of these endeavours have already been sown, but this is hardly a given; for the scales to be tipped towards transformative change a more profound engagement with climate change vulnerability as an outcome of wider social processes in the housing system is required by political leaders, researchers, and decision-makers at multiple levels, from the co-op board to the prime ministers office.

References

- Adger, W. N. (2006). Vulnerability. *Global Environmental Change*, 16(3), 268–281. <https://doi.org/10.1016/j.gloenvcha.2006.02.006>
- Adger, W. N., & Barnett, J. (2009). Four reasons for concern about adaptation to climate change. *Environment and Planning A*, 41(12), 2800–2805. <https://doi.org/10.1068/a42244>
- Aernouts, N., & Ryckewaert, M. (2018). Beyond housing: on the role of commoning in the establishment of a Community Land Trust project. *International Journal of Housing Policy*, 18(4), 503–521. <https://doi.org/10.1080/19491247.2017.1331592>
- Aernouts, N., & Ryckewaert, M. (2019). Reproducing housing commons. Government involvement and differential commoning in a housing cooperative. *Housing Studies*, 34(1), 92–110. <https://doi.org/10.1080/02673037.2018.1432756>
- Andersson, R., & Turner, L. M. (2014). Segregation, gentrification, and residualisation: From public housing to market-driven housing allocation in inner city Stockholm. *International Journal of Housing Policy*, 14(1), 3–29. <https://doi.org/10.1080/14616718.2013.872949>
- Bahadur, A. V., Ibrahim, M., & Tanner, T. (2013). Characterising resilience: Unpacking the concept for tackling climate change and development. *Climate and Development*, 5(1), 55–65. <https://doi.org/10.1080/17565529.2012.762334>
- Bellamy, R. (2019). Social readiness of adaptation technologies. *Wiley Interdisciplinary Reviews: Climate Change*, 10(6), 1–15. <https://doi.org/10.1002/wcc.623>
- Berrang-Ford, L., Siders, A. R., Lesnikowski, A., Fischer, A. P., Callaghan, M. W., Haddaway, N. R., Mach, K. J., Araos, M., Shah, M. A. R., Wannewitz, M., Doshi, D., Leiter, T., Matavel, C., Musah-Surugu, J. I., Wong-Parodi, G., Antwi-Agyei, P., Ajibade, I., Chauhan, N., Kakenmaster, W., ... Abu, T. Z. (2021). A systematic global stocktake of evidence on human adaptation to climate change. *Nature Climate Change*, 11(11), 989–1000. <https://doi.org/10.1038/s41558-021-01170-y>
- Biesbroek, G. R., Klostermann, J. E. M., Termeer, C. J. A. M., & Kabat, P. (2013). On the nature of barriers to climate change adaptation. *Regional Environmental Change*, 13(5), 1119–1129. <https://doi.org/10.1007/s10113-013-0421-y>
- Bisaro, A., de Bel, M., Hinkel, J., Kok, S., & Bouwer, L. M. (2020). Leveraging public adaptation finance through urban land reclamation: cases from Germany, the Netherlands and the Maldives. *Climatic Change*, 160(4), 671–689. <https://doi.org/10.1007/s10584-019-02507-5>
- Boezeman, D., & de Vries, T. (2019). Climate proofing social housing in the Netherlands: toward mainstreaming? *Journal of Environmental Planning and Management*, 62(8), 1446–1464. <https://doi.org/10.1080/09640568.2018.1510768>

- Buchanan, M. K., Kulp, S., Cushing, L., Morello-Frosch, R., Nedwick, T., & Strauss, B. (2020). Sea level rise and coastal flooding threaten affordable housing. *Environmental Research Letters*, 15(12). <https://doi.org/10.1088/1748-9326/abb266>
- Bush, E., & Lemmen, D. S. (2019). *Canada's Changing Climate Report*.
- Chakraborty, J., McAfee, A. A., Collins, T. W., & Grineski, S. E. (2021). Exposure to Hurricane Harvey flooding for subsidized housing residents of Harris County, Texas. *Natural Hazards*, 106(3), 2185–2205. <https://doi.org/10.1007/s11069-021-04536-9>
- Chouinard, V. (1990). The uneven development of capitalist states: 2. The struggle for cooperative housing. *Environment & Planning A: Economy and Space*, 22(11), 1441–1454. <https://doi.org/10.1068/a221441>
- Climate Change Nova Scotia. (2005). *Adapting to a Changing Climate in Nova Scotia: Vulnerability Assessment and Adaptation Options*. https://climatechange.novascotia.ca/sites/default/files/uploads/Adapting_to_a_Changing_Climate_in_NS.pdf
- Cole, L. (2008). *Under construction : a history of co-operative housing in Canada*. Borealis Press.
- de Coninck, H., Revi, A., Babiker, M., Bertoldi, P., Buckeridge, M., Cartwright, A., Dong, W., Ford, J., Fuss, S., Hourcade, J.-C., Ley, D., Mechler, R., Newman, P., Revokatova, A., Schultz, S., Steg, L., & Sugiyama, T. (2018). Strengthening and Implementing the Global Response. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (Eds.), *Global warming of 1.5°C. An IPCC Special Report* (pp. 313–443).
- Co-operative Housing Federation of Canada. (2022, April 7). *Federal budget prioritizes housing: \$1.5B sets the stage to build the next generation of co-op housing*. <https://chfcanada.coop/budget2022/>
- Crabtree, L., Grimstad, S., McNeill, J., Perry, N., & Power, E. (2019). *Articulating Value in Cooperative Housing: International and Methodological Review*. January, 126. <https://doi.org/10.26183/5cad6de9eb200>
- Cutter, S. L., Emrich, C. T., Webb, J. J., & Morath, D. (2009). Social vulnerability to climate variability hazards: A review of the literature. *Final Report to Oxfam America*, 5, 1-44.
- Cutter, S. L. (2020). Community resilience, natural hazards, and climate change: Is the present a prologue to the future? *Norsk Geografisk Tidsskrift*, 74(3), 200–208. <https://doi.org/10.1080/00291951.2019.1692066>

