Climate change, food security, and sustainable development: A study on community-based responses and adaptations in British Columbia, Canada

Julie Drolet, PhD. M.S.W, Associate Professor, Thompson Rivers University

Climate change is the most significant environmental, social, cultural and economic threat facing humankind. In 2007, the United Nations Intergovernmental Panel on Climate Change (IPPC) concluded that evidence of global warming is unequivocal: that it is caused by greenhouse gas emissions from human activity and that it is threatening ecosystems, societies, cultures and economies worldwide. The province of British Columbia (BC) in Western Canada is already feeling significant effects of climate change (David Suzuki Foundation, 2007). According to the BC provincial government many parts of the province have been warming at a rate that, in some cases, is more than twice the global average (BC Government, 2008). Warmer winters have also contributed to the mountain pine beetle epidemic, which destroyed more than 13 million hectares of pine forest. The beetle's numbers have historically been controlled by cold winters and warmer weather is directly linked to their devastating spread.

This article shares research findings on the impacts of climate change on food security in small cities and rural communities from a qualitative research study that focuses on community-level adaptations and responses. The word 'community' is understood to have several meanings, which are context specific (Marsh & Buckle, 2001). It is critically important to better understand how local communities view problems and solutions in order to moderate and adapt to climate change (Health Canada, 2005).

Specifically, social workers engaged in community development can play an important role in adaptation and mitigation processes with regarding climate change. Lena Dominelli (2011) argues that social work needs to become engaged in the following actions - consciousness-raising to reduce greenhouse gases, lobbying for preventative measures at the local level, mobilizing communities to reduce carbon emissions, dialoguing with policy makers, and developing curricula on climate change and interventions that build on individual and community resiliencies.

The United Nations Framework Convention on Climate Change defines climate change as "…a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods" (Article 1.2). There is scientific consensus that the planet is close to a "tipping point", where continued growth in atmospheric concentrations of greenhouse gases will result in successively larger disruptions of global biogeochemical, ecological, economic and social systems.

Nationally and internationally, the frequency of natural disasters is increasing. The cumulative effect of these disasters produces a significant personal, material and economic strain on individuals, communities and the fiscal capacity of all levels of governments. Mitigation consists in addressing the causes of climate change and adaptation refers to coping with the ill-effects of climate change (Jagers & Duus-Otterström, 2008).

Disaster risk arises when hazards interact with physical, social, economic and environmental vulnerabilities (UNISDR, 2005). According to Smit, Burton, Klein and Wandel (2009) perceptions of risk are known to be important in influencing

communities' actions relating to vulnerabilities. Vulnerability is a function of the relative status of socio-economic groups, and a function of class, religion, livelihood, race, ethnicity, family, gender and age (Ribot, Najam & Watson, 2009). British Columbians are seeing increasing evidence of how weather change can adversely affect our lives, and although warmer temperatures may be appealing, seemingly small changes in climate can have significant ecological, social, and economic consequences.

This article shares the research findings on the impacts of climate change on food security in small cities and rural communities, from community member's perspectives and experiences. The research findings are drawn from focus groups, interviews and a survey that highlights the importance of food security and the effects of climate change today.   Community-based approaches and local actions are discussed to show how local communities can engage policymakers and local decision makers in the future.

Literature Review

Climate change, and what to do about it, has become one of the enduring problems of our time (Bulkeley & Kern, 2006, p.2237). The United Nations' Intergovernmental Panel on Climate Change (IPCC), including some 2,500 climate scientists around the world, issued a preliminary report projecting that the average global temperature will rise by about 3˚C, at the present rate of greenhouse gas emissions by 2100 (Baer, 2008, p. 59). The IPCC stated that climate warming is "unequivocal" (IPCC, 2007). There is little doubt that human activities have been, and continue to be, an important force driving climate change by altering the atmosphere (Gifford, 2008). According to the IPCC, the warming of global temperatures would prove extremely harmful, if not catastrophic, for our environment, economy and society, and would

disproportionately affect the world's poor, whose livelihoods are most closely tied to natural resources (Wirth, 2007).

