Working Paper

MCC and Climate Change: Responding to Climate Change Risks

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Over the past three decades, scientists have observed unprecedented warming of the earth's surface as a result of human-caused greenhouse gas emissions. The Intergovernmental Panel on Climate Change (IPCC), an international body formed by the United Nations to assess the science related to climate change, reports; "the atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased".[1] Observed trends occurring as a result of climate change include changing precipitation patterns, altered water systems from the melting of snow and ice, changes in behavior and abundance of plant and animal species, and changes in extreme weather events.[2]

MCC's work in disaster relief, sustainable community development, and peacebuilding is increasingly connected to climate change related risks. Climate change has affected communities in which MCC works, and its impacts are felt most acutely by those already vulnerable. Climate change will exacerbate many of the situations MCC responds to, including conflict, displacement, and food insecurity, and will challenge MCC's efforts to build healthy communities, respond to disasters, provide clean water, create sustainable livelihoods, and promote peace.

1. Terminology

Climate change: A change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and is in addition to natural climate variability (UNFCCC).

Climate change adaptation: The process of adjusting to the actual or expected climate and its effects. In human systems, adaptation seeks to moderate or avoid harm from climate change-related impacts, or exploit beneficial opportunities associated with climate change (IPCC; UNFCCC).

Climate change mitigation: Human intervention to reduce greenhouse gas emissions that are the source of climate change or enhance the sinks of greenhouse gases (UNISDR; IPCC). *Note: mitigation is defined differently when referred to in the context of disasters and risk.*

Disaster mitigation: Lessening or limiting the adverse impacts of hazards and risk of disasters through strategies and actions that reduce hazard, exposure, and vulnerability (UNISDR; IPCC). Mitigation strategies include engineering techniques, hazard resistant construction, social protection programs, improved environmental management, and public awareness. *Note: mitigation is defined differently when referred to in the context of climate change.*

Disaster risk reduction: The practice of reducing the risk of disaster through efforts to analyze and manage the factors causing disasters, including reducing exposure to hazards, lessening vulnerability of people and property, improving management of land and the environment, and improving preparedness for adverse events. Disaster risk reduction includes disciplines such as disaster management, disaster mitigation and disaster preparedness (UNISDR).

[1] IPCC, 2013, p 2

[2] IPCC, 2014b

Natural hazard: A natural process or event that may cause loss of life, injury, or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (UNISDR). Natural hazards include droughts, extreme temperatures, cyclones, landslides, etc.

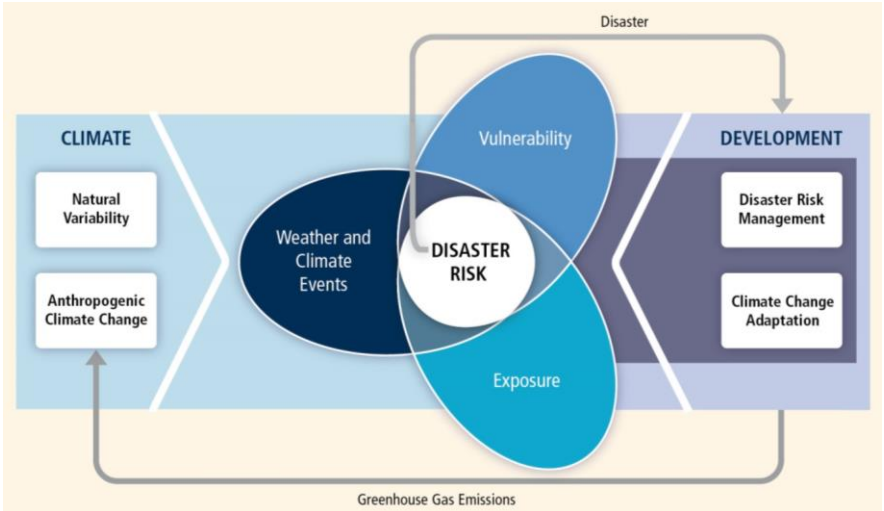
Resilience: The ability of a community or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of a hazard (UNISDR).