- Dietz, S. and Arnold, S. (2021). Atlantic Provinces; Chapter 1 in *Canada in a Changing Climate: Regional Perspectives Report*, (ed.) F.J. Warren, N. Lulham and D.S. Lemmen; Government of Canada, Ottawa, Ontario.
- Dodaro, S., & Pluta, L. (2012). Big picture: The Antigonish movement of eastern Nova Scotia. In *McGill-queen's studies in the history of religion. series two*, 57. McGill-Queen's University Press.
- Dodman, D., & Mitlin, D. (2013). Challenges for community-based adaptation: Discovering the potential for transformation. *Journal of International Development*, 25(5), 640–659. <https://doi.org/10.1002/jid>
- Eisenack, K., Moser, S. C., Hoffmann, E., Klein, R. J. T., Oberlack, C., Pechan, A., Rotter, M., & Termeer, C. J. A. M. (2014). Explaining and overcoming barriers to climate change adaptation. *Nature Climate Change*, 4(10), 867–872. <https://doi.org/10.1038/nclimate2350>
- Eriksen, S. H., Nightingale, A. J., & Eakin, H. (2015). Reframing adaptation: The political nature of climate change adaptation. *Global Environmental Change*, 35, 523–533. <https://doi.org/10.1016/j.gloenvcha.2015.09.014>
- Ensor, J. E., Park, S. E., Attwood, S. J., Kaminski, A. M., & Johnson, J. E. (2018). Can community-based adaptation increase resilience? *Climate and Development*, 10(2), 134–151. <https://doi.org/10.1080/17565529.2016.1223595>
- Eriksen, S., Aldunce, P., Bahinipati, C. S., Martins, R. D. A., Molefe, J. I., Nhemachena, C., O'Brien, K., Olorunfemi, F., Park, J., Sygna, L., & Ulsrud, K. (2011). When not every response to climate change is a good one: Identifying principles for sustainable adaptation. *Climate and Development*, 3(1), 7–20. <https://doi.org/10.3763/cdev.2010.0060>
- Evans, P. (2021, April 15). Average price of Canadian home rising at fastest annual pace ever, now up to \$716,828. *CBC News*. <https://www.cbc.ca/news/business/crea-housing-march-1.5988543>
- Ford, J. D., & King, D. (2015). A framework for examining adaptation readiness. *Mitigation and Adaptation Strategies for Global Change*, 20(4), 505–526. <https://doi.org/10.1007/s11027-013-9505-8>
- Ford, J. D., Labbé, J., Flynn, M., & Araos, M. (2017). Readiness for climate change adaptation in the Arctic: a case study from Nunavut, Canada. *Climatic Change*, 145(1–2), 85–100. <https://doi.org/10.1007/s10584-017-2071-4>
- Government of Canada. (2022, May 13). Canada's National Adaptation Strategy. <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/national-adaptation-strategy.html> Retrieved July 1, 2022
- Government of Canada. (2018). *Canada's National Housing Strategy*. 41. placetocallhome.ca

- Government of Canada. (2016). Pan-Canadian Framework on Clean Growth and Climate Change : Canada's plan to address climate change and grow the economy. In *Government of Canada*. http://publications.gc.ca/collections/collection_2017/eccc/En4-294-2016eng.pdf
- Grannis, J. (2021). *Community Land = Community Resilience: How Community Land Trusts Can Support Urban Affordable Housing and Climate Initiatives*. Georgetown Climate Center.
https://www.georgetownclimate.org/files/report/Community_Land_Trust_Report_2021.pdf
- Harris, R. (2001). Flattered But Not Imitated : Co-operative Self-Help and the Nova Scotia Housing Commission , 1936-1973. *Acadiensis : Journal of the History of the Atlantic Region*, 31(1), 103–128.
- Hawley, J., & Roussopoulos, D. (Eds.). (2019). *Villages in Cities: Community Land Ownership, Cooperative Housing, and the Milton Parc Story*. Black Rose Books.
- Hayles, C. S., & Dean, M. (2015). Social housing tenants, Climate Change and sustainable living: A study of awareness, behaviours and willingness to adapt. *Sustainable Cities and Society*, 17, 35–45. <https://doi.org/10.1016/j.scs.2015.03.007>
- Henstra, D. (2017). Climate Adaptation in Canada: Governing a Complex Policy Regime. *Review of Policy Research*, 34(3), 378–399. <https://doi.org/10.1111/ropr.12236>
- Henstra, D., Thistlethwaite, J., Brown, C., & Scott, D. (2019). Flood risk management and shared responsibility: Exploring Canadian public attitudes and expectations. *Journal of Flood Risk Management*, 12(1). <https://doi.org/10.1111/jfr3.12346>
- Hoegh-Guldberg, O., Jacob, D., Taylor, M., Bindi, M., Brown, S., Camilloni, I., Diedhiou, A., Djalante, R., Ebi, K. L., Engelbrecht, F., Guiot, J., Hijikata, Y., Mehrotra, S., Payne, A., Seneviratne, S. I., Thomas, A., Warren, R., & Zhou, G. (2018). Impacts of 1.5°C Global Warming on Natural and Human Systems. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (Eds.), *Global Warming of 1.5°C. An IPCC Special Report* (pp. 175–311).
- Hood, C. (1983). *The tools of government*. Macmillan.
- Hulchanski, D. J. (2004). What Factors Shape Canadian Housing Policy? The Intergovernmental Role in Canada's Housing System. In R. Young & C. Leuprecht (Eds.), *Canada: The State of the Federation 2004 - Municipal-Federal-Provincial Relations in Canada* (pp. 221–250). McGill-Queens University Press.
- Instone, L., Mee, K. J., Palmer, J., Williams, M., & Vaughan, N. (2014). Climate change adaptation in the rental sector. In *Applied Studies in Climate Adaptation* (Vol. 9781118845). <https://doi.org/10.1002/9781118845028.ch41>