Canada's climatic landscape is one of the most diverse and expansive in the world, spanning seven climatic regions across the country (Chiotti, 1998). The extensive range of extreme events that occur in many regions across the country include drought, floods, rainstorms, hail storms, blizzards, ice storms, tornadoes, and even hurricanes. Huq et al. (2007) discuss the vulnerability of cities and smaller settlements to extreme weather evidence by citing the devastation of Hurricane Katrina in New Orleans and Hurricane Mitch to Central America. "In many cities, there is already evidence that what used to be a once in a 100 year event is "becoming more common" (Huq et al., 2007, p.4). Yet climate change is not just about the environment, and it is not just a national and global issue; it is also about local economies and community development (DeWitt, 2008, p.107). One can argue that "all disasters are local," at least in the short term (Masten & Obradovic, 2008). The United Nations and non-governmental organizations and other groups have been working on a range of efforts to link the environment with economic development and social equity as part of 'sustainable development.'

The concept of sustainable development emerged in the 1980s to explore the relationship between development and the environment (Banerjee, 2003). According to Galvão et al. (2009, p.81) "sustainable development consists of three core pillars, namely an environmental pillar, an economic pillar and a social pillar." It has been defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development, 1987). Banerjee (2003) and Langhelle (1999) critically explore the

concept of sustainable development by examining the political, economic and developmental assumptions and their consequences. There are numerous interpretations of sustainable development, with controversies and disagreement among scholars in various disciplines (Banerjee, 2003; George, 2007). "Sustainable development … is about rethinking human-nature relationships, re-examining current doctrines of progress and modernity, and privileging alternative visions of the world" (Banerjee, 2003, p.169). Sustainable development has become a widely accepted norm yet still presents major problems for implementation (George, 2007).

The 1992 United Nations' Conference on Environment and Development held in Rio highlighted the importance of local action for environmental protection and sustainable development as a central theme (Schreurs, 2008). Bulkeley and Kern (2006) argue that to address the challenges of climate change, attention must focus not only at the international level but also on how climate protection policy is taking shape locally. Because many people are directly affected by climate-induced impacts, there is a need to consider approaches at more local levels of government where implementation of climate change policies and programs must occur (Mukheibir & Ziervogel, 2007). "Transnational and international institutions operating under neoliberal economic regimes have little regard for the specificities of places or the communities that inhabit them and cannot and will not generate sustainable local economies" (Banerjee, 2003, p.174).

For at least two decades federal and provincial governments have favored a neoliberal policy approach giving priority to market forces over social benefits, resulting in reduced government interventions, a decline in infrastructure and an expectation that people and communities will become more self-reliant, similar to other Western countries

(Alston & Kent, 2009). Many governments favor climate change and disaster policies that promote 'community resilience.' Community resilience is defined as a community or region's capability to prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to public safety and health, the economy, and national security (Colten, Kates & Laska, 2008, p.38).

Community resilience as a concept is complicated by variation in the meaning of community (Norris et al., 2008, p.128-130). The literature demonstrates that those with the least resources have the least capacity to adapt to the impacts of climate change and are the most vulnerable (Duncan, 2007; Tobin & Whiteford, 2002). Adaptation must address the underlying factors that determine chronic poverty, vulnerability and adaptive capacity – the ability to undertake adaptations or system changes (Tschakert & Dietrich, 2010). An emerging area of interest related to climate change is food security. Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Internationally, the global community has not met this definition, and climate change will make it even more challenging to achieve food security at all levels.

Disasters affect women and men differently, and women are at greater risk due to gender inequalities (Enarson, 2009). According to Minu Hemmati and Ulrike Röhr (2007, p.5) "there is virtually no discussion of gender consequences of climate change and little mobilization of women to inform the policy and practices." Anderson (2007) considers women's roles in climate issues and finds that women's participation extends beyond their occupational responsibilities to connections with their communities.

According to Ballard (2005, p.144) "developing agency is a key process in change for sustainable development and action and reflection is perhaps crucial in developing it, both at the individual and the collective levels."

Theoretical Framework and Research Questions

The theoretical framework guiding the research and methodology in this article stems from a community based participatory action research (CBPAR) framework. CBPAR is a collaborative approach to research that equitably involves all partners in the research process and recognizes the unique strengths that each brings. CBPAR has the potential to create new knowledge and research capacity by and with communities, practitioners, and key individuals.