Vulnerability: The characteristics and circumstances of a community that make it susceptible to the damaging effects of a hazard and lacking the capacity to cope and adapt. Vulnerability is affected by a wide range of social, economic, and cultural factors including wealth, demographics, access to technology and information, employment, governance structures, institutions, and societal values. (UNISDR; IPCC)

2. Climate Change Impacts and Risks

While everyone is at risk of being affected by the hazards associated with climate change, the level of this risk is determined by one's vulnerability to these hazards. Vulnerability is defined as a) one's exposure to hazards, and b) one's ability to cope or adapt to adverse effects. Disasters are caused by a combination of vulnerability, including exposure, and the occurrence of a hazard event (see figure 1). For example, the risk of being affected by drought is higher for communities living in arid regions (i.e. exposed to drought), and who depend on agriculture for their livelihoods, with limited assets or financial resources at their disposal (i.e. limited ability to cope or adapt).

Figure 1 Disaster risk, exposure and vulnerability
(Lavell et al, 2012)



Vulnerability is influenced by a variety of factors unrelated to climate change, including inequalities in the distribution of resources, gender and age, access to technology and information, employment patterns, and governance structures. Inequalities within communities also lead to differences in vulnerability and exposure among community members. Considering these factors, the risk of being significantly affected by climate change impacts is greater for communities and individuals that are socially, culturally, politically or otherwise marginalized, have limited access to resources (including financial resources), and whose livelihoods are dependent on natural resources. In many contexts, women are more vulnerable than men to the effects of climate change due to factors such as unequal access to decision-making processes, limited mobility, and

economic barriers that limit their capacity to cope.[3] Communities and individuals with the above characteristics are already the most vulnerable and exposed to natural hazards, such as flooding or drought. Climate change is increasing the frequency and severity of many natural hazards, as well as increasing the unpredictability of weather events, diminishing the capacity of communities to cope with anticipated adverse events. For example, erratic seasonal rainfall has had devastating effects on farming communities who rely on the predictability of seasonal rains for their food production.

Climate change impacts are direct or indirect effects on the environment or human systems, unevenly distributed across continents, regions, and countries. The primary impacts of climate change are a direct result of increasing global surface temperatures due to greenhouse gas emissions, and can generally be predicted with a level of confidence. Secondary impacts are indirect effects of climate change, and are more difficult to predict with certainty. Table 1 provides examples of projected climate change impacts most relevant to the contexts in which MCC works. Table 2 outlines examples of observed climate trends likely caused by climate change, and trends projected to occur as a result of future climate change.

Research on climate change impacts reports that climate change is likely causing an increase in the frequency and severity of natural hazard events such as drought, flooding and tropical cyclones. While it is tempting to attribute specific disaster situations to climate change (i.e. the Syria crisis[4], typhoon Haiyan in the Philippines, wildfires in North America[5], and more frequent droughts in Central America, southern Africa and the Horn of Africa[6]) one must consider underlying vulnerability which leads to a disaster. In addition, it is still difficult to attribute natural hazards to climate change with confidence. Even if climate change is thought to have influenced the hazard leading to a disaster situation, specific disasters are influenced by many complex and interacting environmental, socioeconomic and political factors. While disasters cannot be definitively traced back to climate change, it is important to recognize the role of climate change in exacerbating influencing factors, such as conflict over access to more limited water resources.