- IPCC. (2021). Summary for Policymakers. In: *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Masson-Delmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press. In Press.
- IPCC. (2022). Summary for Policymakers. In: *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 3–33, doi:10.1017/9781009325844.001.
- Juhola, S., Glaas, E., Linnér, B. O., & Neset, T. S. (2016). Redefining maladaptation. *Environmental Science and Policy*, 55, 135–140. <https://doi.org/10.1016/j.envsci.2015.09.014>
- Kalman-Lamb, G. (2017). The financialization of housing in Canada: Intensifying contradictions of neoliberal accumulation. *Studies in Political Economy*, 98(3), 298–323. <https://doi.org/10.1080/07078552.2017.1393911>
- Kates, R. W., Travis, W. R., & Wilbanks, T. J. (2012). Transformational adaptation when incremental adaptations to climate change are insufficient. *Proceedings of the National Academy of Sciences of the United States of America*, 109(19), 7156–7161. <https://doi.org/10.1073/pnas.1115521109>
- Kenna, S. (2008). Do social housing providers across Yorkshire and the East Midlands have effective flood risk management in place when maintaining and repairing their housing stock? *Journal of Building Appraisal*, 4(2), 71–85. <https://doi.org/10.1057/jba.2008.28>
- Kim, H., Marcouiller, D. W., & Woosnam, K. M. (2021). Multilevel Climate Governance, Anticipatory Adaptation, and the Vulnerability-Readiness Nexus. *Review of Policy Research*, 38(2), 222–242. <https://doi.org/10.1111/ropr.12417>
- Khan, A., & Amelie, V. (2015). Assessing climate change readiness in Seychelles: implications for ecosystem-based adaptation mainstreaming and marine spatial planning. *Regional Environmental Change*, 15(4), 721–733. <https://doi.org/10.1007/s10113-014-0662-4>
- Lamb, Z., Shi, L., Silva, S., & Spicer, J. (2022). Resident-Owned Resilience: Can Cooperative Land Ownership Enable Transformative Climate Adaptation for Manufactured Housing Communities? *Housing Policy Debate*, 00(00), 1–23. <https://doi.org/10.1080/10511482.2021.2013284>

- Laroche, J. (2021, February 25). Province told that rural N.S. has 'affordable housing crisis'. CBC NEWS. Retrieved from <https://www.cbc.ca/news/canada/nova-scotia/house-affordable-legislature-committee-south-shore-coalition-1.5927836>
- Lesnikowski, A., Ford, J., Biesbroek, R., Berrang-Ford, L., & Heymann, J. (2016). National-level progress on adaptation. *Nature Climate Change*, 6(3), 261–264.
- Lesnikowski, A., Ford, J., Biesbroek, R., Berrang-Ford, L., Maillet, M., Araos, M., & Austin, S. E. (2017). What does the Paris Agreement mean for adaptation? *Climate Policy*, 17(7), 825–831. <https://doi.org/10.1080/14693062.2016.1248889>
- Lesnikowski, A., Ford, J. D., Biesbroek, R., & Berrang-Ford, L. (2019). A policy mixes approach to conceptualizing and measuring climate change adaptation policy. *Climatic Change*, 156(4), 447–469. <https://doi.org/10.1007/s10584-019-02533-3>
- Lesnikowski, A., Berrang-Ford, L., Siders, A. R., Haddaway, N., Biesbroek, R., Harper, S., Minx, J., de Perez, E. C., Reckien, D., New, M., Singh, C., Thomas, A., Totin, E., Trisos, C., & Van Bavel, B. (2021). The Global Adaptation Mapping Initiative (GAMI): Part 3 – Coding protocol. *Nature Protocols*. <https://protocolexchange.researchsquare.com/article/pex-1242/v1>
- Lubik, A., & Kosatsky, T. (2019). Public health should promote co-operative housing and cohousing. *Canadian Journal of Public Health*, 110(2), 121–126. <https://doi.org/10.17269/s41997-018-0163-1>
- Magnan, A. K., Schipper, E. L. F., Burkett, M., Bharwani, S., Burton, I., Eriksen, S., Gemenne, F., Schaar, J., & Ziervogel, G. (2016). Addressing the risk of maladaptation to climate change. *Wiley Interdisciplinary Reviews: Climate Change*, 7(5), 646–665. <https://doi.org/10.1002/wcc.409>
- Melles, B. (2003). *The relationship between policy, planning, and neighbourhood change: the case of the gottingen street neighbourhood, 1950-2000*. [Master's Thesis, Dalhousie University]
- Morris, M. (2015). The Cooperative Advantage for Social Inclusion Meets Uncooperative Government Regulation: International Cooperative Principles and Cooperative Housing Regulation in the Province of Ontario, Canada. *The Journal of Entrepreneurial and Organizational Diversity*, 4(1), 28–51. <https://doi.org/10.5947/jeod.2015.003>
- Ness, R., Clark, D. G., Bourque, J., Coffman, D., & Beugin, D. (2021). *Under Water: The Costs of Climate Change for Canada's Infrastructure*. Canadian Institute for Climate Choices. <https://climatechoices.ca/reports/under-water/>
- Nightingale, A. J., Eriksen, S., Taylor, M., Forsyth, T., Pelling, M., Newsham, A., Boyd, E., Brown, K., Harvey, B., Jones, L., Bezner Kerr, R., Mehta, L., Naess, L. O., Ockwell, D., Scoones, I., Tanner, T., & Whitfield, S. (2020). Beyond Technical Fixes: climate solutions