Historically, in social work a variety of theorists have sought to develop and affirm the importance of an integrated framework of person/environment transactions (Besthorn & McMillon, 2002). Ecological models of social work practice view problems in living as a result of stress associated with inadequate fit between people and their environments (Besthorn, 1997; Kemp, Whittaker & Tracy, 1997; Berger, 1995). These problems often revolve around stressful life transitions, maladaptive interpersonal processes, and unresponsive environments. In the words of Germain (1978, p.539), "people and their environments are viewed as interdependent, complementary parts of a whole in which person and environment are constantly changing and shaping the other."

Environmental change and climate change impact social work practice in many ways. The profession of social work continues to be involved in disaster psychosocial services through the BC provincial health services' authority, as well as international disaster recovery efforts. This study aims to better understand the reality of climate

change by affected communities from their perspective using qualitative research methods. The study considers the following research questions:

1. What are the experiences of affected communities in British Columbia?

2. What innovative ways to moderate and adapt to climate change are being used or promoted in small cities and rural communities?

3. How can small cities and rural communities be supported to deal with the challenges that lie ahead?

Research Methodology

A CBPAR approach was used to empower members of communities to become active participants in the project and position them as actors of change. The study emerged from an ongoing partnership between the School of Social Work and Human Service at Thompson Rivers University and the Kamloops Women's Resource Group Society (KWRGS), a nonprofit grassroots women's organization in British Columbia. The study was conducted in six small cities and rural communities: Kamloops, Quesnel, Prince George, Clearwater, 100 Mile House and Merritt all located in the Interior and Northern regions of British Columbia.

Initially, the project aimed to focus on the experiences in the Interior region of BC. However, additional sites in the North were included due to the presence of women's centres and women's resource societies, in order to better understand women's realities in smaller communities. Further, as preliminary research results emerged, it was necessary (through snowball sampling) to interview key informants in other community organizations to learn about their situation and their approaches in sustainable development at the community level.

This qualitative research study used interviews, focus group discussions, a survey, documentation and observations to learn about community members' experiences. Data were collected in 2009-2010. In-depth individual interviews were conducted with key informants such as community leaders, government officials, practitioners, activists, disaster managers, policy makers, First Nations and female community leaders. Each interview was recorded using a digital voice recorder and later transcribed for the purposes of data analysis. In addition, five focus group discussions were conducted: three focus groups with women members of women's grassroots organizations in Kamloops, Prince George, and Quesnel, and two mix gender focus groups with environmental groups in Kamloops. Each focus group comprised 5-11 participants. Focus groups were organized in the respective host communities and held with women or mixed gender groups depending on the priorities and mandate of the organization. The focus group discussions were videotaped to record nonverbal communication and later transcribed. All transcripts were recorded in Word and imported into NVivo 9.0 for qualitative data analysis. A survey was completed with members of the public at two community forums on health promotion and sustainability in Kamloops. The survey was self-administered and used as a means of reaching a large number of respondents in the shortest possible time. It contained close-ended questions in a Likert scale for participants to share their attitudes and perspectives on climate change.

Analysis of qualitative data involved careful reading and analysis of respondents' answers to the questions. Transcripts and survey results were analyzed using NVivo 9.0 to support multiple strategies concurrently such as reading, coding, annotating, memoing, discussing and visualizing the results of the data collection

activities in nodes and memos. The tools in NVivo 9.0 allow for flexibility in data

analysis in order to allow for changes in conceptualization and organization as the project

developed. Comparisons were drawn across cases using purposively sampling of diverse

cases, and by reviewing what the literature had to say on the topic. Transcripts were

coded line-by-line in order to identify concepts and thinking about meanings grounded in

the data. Data gathered from multiple sources and multiple perspectives helped to ensure

credibility of the findings through a method of triangulation (Tripodi & Potocky-Tripodi,

2007). The interviews, focus groups and survey did not specifically ask about the

impacts of climate change on food security, although it was consistently raised as an

issue in the interviews and focus groups findings from small cities and rural communities.

Qualitative content analysis focused on creating a picture embedded within a particular

context, of which 22 codes (nodes) were identified using Nvivo 9.0; the 'food' code was

supported by 14 sources and 54 references, and emerged as an important finding in the

study.

The research findings are based on data collected with 121 participants, including

19 key informant interviews, 32 focus group participants, and 70 survey respondents.

Interviews and focus groups in the Interior and Northern regions revealed information

about the community services and programs, and participants offered their opinions and

positions on various subjects related to the project, as well as important insights.