Table 1: Examples of projected primary and secondary impacts of climate change (IPCC)

Primary impacts	Secondary impacts
More frequent or longer warm spells/heat waves	New crop pests and disease
Longer and more severe drought	Increased stress on water resources
More frequent and/or intense heavy precipitation	Flooding and landslides
Variability in precipitation patterns / change in seasons	Deterioration of livelihoods
	Declining crop production
Increase in the intensity and frequency of tropical storms	Loss of property, livestock, infrastructure and other assets
Coastal flooding and erosion due to sea level rise	Soil erosion and degradation
	Migration and displacement of people

[3] UN Women Watch, 2009
[4] https://www.theguardian.com/commentisfree/2015/nov/29/climate-change-syria-civil-war-prince-charles
[5] http://www.huffingtonpost.ca/2016/05/30/naomi-klein_n_10209718.html
[6] http://www.abc.net.au/news/2016-06-18/el-nino-and-climate-change-a-dire-recipe-for-africa/7518410

Table 2: Examples of observed and projected climate change trends relevant to MCC's international programmatic areas (IPCC)

	Observed climate trends	Projected climate trends
Asia	• Increased average temperatures and more frequent heat waves • Southern Asia – reduced seasonal rainfall overall, but more frequent heavy rainfall events	• Northeast & Southern Asia – increased precipitation and more frequent heavy rainfall events related to summer monsoons
Europe & Middle East	• Eastern Europe – more frequent high temperature extremes	• Egypt – decreased rainfall • Europe – increase in heat waves, droughts and heavy precipitation events
LACA	• Central America – decreased rainfall overall and irregular seasonal rains	• South America – more frequent and/or intense heat waves • Central America – decreased rainfall
Africa	• East Africa – decreased rainfall and more frequent droughts • Southern Africa – decreased rainfall and changes in the onset, intensity and duration of seasonal rainfall	• Higher temperatures, rising faster than the global average • Southern Africa – decreased rainfall and delay in onset of summer seasonal rains

3. MCC's approach and response to climate change

Initiatives that respond to the threat of climate change can be separated into either climate change mitigation or climate change adaptation approaches. Considering the current and future impacts of climate change on vulnerable communities, the primary focus of MCC's international programs is on climate change adaptation – building resiliency and reducing the risk of climate change related disasters. In the U.S., MCC's advocacy on federal policy issues focuses on both mitigation and adaptation.

Acting in a way that promotes environmental, social, and economic sustainability is one of MCC's operating principles, and climate change mitigation is a critical aspect of acting sustainably. Although not a programming focus, MCC has involvements related to the reduction of greenhouse gas emissions, including:

- Advocating for U.S. government policies that address climate change and provide economic support to vulnerable communities for mitigation, and encouraging constituents in the U.S. to advocate to members of Congress and administration officials;
- Educating constituents and policymakers on how U.S. policies adversely contribute to or seek to positively address climate change and on the need for funding for mitigation in vulnerable communities around the world;
- Encouraging constituents to live simply and reduce consumption, promoting this lifestyle through MCC thrift stores;
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- Evaluating operational decisions and capital projects based on sustainability criteria, and expanding efforts to implement sustainability initiatives within MCCs in Canada and the U.S.;

- Partnering with Eastern Mennonite University and Goshen College in the founding of the Center for Sustainable Climate Solutions to advance thinking and action within faith communities on mitigation; and
- International project activities that reduce deforestation or involve afforestation/reforestation.

Climate change adaptation strategies are designed to manage or reduce risks associated with climate change impacts and build the resilience of communities. Adaptation encompasses a variety of approaches to reduce risk including disaster risk reduction and social protection, and involves activities such as technological advances, environmental management, education and communication of information, and government policies, programs, and regulations. MCC is involved in climate change adaptation through activities that:

- Reduce the vulnerability of rural livelihoods and food production to changing climate trends and increased unpredictability;
- Enable communities to prevent and cope with the adverse effects of hazards, reducing the risk of a disaster occurring;
- Build capacity of communities to prepare for future disasters; and
- Advocate for government policies in the U.S., Canada, and in some countries where MCC works that support climate change adaptation, particularly in vulnerable communities.

3.1 MCC's climate change adaptation activities

Much of MCC's current community development and disaster response programming is designed to address different aspects of vulnerability, and a significant portion of projects could be considered a form of climate change adaptation. For the purpose of this report, MCC's climate change adaptation activities and projects are those that a) include adaptation strategies outlined by the IPCC, and b) respond to risks associated with natural hazards, even if not explicitly associated with climate change, recognizing the impact of climate change on hazards now and in the future.