- and the great derangement. *Climate and Development*, 12(4), 343–352.
<https://doi.org/10.1080/17565529.2019.1624495>
- Nova Scotia Affordable Housing Commission. (2021). *Charting a new course for affordable housing in Nova Scotia*. <https://beta.novascotia.ca/sites/default/files/documents/1-2679/charting-new-course-affordable-housing-nova-scotia-en.pdf>
- O'Brien, K., Eriksen, S., Sygna, L., & Naess, L. O. (2006). Questioning Complacency : Climate Change Impacts , Vulnerability , and Adaptation in Norway. *Ambio*, 35(2), 50–56.
- O'Brien, K., Eriksen, S., Nygaard, L. P., & Schjolden, A. (2007). Why different interpretations of vulnerability matter in climate change discourses. *Climate Policy*, 7(1), 73–88.
<https://doi.org/10.1080/14693062.2007.9685639>
- O'Brien, K. (2012). Global environmental change II: From adaptation to deliberate transformation. *Progress in Human Geography*, 36(5), 667–676.
<https://doi.org/10.1177/0309132511425767>
- O'Hare, P., White, I., & Connelly, A. (2016). Insurance as maladaptation: Resilience and the 'business as usual' paradox. *Environment and Planning C: Government and Policy*, 34(6), 1175–1193. <https://doi.org/10.1177/0263774X15602022>
- Park, S. E., Marshall, N. A., Jakku, E., Dowd, A. M., Howden, S. M., Mendham, E., & Fleming, A. (2012). Informing adaptation responses to climate change through theories of transformation. *Global Environmental Change*, 22(1), 115–126.
<https://doi.org/10.1016/j.gloenvcha.2011.10.003>
- Pelling, M. (2011). *Adaptation to climate change: from resilience to transformation*. Routledge.
- Pelling, M., O'Brien, K., & Matyas, D. (2015). Adaptation and transformation. *Climatic Change*, 133(1), 113–127. <https://doi.org/10.1007/s10584-014-1303-0>
- Pittis, D. (2021, May 21). Bank of Canada reminds us of more things to worry about. CBC News. Retrieved from <https://www.cbc.ca/news/business/financial-system-column-don-pittis-1.6033840>
- Province of Nova Scotia. (2019). *Housing Nova Scotia 2019-2022 Action plan*.
- Randle, J., Hu, Z., & Thurston, Z. (2021). *Housing experiences in Canada: Total Population in 2018* (Catalogue no. 46280001). Statistics Canada. Retrieved from <https://www150.statcan.gc.ca/n1/pub/46-28-0001/2021001/article/00002-eng.htm>
- Rapaport, E., Manuel, P., Krawchenko, T., & Keefe, J. (2015). How can aging communities adapt to coastal climate change? Planning for both social and place vulnerability. *Canadian Public Policy*, 41(2), 166–177. <https://doi.org/10.3138/cpp.2014-055>