Respondents were asked to share their thoughts on climate change today, their

perceptions of how climate change has affected their community, who is affected by

climate change including vulnerable populations, how the community is responding

and/or adapting to the impacts of climate change, what information or resources are

needed to better respond or adapt, what organizations/groups/services have helped the most, the role of the government, and what they would like to see in the future. Focus groups were organized in the respective host communities and held with women's groups or mixed gender groups depending on the priorities of the organization.

Participants agreed to participate in the study on a voluntary basis, and research ethics approval was obtained through the university's research ethics board. While it is not possible to generalize the findings of this study due to its limited sample size, the methods allowed for rich qualitative data to emerge on the social context, opinions and meanings of climate change in the lives of community members in this exploratory study.

Importance of Place and Local Space

The study found that many people are increasingly concerned about the impacts of climate change, which vary according to the geographic and social location of each small city and rural community. The survey results demonstrate that 87 percent of respondents either strongly agree or agree that climate change is taking place in their community. What is striking is that even within a relatively short distance (100 to 200 kilometers) between communities, the impacts of a changing climate are experienced differently as reported in each community. Interview and focus group respondents identified several climate change impacts in their communities, which varied from low water tables, an increase in wildfires (and their extreme behavior) and smoke pollution, drought-like conditions, loss of snowpack, increase in freshette, flooding, impacts on crops and agriculture, and impacts on natural resources, fishing and the tourism industry.

Residing in a potential at-risk or vulnerable location can play a role in determining vulnerability, and at the same time, a number of non-climate risk factors

were found to interact with and influence vulnerability. This was the case in communities affected by the mountain pine beetle, which has resulted in a social, economic and environmental crisis affecting all sites. Many respondents identified in both interviews and focus groups that the most affected individuals resided in rural and remote communities who live close to the land and depend on natural resources for their livelihood. Other factors included economic status, age, gender, urban or rural status, work status, First Nations status, and health conditions. Many individuals affected by the mountain pine beetle have been forced to leave to find work elsewhere, especially those employed in natural resource sectors.

> "I think that our community has definitely been affected by climate change, when I moved here in the fifties' we used to have -40˚C to -45˚C weather and now because we do not have that cooling weather we had a huge pine beetle infestation which has really killed a lot of our Douglas fir [trees], and that has hugely impacted our community because we've had saw mills that have closed down and many people are now unemployed." (Quesnel FG female participant)

The findings from the survey data show that 95 percent of respondents either strongly agreed or agreed that climate change is a serious problem. Furthermore, 90 percent of respondents strongly agreed or agreed that climate change is a threat to their future well-being and safety.

> The research findings show a real concern about food security challenges.

> "… I think with the economy going down for a lot of our workers in our community that healthy food is an issue." (Quesnel FG female participant)

Respondents in focus groups identified that transportation and freight expenses contributed to the higher cost of nutritious food, and all participants expressed their support for efforts by individuals and families to grow more local food. Some respondents shared that there may be some potential benefits to a changing climate for local food production and agricultural practices.

> "… with farming and food production, it is something that you know 50 or 100 hundred years ago we wouldn't necessarily have been able to do that up here as much as now, but with climate change and with the changes that is bringing, we are getting a longer growing season and we are actually able to do more with climate change, so that is kind of an interesting thing." (Quesnel FG woman participant)

A similar result was found in Kamloops, a small city in the Interior of BC.

> "…I feel people are quite interested in local food production knowing that it's healthier and it has a smaller carbon footprint. To be local, that seems to be catching on in Kamloops, as there is a lot of interest in that issue and people are trying to eat more local." (Kamloops FG participant)

The survey findings also demonstrate that 99 percent of respondents strongly agreed or agreed that human activity such as industry and transportation is a significant cause of climate change.

Several community respondents agreed that local food production should be supported through community garden programs. According to an interview respondent, there are some cautions and challenges in how climate change is affecting, and will affect, food production systems at the local community level.

"…we will have changes in our agricultural community and local food supply, some of which may be positive, some of which may be negative. When the longer growing season is accompanied by the potential for greater drought, it might mean adjustments in local food supply. For example, what food will grow well 20 years from now, 30 years from now, 50 years from now? And if drought is severe enough, it might impact our food supply in ways that we haven't experienced before … the change will come and it will demand flexibility on the parts of communities and adaptability in ways and degrees that we may not have experienced." (Prince George male interviewee)

Furthermore, concerns about community garden practices emerged due to water restrictions as a result of the impacts of climate change.