Climate change adaptation activities
Soil conservation and water management Reducing the vulnerability of rural communities to climate change impacts, including increased pressure on water resources, unpredictable or changing rainfall patterns, reduced crop production, and land degradation.
Key project activities: • Promoting and training farmers in the adoption of conservation agriculture methods and new cultivation practices that provide stable or increased crop production while enhancing soil fertility and conserving water. • Collaborating with other organizations and academic institutions to promote enhanced learning and research in conservation agriculture methods. • Construction of irrigation systems, water management structures, and rainwater harvesting structures to improve access to and sustainably manage water resources for agricultural use. • Rehabilitation of degraded watersheds through the construction of structures to prevent soil erosion and reclaim degraded farmland. • Reforestation of degraded land and support for agroforestry practices to decrease soil erosion, improve soil fertility, and increase the production and diversity of crops.

Improved access to potable water Reducing the vulnerability of communities to decreased access to potable water resources due to climate change
Key project activities: • Construction of rainwater harvesting structures and wells to improve access to safe, clean, and nearby water resources for household use. • Promoting the sustainable use of water resources by establishing community water management committees.
Resilient crop varieties and livestock breeds Reducing the risk of climate-related impacts to crop and livestock production, leading to more resilient rural livelihoods and food production systems.
Key project activities: • Encouraging the production of drought tolerant crops, and promoting the use of climatically adaptable seed varieties. • Improving availability of high quality seeds through seed banks and other initiatives. • Developing high quality and healthy livestock herds through technical support for livestock husbandry, vaccinations, and other measures to reduce disease and improve genetics.
Increased access to financial resources Reducing the risk of disasters by enabling community members to better cope with economic shocks.
Key project activities: • Establishing and building the capacity of community savings and loans groups that provide households with the opportunity to save income and acquire low interest loans when needed.
Livelihood diversification Reducing the risk to rural livelihoods from adverse impacts on crop production.
Key project activities: • Encouraging diversified crop production for reduced dependence on a single food or income source. • Training and support for income generation activities beyond crop production, such as bee-keeping or livestock rearing.
Seasonal safety nets Reducing the risk of disaster due to unexpected shocks and unpredictable hazards affecting rural livelihoods and food production.
Key project activities: • Cash-for-work or food-for-work initiatives that provide short-term assistance for rural communities during lean seasons (in between planting and harvest) while working on longer-term adaptation activities, such as soil and water conservation measures. • Restocking lost assets, such as livestock or seed stores.
Hazard resistant shelter construction Mitigating the risk of a disaster due to extreme weather events, such as tropical cyclones. A disaster risk reduction strategy incorporated into long-term disaster responses.
Key project activities: • Working with communities to develop culturally appropriate shelter designs that are resilient to hazards, such as flooding, earthquakes, and tropical storms. • Training for community members and construction laborers in hazard resistant construction techniques. • Construction of safe housing, schools and community buildings resistant to hazards.

Disaster preparedness

Building the capacity of communities to mitigate the risk of disaster and to ensure quicker recovery and response to disasters when they occur.

Key project activities:

- Increasing awareness of vulnerabilities and establishing community committees to enable effective planning and response.
- Conducting community workshops for vulnerability and capacity assessments and hazard mapping.
- Capacity building and training for communities in risk assessment and disaster management.
- Working with communities to develop disaster mitigation and risk reduction plans and early warning systems.

Advocacy for climate change adaptation

Urging government policymakers to fund adaptation programs, particularly those that reach the most vulnerable populations and empower local communities.