- Reckien, D., Flacke, J., Dawson, R. J., Heidrich, O., Olazabal, M., Foley, A., Hamann, J. J. P., Orru, H., Salvia, M., de Gregorio Hurtado, S., Geneletti, D., & Pietrapertosa, F. (2014). Climate change response in Europe: What's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries. *Climatic Change*, *122*(1–2), 331–340. <https://doi.org/10.1007/s10584-013-0989-8>
- Renic, K. (2021, March 25). Two Halifax families speak out about racism they say they're facing at a housing co-op. *Global News*. <https://globalnews.ca/news/7711270/two-families-racism-halifax-housing-co-op/>
- Righter, D. (2021). *From groundwork to implementation: a systematic review of coastal adaptation planning in Nova Scotia, Canada*. University of British Columbia.
- Roders, M., Straub, A., & Visscher, H. (2013). Evaluation of climate change adaptation measures by Dutch housing associations. *Structural Survey*, *31*(4), 267–282. <https://doi.org/10.1108/SS-01-2013-0009>
- Rutland, T. (2018). *Displacing blackness*. University of Toronto Press.
- Savard, J.-P., van Proosdij, D., & O'Carroll, S. (2016). Perspectives on Canada's East Coast region. In D. S. Lemmen, F. J. Warren, T. S. James, & C. S. L. M. Clarke (Eds.), *Canada's Marine Coasts in a Changing Climate* (pp. 99–152). Government of Canada.
- Schipper, E. L. F. (2006). Conceptual history of adaptation in the UNFCCC process. *Review of European Community and International Environmental Law*, *15*(1), 82–92. <https://doi.org/10.1111/j.1467-9388.2006.00501.x>
- Schipper, E. L. F. (2020). Maladaptation: When Adaptation to Climate Change Goes Very Wrong. In *One Earth* (Vol. 3, Issue 4, pp. 409–414). Cell Press. <https://doi.org/10.1016/j.oneear.2020.09.014>
- Seguin, N. (2021, April 20). The downside to the real estate boom in Nova Scotia. CBC News. Retrieved from <https://www.cbc.ca/news/canada/nova-scotia/real-estate-boom-evictions-tenants-landlords-nova-scotia-1.5993233>
- Suttor, G. (2016). *Still renovating: A history of Canadian social housing policy* (Vol. 6). McGill-Queen's University Press.
- Sarkodie, S. A., & Strezov, V. (2019). Economic, social and governance adaptation readiness for mitigation of climate change vulnerability: Evidence from 192 countries. *Science of the Total Environment*, *656*, 150–164. <https://doi.org/10.1016/j.scitotenv.2018.11.349>
- Shearer, H., Coiacetto, E., Dodson, J., & Taygfeld, P. (2016). How the structure of the Australian housing development industry influences climate change adaptation. *Housing Studies*, *31*(7), 809–828. <https://doi.org/10.1080/02673037.2016.1150430>

- Shi, L., Chu, E., Anguelovski, I., Aylett, A., Debats, J., Goh, K., Schenk, T., Seto, K. C., Dodman, D., Roberts, D., Roberts, J. T., & Van Deveer, S. D. (2016). Roadmap towards justice in urban climate adaptation research. *Nature Climate Change*, 6(2), 131–137. <https://doi.org/10.1038/nclimate2841>
- Smit, B., & Wandel, J. (2006). Adaptation, adaptive capacity and vulnerability. *Global Environmental Change*, 16(3), 282–292. <https://doi.org/10.1016/j.gloenvcha.2006.03.008>
- Larry Smith and Associates. (1986). *Gottingen commercial area, marketing strategy study*. <https://halifax.bibliocommons.com/v2/record/S135C19781>
- Sovacool, B. K., Linnér, B. O., & Goodsite, M. E. (2015). The political economy of climate adaptation. *Nature Climate Change*, 5(7), 616–618. <https://doi.org/10.1038/nclimate2665>
- Sultana, F. (2022). Critical climate justice. *Geographical Journal*, 188(1), 118–124. <https://doi.org/10.1111/geoj.12417>
- Sustainability Solutions Group. (2020). *Halifax Regional Municipality Climate Adaptation Baseline Report*.
- Termeer, C. J. A. M., Dewulf, A., & Biesbroek, G. R. (2017). Transformational change: governance interventions for climate change adaptation from a continuous change perspective. *Journal of Environmental Planning and Management*, 60(4), 558–576. <https://doi.org/10.1080/09640568.2016.1168288>
- Thomas, K., Hardy, R. D., Lazrus, H., Mendez, M., Orlove, B., Rivera-Collazo, I., Roberts, J. T., Rockman, M., Warner, B. P., & Winthrop, R. (2019). Explaining differential vulnerability to climate change: A social science review. *Wiley Interdisciplinary Reviews: Climate Change*, 10(2), 1–18. <https://doi.org/10.1002/wcc.565>
- Thomas, K. A., & Warner, B. P. (2019). Weaponizing vulnerability to climate change. *Global Environmental Change*, 57, 101928. <https://doi.org/10.1016/j.gloenvcha.2019.101928>
- Tilleard, S., & Ford, J. (2016). Adaptation readiness and adaptive capacity of transboundary river basins. *Climatic Change*, 137(3–4), 575–591. <https://doi.org/10.1007/s10584-016-1699-9>
- Triana, M. A., Lamberts, R., & Sassi, P. (2018). Should we consider climate change for Brazilian social housing? Assessment of energy efficiency adaptation measures. *Energy and Buildings*, 158, 1379–1392. <https://doi.org/10.1016/j.enbuild.2017.11.003>
- UN Habitat. (2011). *Cities and Climate Change: Global Report on Human Settlements*. <https://doi.org/10.1350/enr.2012.14.3.162>
- United Nations. (2015). *Paris Agreement*. <https://unfccc.int/process/conferences/pastconferences/paris-climate-change-conference-november-2015/paris-agreement>