"There are a lot of people in this area that grow their own gardens for food. They have noticed the water restrictions put in place because of the climate thing and there's a drought. " (100 Mile House interview woman participant)

Also, concerns were raised about erratic weather patterns that affect the growing season for gardeners.

"We are going to have to evolve and start to do more with greenhouses to maintain the consistent temperatures." (Merritt woman interviewee)

Despite these challenges, female respondents expressed an eagerness to address current challenges by promoting, supporting, and encouraging local food production practices to better meet the needs of their families. Several strategies to achieve this aim were identified by respondents.

"… I have been involved with the food security movement here in the North for over a decade. Over the past two years, I would say the interest in food has really begun to emerge. For example, last summer there was a beautiful community garden in our downtown [Prince George]… People are growing the most incredible food, and there is interest in food in knowing where it came from, that it hasn't been inundated with pesticides and chemicals, and that it's not contributing to greenhouse gases by travelling thousands of miles. Because we are actually very food insecure in the north." (Prince George FG woman participant)

One of the ways of taking local action is by changing consumer practices by shopping at farmers' markets, working in community gardens, and taking a more proactive role in building strong and more cohesive communities.   This can include establishing closer ties with local communities and farmer's markets, reducing the distance that food travels, and considering new ways to adapt to the changing weather patterns that bring drought and downpours of rain.

"I think we as consumers need to take responsibility. In supporting those people that are trying to grow locally and support, to buy from them even if the cost is a little bit more because that is what is protecting our food supply."
(Quesnel FG female participant)

At the same time, women acknowledged their role in meeting their food needs for their families can take extra work. Food insecurity has a gender dimension that should be considered. If women are increasingly challenged to meet food security for their families, then programs must consider climate change adaptation to address women's

rights. Further, local community members would like to see more government involvement and support rather than rely on individuals' action. During the 2010 summer wildfires in the Interior of BC, some women met their food requirements by accessing the local food bank, although not without compromising their health due to smoke pollution.

> "… [women] don't have a choice on choosing whether they walk up to the food bank … and for some of them a walk means a half hour walk in the smoke when they have health problems already." (100 Mile House woman interviewee)

In disaster recovery, there continues to be an emphasis on meeting basic needs rather than addressing a more holistic approach.

> "Providing them with the basic need, that is an absolute must … if we can make sure that people have food, water and shelter, and those things, we can provide them with those basic needs. You can't go on before you do that. You can't be talking about self-esteem and what you're gonna do if you do not have the basics. (Interview with a female disaster volunteer)

These sentiments may show a need to consider a range of policy and program approaches that will support local food production, community gardens, and employment options for women and other potentially vulnerable groups.

Successful adaptation strategies will require new practices and behaviors. It will also require action by government to address food security and sustainable development. The research finds that while individuals are beginning to take action to ensure their right to food security, there is a need for more comprehensive and holistic approaches to better

understand how structural and global challenges that are experienced at the local level can be addressed by government.

> " … I started a business two years ago … and I use all organic, local ingredients and it's not just for environmental reasons but also for supporting local agriculture and food sovereignty and sustainability in the local area and supporting local farmers that I know pretty well. … the less your food travels and the less pesticides and local fertilizers there are for the environment." (Kamloops male interviewee)

During the research it was highlighted that municipal or local governments are formulating their own sustainable development plans that include strategies to diversify the local economy, developing cycling lanes, fuel management programs, community sustainability plans and climate action. The provincial BC Climate Action Charter pledges regional districts to significantly cut greenhouse gas emissions. Local volunteers are organizing in non-profit groups such as the North Thompson Food Action Network to help improve food security by strengthening the local food system and connecting consumers with local producers, processors, retailers, and dining establishments.

Furthermore, the Kamloops Food Policy Council acts as an umbrella group for project and advocacy groups to form partnerships and coordinate their work through grassroots projects such as Gardengate, Community Gardens, Community Kitchens, Farmer's Markets, Good Food Box, Farm to School Program and Heartland Quality Foods. The City of Prince George had adopted a Community Climate Change Adaptation Strategy to address emergent top priorities. Community organizing that brings together individual and community members to respond to the unavoidable changes

taking place in their communities are innovative in the sense that new practices are being promoted and implemented to adapt to climate change at an individual and collective level.