- Vasseur, L., & Catto, N. R. (2007). Atlantic Canada. In D. S. Lemmen, F. J. Warren, J. Lacroix, & E. Bush (Eds.), *From Impacts to Adaptation: Canada in a Changing Climate 2* (pp. 119–170). Government of Canada.
- Vidal, L. (2019). Cooperative Islands in Capitalist Waters: Limited-equity Housing Cooperatives, Urban Renewal and Gentrification. *International Journal of Urban and Regional Research*, 43(1), 157–178. <https://doi.org/10.1111/1468-2427.12726>
- Vogel, B., Henstra, D., & McBean, G. (2020). Sub-national government efforts to activate and motivate local climate change adaptation: Nova Scotia, Canada. *Environment, Development and Sustainability*, 22(2), 1633–1653. <https://doi.org/10.1007/s10668-018-0242-8>
- Waldron, I. (2018). *There's something in the water: Environmental racism in indigenous and black communities*. Fernwood Publishing.
- Walks, A. (2014). From Financialization to Sociospatial Polarization of the City? Evidence from Canada. *Economic Geography*, 90(1), 33–66. <https://doi.org/10.1111/ecge.12024>
- Walks, A. (2016). Homeownership, Asset-based Welfare and the Neighbourhood Segregation of Wealth. *Housing Studies*, 31(7), 755–784. <https://doi.org/10.1080/02673037.2015.1132685>
- Warren, F. J., & Lemmen, D. S. (2014). *Canada in a Changing Climate: Sector Perspectives on Impacts and Adaptation*.
- Wemheuer, C., & Wendorf, G. (2013). Increased Efficiency and Climate Protection in Housing Co-operatives through Residents' Participation. *International Journal of Co-operative Management*, 6(2), 91-96.

Appendix A

Policy Coding Protocol (Adapted from Lesnikowski et.al, 2019)

INDICATOR	DEFINITION	FIELD OPTIONS
Jurisdiction	Policy Author(s)	Provincial Municipal (Open / Specify)
Active years	Years in force or year of adoption	Open
Policy name	Name of document	Open
Policy aims	Overall vision for the strategy's outcome	Open
Document category	Type of document coded	Strategic Planning (including MCCAP)
		Legislative Bill
		Land Use Planning
		Report / Assessment
		Other (open)
Policy objectives	Specified policy goal related to housing (single instrument in adaptation policy document)	Open
Climatic hazard addressed Select all that apply	Type of climatic hazard addressed	Sea level rise (including storm surges and coastal flooding)
		Extreme precipitation and inland flooding
		Storms
		Drought
		Wildfires
		Erosion and landslides
		Changing patterns of infectious diseases

		Extreme heat events
		Extreme cold events
		Water Security
		Other (open)
Climatic vulnerability addressed Select all that apply	Type of climatic vulnerability addressed (Lesnikowski et. al, 2021)	Poverty
		Food Security
		Health & wellbeing
		Education
		Gender equality
		Inequalities (other than gender)
		Clean water & sanitation
		Energy Security
		Work and economic growth
		Industry, innovation, and technology
		Sustainable cities & production
		Consumption & production
		Marine & coastal ecosystem services
		Terrestrial & freshwater ecosystem services
		Peace, justice & strong institutions
Other (open)		
Policy tool category (general) Select all that apply	What policy instruments to address the housing-climate change nexus are specified in the policy?	Nodality
		Authority
		Treasure
		Organization
Type of substantive policy tool (specific)	What policy instruments to address the housing-climate	Not Substantive
		NODALITY
		Advice
		Education and training

Select all that apply	change nexus are specified in the policy? Policy instruments intended to directly affect the nature, type, quantity, distribution of goods and services in society. (from Lesnikowski et al. 2019)	Reports and assessments
		Monitoring and evaluation
		AUTHORITY
		Inter-governmental mandate
		Land use planning & by-laws
		Infrastructure performance standards
		Building regulations
		Strategic planning
		Adaptation planning
		TREASURE
		User charges
		Grants or subsidies
		Loans
		Direct expenditures
		ORGANIZATION
		Demonstration projects
		Operations
Facilities		
Other (open)		
Type of procedural policy tool (specific)	What policy instruments to address housing are specified in the policy?	Not procedural
		NODALITY
		Exhortation
		Public outreach
		Labelling
		AUTHORITY
		Agreements
		Advisory groups creation
		Hearings
		Urban climate networks
Select all that apply	Policy instruments intended to influence the network relationships among actors in a policy system.	TREASURE

	(from Lesnikowski et al. 2019)	Research funding Interest group funding ORGANIZATION Conferences and workshops Institutional reforms Consultation & collaboration Other (open)
Policy target (actor category) Select all that apply	What types of actors do the policy instruments target?	Provincial government Local government Private sector Civil society Households General public Other (open)
Policy target (housing tenure category) Select all that apply	What types of housing tenure do the policy instruments target?	Owner Occupied (with or without mortgage) Private rental Affordable private rental Social housing Temporary housing Unhoused Property investor Housing co-operative Indigenous on-reserve housing Indigenous off-reserve housing Unspecified Other (open)
Policy target	Specify actor(s)	Open
Instrument setting	Detailed descriptions of tool design	Open

Time horizon	Select all that apply to tools identified above	Single occurrence Fixed time Permanent
Implementation Status	Evidence of policy instrument implementation	Planned
		Underway
		Completed
		Proposed/Recommended
		Unknown
Equity	Is equity recognized in the policy?	Yes No
	Is equity recognized in the link between housing and climate change?	Yes No
	Which vulnerable population groups are targeted by the policies above? Select all that apply.	Low-income individuals/households
		People experiencing homelessness
		Elderly
		Gender
		Immigrants/Migrants
		Youth
		Persons with disabilities
		Indigenous peoples
		Racialized groups
		Unspecified
Other (open)		
Copy relevant text	Open	
Co-operative Relevance	Does the policy have specific relevance or implications for housing co-ops?	Yes No Maybe

	If yes or maybe, what relevance/implications?	Open
	Does this policy offer potential benefits or disadvantages to housing co-ops?	Benefit Disadvantage Neutral Unsure/other (open)
Co-operative Autonomy	Is co-operative stakeholder autonomy recognized/supported in the policy?	Yes No N/A
	If yes, copy relevant text	Open
Collective Tenure Security	Does the policy make provisions for Community Land Trusts or other collective tenure mechanisms?	Yes No N/A
	If yes, copy relevant text	Open

Appendix B

Sample interview guide for local and provincial civil servants (including adaptation planners and Nova Scotia Housing)

1. Introductory Questions

Can you tell me about your role (within organisation) – what are your responsibilities and what is the work your colleagues do more broadly?