Our research found a need to better understand the role of traditional foods in providing better diets, and how this may be affected by climate change and what adaptation strategies are possible.

"I really think that people who rely on food sources where they're either growing food or hunting or fishing, I think they'll experience a change in livelihood and I think this could also change their economic circumstances and community dynamics." (Interview with female policy analyst)

A similar sentiment was expressed by a focus group participant in Quesnel,

"If we are looking at being able to live with more local food resources and so forth, and there are no fish in the rivers, we are not going to be able to drink, live off or eat off our land … I am really concerned about the direction of public policy and where it's going right now … it needs to stop and turn around and go in a different direction … I see it happening at the grassroots level but I do not see it happening where it can affect big change …" (Quesnel FG woman participant)

The research findings demonstrated that women are taking local actions in collaboration with grassroots organizations to address the impacts of climate change in their communities. Yet what is lacking is a concerted effort between all levels of government. Gaining access to traditional food sources and securing a better diet is a concern expressed by First Nations' community members, who are adapting to this change by engaging in innovative trading practices among First Nations' communities.

"Our traditional food services have been really impacted …we are trading …to gain access to dried fish or the Coho [salmon] from Bella Coola or Sockeye [salmon] from Vancouver Island … you have to reach out way further to get that resource that you normally would." (Merritt First Nations woman interviewee)

Individually and collectively, First Nations communities are engaging **in innovative** trading practices to meet their traditional food needs and sustain cultural practices that are threatened by a changing climate. Many women expressed a growing interest in learning 'the old ways' of preserving food and canning, and at the same time, raised concerns about time management.

"More resourceful … they have to be more resourceful and put more work into getting their food source …I think of a young mom right now and she is from the coast and they have smoke houses, and she is really immersed into that practice of the smoke house in making the dried fish, strips of fish and making sure they have enough for a year. "(Merritt First Nations woman interviewee)

Other benefits were identified by respondents in terms of how they meet their critical food needs, and those voice less likely to be heard. "… just the very fact that [people] can participate in food preservation, the food security makes them [families] feel better." (Merritt First Nations female interviewee). The benefits may include contributing towards empowering women and fostering more sustainable development practices. Many women and their family members rely on berry picking in the summer months, and they have noticed a change in the availability of the berries due to a changing climate.

"I went to go huckleberry picking with my uncle and we picked close to where we normally pick …but there were still green huckleberries, that was just the

weirdest thing, because you know [with] the fluctuations with the temperature and

all of that stuff, … when we were kids, come August, September, we go out for

two weeks at a time and it was just plentiful, you could pick huckleberries all day,

and now it's like you know, … there were still green berries." (Merritt First

Nations female interviewee).

Because of these changing climate conditions, community members are engaged in social

networking to share information yet accessing these traditional sources of food may not

be accessible to everyone.

"… it is a lifestyle, it is a choice, so you are looking for people who are like-

minded [and] are willing to put that extra effort to go hunting, to go fishing, and

put the food away … it really makes you think harder and be more assertive about

getting these things..." (Merritt female interview)

There are social and economic benefits in meeting one's food security needs.

"…If you are more self-sufficient and more self-reliant and subsistent, your

quality of life is going to go up and you are going to be more mindful of the

environment … [when] your bottom line is food on the table, house over your

head, basic needs, are you going to think about the environment? Most likely not,

you are going to think about your wellbeing, your family's wellbeing … how

often is climate change a priority for the working poor or the low income family?

How many people have the time to care? (Merritt interview woman participant)

Respondents recognize the scale of the climate change 'challenge' and the need to bring

together all people and to develop a common understanding across all levels of

government. Respondents identified neoliberal cutbacks on public expenditures as

placing an increased burden and reliance on the role of individual volunteers in adapting to the impacts of climate change and in responding to natural disasters.

> "I don't always feel that good about volunteers 'cause I think it's part of the whole neoliberal agenda … the government doesn't do it, the people in the community do it and I totally believe in community and … but it really kind of irks me when more and more is thrown on volunteers … the city should be dealing with this." (Kamloops FG woman interviewee)

The data reflect a lack of trust in government to address climate change effectively particularly at the local community level. Specifically, the findings demonstrate that there is a need for more government assistance and support.

> "… They are total volunteers, they don't have any funding at all … not that they are asking to be paid, you know a salary or anything, but you would think that there would be enough interest in them for the provincial government to look at how they can assist or support groups like that." (Clearwater male interviewee)

Interestingly, the research findings show that male respondents are less convinced of climate change impacts than women respondents, and more men indicated that they would like more evidence. Both men and women expressed an interest in being able to access more information on climate change including adaptation and mitigation measures. The survey data demonstrate the need for more information on climate change; public outreach is currently ongoing by building bridges and sharing the research findings in and between these respective communities.

Discussion

Social work and community development have an important role to play in understanding the social and community aspects of adaptation and mitigation to the impacts and challenges presented by climate change. All respondents in the study expressed a concern about the future impacts of climate change especially with the increase in weather-related hazards and potential for natural disasters in BC. Individuals and community members recognize the human impacts of climate change, the urgency of taking real action, and working together to foster a better response. Because climate change impacts are experienced at a local level, the need for more sustainable economic and social development policies and practices are becoming more urgent.

The effects of climate change are expected to become more serious, and there is a need to focus on those most affected including vulnerable regions, communities and populations. Based on the results of the study, there are policy implications for dealing with the emergent food security challenges identified in small cities and rural communities.

First, there is a need for public and private sector action today. There is a need to support informed local action at the community and regional levels, and specifically, to **further** support local food production to reduce food insecurity. While this study has not considered the many dimensions of agricultural practices and systems, what is apparent is that small and local family and community gardens, and traditional food sources, play an important role in meeting the needs of individuals and families in small cities and rural communities, and these practices are being impacted by climate change. Climate action policies should include targets to grow more local food. This can be achieved by supporting local gardens, farmers markets, community supported agriculture, community

gardens, and other venues for healthy foods, and the continued need for innovation to inform the actions of grassroots community members.

Further research will be necessary to gain a better understanding to find ways to improve food security and to deal with the existing and future challenges in food production and growing in terms of productivity as climate changes. Food security, climate change and sustainable development policies should be considered together.

Second, vulnerable communities face economic challenges that are exacerbated by hazards resulting from climate change. For policymakers it is imperative to consider how food insecurity is experienced by marginalized populations. Social work practitioners can play a role in this process given their expertise in working with vulnerable groups to foster human rights and social justice. Sustainable development plans can help people manage their environments more responsibly and equitably over the long term. Adaptation and mitigation efforts with respect to climate change are a 50-year agenda (at least) (DeWitt, 2008), but action is starting with individuals at the local community level.

What is lacking is a coherent government response across the federal, provincial and municipal levels. A coordinated policy response at all levels of government is essential, and should consider the role of non-government and not-for-profit organizations, professional associations, community leaders, businesses, voluntary sector organizations, public health, and other groups representing farmers, fishers, indigenous peoples, women, men and youth, social and people's movements, and charitable organizations. There is promise of future innovative local community development initiatives in adapting and mitigating the impacts of climate change, and these efforts

need greater support from government in the short and long term. Climate change and resultant disasters need to be linked to sustainable development to strengthen local efforts to address local impacts and to promote community resilience.

Successful adaptation at the community level will require new practices and approaches to meeting livelihoods, with a shift away from relying on natural resources and extractive oil and gas industries towards fewer fossil fuels and more renewable energy. This will require action by governments to support a transition towards a greener economy. Policy implications resulting from this analysis include support for sustainable food action plans that address food security and poverty at the municipal and provincial level. The lack of access to traditional food sources must be considered as a pillar of food security in order to meet social and cultural preferences. The role of traditional food in meeting healthy diets, and how this may be affected by climate change, needs to be better understood and requires future research including the possible effects of climate change on fisheries, and adaptive management approaches.

The research results and narratives demonstrate an interconnectedness between the social, economic and environmental factors that affect the ability of an individual, family, or community to respond to the impacts of climate change, and the factors that contribute to social vulnerability. There is an important role for social work practitioners to act as advocates for the critical needs of food systems to adapt to climate change, and to champion the rights of those whose voices may not be heard by policy makers in government. Social work and community development approaches can work to address factors that contribute to poverty and exclusion, by enhancing adaptive climate change

capacity, and seeking improved social policies that will contribute towards social

protection (including access to health and education, decent work and social services).

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