Is your organization involved with climate change, or are you personally? Has it been identified as an area of concern? If so, what are the main ways it is being addressed?

2. Institutional Organization

Is there long-term planning for climate change impacts within your organization or department?

Are there any committees or working groups in your organization that would be capable of taking on adaptation work? If not climate change per se, then ‘disaster management preparedness’ work?

Are there any linking mechanisms (e.g. partnerships) between your institution and other institutions involved in climate change (CC) and adaptation? Between projects your institution is involved in?

- a. Probe about government/private/NGO/research/university partnerships

Are there any challenges within your organization or current operating procedures that act as barriers for adaptation (or CC-related) initiatives? How are these currently managed?

Generally, how willing is your department/organization to include CC in your work? How possible is it given the structure and available resources of organization?

Who is (or would be) involved or responsible for the different phases of an adaptation initiative?

- a. Ex: planning, coordination, implementation, monitoring, evaluation etc.?

3. Leadership

Are there any individuals within your organization or within another organization you work with that have pushed for action or policies regarding climate change or climate change adaptation?

If so:

What sort of actions have been taken? How did this manifest?

or if not:

Are there specific people within your organization who would have the capacity or be in a position to take on the task of advocating for climate change adaptation?

Are there any policies or mandates in place to ensure that climate change and/or climate change adaptation is considered?

4. Decision-making and stakeholder engagement

How would you rate the quality of communication and co-ordination between your organization and other partners you work with in general (CMHC / Housing NS / CHF / Municipality / Non-profits / individual co-ops)?

- a. How would you rate the quality of communication and co-ordination between your organization and partners you work with when it comes to climate change work (if applicable)?
- b. If there are challenges in collaboration, how could this be improved?

Can you tell me about how decisions are made regarding climate change and adaptation in your organization?

Once a decision has been made or implemented, how flexible is it to change or make additional decisions surrounding the policy, project, or initiative?

What role does stakeholder engagement play in planning, development, implementation, and evaluation for your organization's projects (e.g., housing co-ops/non-profits/municipalities)? If engaged in CC/adaptation work, which stakeholders are consulted?

How is uncertainty accounted for in the planning and decision-making processes?

Do you consider the potential for adaptation responses to increase vulnerability for some people in the future in planning and implementation decision making processes? (further define maladaptation w/ examples if necessary)

- a. When planning for climate change how are current and future climate scenarios and impacts taken into account?

5. Usable Science

Does your organization have access to, make use of, or receive updates about climate change science and reports, such as impact or vulnerability assessments etc.?

What information or research informs adaptation policies, plans, programs, actions?

When climate change and/or adaptation research or information collected by other institutions is shared with you, is it usable or useful for your organization and decision-making process?

Have specific policy or adaptation recommendations been made to your organization regarding preparing co-operative / community housing for climate change impacts? If so, by whom and what information were these recommendations based on (e.g., information, experiences, guidelines, research etc.)?

6. Funding

How does your organization receive funding – both in general and for a project such as climate change adaptation as it pertains to community/co-op housing? (explain process)

Does your organization have available funding for climate change-related projects? How are funds obtained; where do they come from?

Does your organization have available funding for climate change adaptation specifically? How are these funds obtained; where do they come from?

Is there extra funding available to take on additional projects, or grants / funding streams that can be applied for?

- a. Is this funding accessible? Do you have people with the know-how to get these funds?

In general, would you say your organization and its activities are well-funded? Are there difficulties in attaining funds and/or do you have suggestions on how funding could be improved?

7. Public Support

Where do you see the overall level of public support in Nova Scotia for adaptation and CC being?

How does your organization engage with communities (& co-op members)? How better could you engage with communities (& co-op members)?

To your knowledge, have members of your organization attended climate change conferences, workshops, training sessions, public protests or other climate change-related events?

8. General closing questions

How do you think your organization is doing with adaptation or addressing climate change concerns in general?

- a. What are main strengths? Areas for improvement?
- b. Can you identify any specific needs or gaps?

How do you think Nova Scotia is doing on the whole at supporting the community housing sector in the province in light of climate change risks?

- a. What about co-ops specifically?
- b. Strengths / areas of improvement?

Sample interview guide for housing co-operative representatives and the Co-operative Housing Federation¹

1. Introductory Questions

Can you tell me about your role (within organisation) – what are your responsibilities and what is the work your colleagues do more broadly?

Tell me a little bit about the population your housing co-operative serves – i.e. is it primarily low income residents? Middle income? A mixture? Racialized groups? Does the co-op have a specific mandate, i.e. a seniors co-operative?

Does your co-op own or lease the land on which housing is built? If leased who is the owner, if owned how did that occur, and what are the circumstances, i.e., Community Land Trust?

Are any properties or units in need of major repairs? Please describe these conditions and any planned renovations.

Is your organization involved with climate change-related work, or are you personally? Has it been identified as an area of concern? If so, what are the main ways it is being addressed?

2. Institutional Organization

To what extent does long-term planning (in general) take place within the co-op? Is there long-term planning for climate change impacts within the co-op?

Generally, how willing is your co-op to include CC in your work? How possible is it given the structure and available resources of the organization?

Are there any committees or working groups in your organization that would be capable of taking on climate change-related work?

a. Ask about adaptation and define if necessary

b. If not climate change per se, then ‘disaster management preparedness’ work?

What sort of special projects / activities have co-op members undertaken within the co-op or surrounding community in recent years? Are any related to climate change, environmental concerns, infrastructure protection/upgrades?

Are there any challenges within your organization or current operating procedures that act as barriers for CC-related (or CC-adaptation) initiatives? How are these currently managed?

Are there any partnerships between your institution and other institutions involved in CC and adaptation? Between projects your institution is involved in?

a. Probe about government/private/NGO/research/university partnerships

¹ This interview guide also applies to participants from the CHF, but questions will be asked in a way which applies to the co-operative housing sector in NS more broadly.

How would you describe your co-op's relationship with CHF? What do you feel are the main areas of their advocacy you benefit from, or areas that are neglected?

3. Leadership

Are there any individuals within your organization or within another organization you work with that have pushed for action or policies regarding climate change or climate change adaptation?

If so:

What sort of actions have been taken? How did this manifest?

or if not:

Are there specific people within your organization who would have the capacity or be in a position to take on the task of advocating for climate change adaptation?

Are there any policies or mandates in place to ensure that climate change and/or climate change adaptation is considered?

7. Decision-making and stakeholder engagement

How would you rate the quality of communication and co-ordination between your organization and other partners you work with in general (CMHC / Housing NS / CHF / Municipality / Non-profits)?

- b. How would you rate the quality of communication and co-ordination between your organization and partners you work with when it comes to climate change work (if applicable)?
- c. If there are challenges in collaboration how could this be improved?

To what extent do you feel generally the needs of co-operatives are taken into account by municipal / provincial government / Housing NS?

Can you tell me about how decisions are generally made within the co-op? Any examples with regard to climate change and/or adaptation?

To your knowledge, has climate change been discussed at board meetings or AGM?

How engaged in co-operative governance and decision-making is the average member of your co-op? (could be gauged by meeting attendance, etc.)

Once a decision has been made or implemented, how flexible is it to change or make additional decisions surrounding the project, or initiative?

To what extent does your co-op have the capacity to make big decisions autonomously, and initiate projects without government or CHF direction? (examples / how-so)

8. Justice and Inclusivity

What is the process for accepting new members into the co-op? Are there specific criteria prospective new members must meet to be included in the housing co-operative?

Does your co-op see a role for itself in helping marginalized communities? How could your co-op or housing co-ops in general do more to help marginalized communities, and what barriers are there to this activity?

Is the co-op involved in any tangible efforts to fight housing discrimination, either in terms of discrimination of new members or more broadly in the community? Has expanding the accessibility and inclusivity of housing co-ops been a topic of discussion among your membership?

9. Usable Science

Has your co-op been informed about projected climate change impacts in your region? Do you have access to climate change data/projections/impact assessments? Are they in a useful format? Are they understandable? Is there climate change information that your co-op wants that it does not currently have access to?

Have specific policy or adaptation recommendations been made to your organization regarding preparing the co-operative for climate change impacts? If so, by whom and what information were these recommendations based on (e.g., information, experiences, guidelines, research etc.)?

10. Funding

How does your co-op receive funding, in general? (explain process)

How dependent on public funding or policy is your co-op? Could it survive without? Could it remain 'affordable' without?

Does your co-op have any available funding for climate change-related projects?

Does your organization have available funding for climate change adaptation specifically? For example, renovations for flood-resiliency or other structural alterations to the property? How are these funds obtained if so; where do they come from and are they sufficient?

Is there extra funding available to take on additional projects, or grants / funding streams that can be applied for?

a. Is this funding accessible? Do you have people with the know-how to get these funds?

Do you think your co-op or the co-operative housing sector in NS in general will be able to benefit from funds made available through the National Housing Strategy?

In general, would you say your organization and its activities are well-funded? Are there difficulties in attaining funds and/or do you have suggestions on how funding could be improved?

11. Member Support

Do you have the sense that co-op members are generally aware or concerned about climate change? Have co-op members expressed that there is a need to adapt to a changing climate? If so, are these members in leadership roles or no?

Do co-op members have access to workshops, training, or educational opportunities pertaining to climate change or environmental issues?

Are there any ties or collaborations with local environmental groups for training, education, or organizing opportunities?

To your knowledge, have members of your organization attended climate change conferences, workshops, training sessions, public protests or other climate change-related events?

12. Closing Questions

Do you feel your co-op is generally well-supported by municipal and provincial governments? The CHF? How included and supported is your organization where planning for climate change is concerned?

Do you feel that opportunities to expand or make improvements your co-op or the co-op housing sector are being sufficiently supported by government (and CHF)?

How do you think your organization/co-op is doing with adaptation or addressing climate change concerns in general?

- c. What are main strengths? Areas for improvement?
- d. Can you identify any specific needs or gaps?

How do you think Nova Scotia is doing on the whole at supporting the community housing sector in the province in light of climate change risks?

- c. What about co-ops specifically?
- d. Strengths / areas of improvement?