Key activities:

- Participating in the Canadian Coalition on Climate Change and Development (C4D) to advocate for government policies that assist countries in climate change adaptation.
- Member organization of Canadian Foodgrains Bank which advocates the Canadian government to contribute more funding towards adaptation programs, especially those focused on the most vulnerable.
- Participating in the Washington Interreligious Staff Community Energy and Ecology Working Group to advocate for U.S. government policies that address climate change and provide economic support to vulnerable communities for mitigation and adaptation.
- Member organization of Creation Justice Ministries (U.S.) which advocates and educates on a variety of issues related to climate change.
- Advocating for U.S. government policies that provide economic support to vulnerable communities for mitigation and adaptation, including the Green Climate Fund.
- Monitoring the implementation of programs such as the Green Climate Fund to ensure they align with MCC principles on issues such as community participation, transparency, and reaching the most vulnerable and, if needed, advocating for changes to such programs.
- Supporting partner organizations, such as ANADES and IBDC in El Salvador, to empower communities to advocate for local government investment in disaster prevention.

Examples of projects with climate change adaptation activities
El Salvador –Building capacity for risk prevention, mitigation and disaster response **ANADES and IBDC** (Soil conservation and water management; disaster management and preparedness; advocacy)
El Salvador is at a high-risk of being impacted by a variety of natural and human-caused hazards, often causing disasters. The municipalities targeted by this project are particularly vulnerable to hazards including landslides, forest fires, drought, and water pollution. Through this project community committees are established and empowered to develop risk management and disaster mitigation plans and have the capacity to respond effectively to emergency situations. The capacity of community members is enhanced through workshops on climate change, environmental care, water management, and risk analysis. Communities also participate in disaster mitigation measures including planting barriers to prevent soil erosion, protecting water catchment areas through reforestation, and constructing water reservoirs and wastewater systems.
Haiti – Agroforestry, farmer support, and natural resource management training (CFGB #2534) (Soil conservation and water management; livelihood diversification)
Rural communities in Haiti are vulnerable to the effects of deforestation, soil erosion, and desertification on agricultural production. This project improves food security, prevents soil erosion and degradation, and promotes sustainable natural resource management through agroforestry, reforestation and community education on natural resource management. Reforestation reduces soil erosion and provides income for community members from the sale of charcoal and fruit, while agroforestry diversifies harvested crops and increases food production.
Guatemala – Horticultural production, organization, training and adaptation to climate change in Camotan, Chiquimula **Cosecha** (soil conservation and water management)
Camotán municipality is located in the dry corridor of Guatemala which is characterized by the shortage and irregularity of rainfall. This is one of the municipalities most affected by recent drought and increasingly unpredictable rainfall, causing food shortages and chronic hunger. Cosecha is working with 22 families to improve food security by increasing vegetable production in home gardens. Rain water catchment systems will be built to enable vegetable production during the dry season and to reduce the risk of crop loss from midsummer heat. Participants will also be trained in soil and water conservation, sowing methods, crop rotation, organic control of pests and disease, and other sustainable agriculture practices.
Ethiopia – Scaling up conservation agriculture (CFGB #2686) **Food for the Hungry Ethiopia (FHE)** (Soil conservation and water management; access to financial resources)
Farmers in the Benishangul Gumuz region are dependent on red-fed agriculture and experience food insecurity as a result of soil infertility and erosion, erratic rainfall, a poor market system, and other factors. Through the adoption of CA, farmers are expected to improve or stabilize crop yields on marginal lands while practicing sustainable soil and water management techniques, increasing food security and the resilience of farmers to changing climatic conditions. Community groups are established and encouraged to regularly save from their income, so groups can access credit services.

Ethiopia – Wotebet and Berbenz watersheds rehabilitation project for food security (CFGB #2676) **MSCFSO** (Soil conservation and water management; livelihood diversification; access to financial resources; safety-net programming)
Land degradation caused by erosion has seriously affected the quality and quantity of farmlands and grazing lands in the Wotebet and Berbenz watersheds. This project fills short-term food gaps during lean seasons (between planting and harvest) through cash-for-work activities focused on rehabilitating degraded watersheds through the construction of water conservation structures, and planting trees and grasses to prevent soil erosion, improve soil fertility, and improve soil moisture. In addition, resiliency of households is improved through the organizing of community groups for savings and to provide access to loans, as well as a revolving seed system as a means of insuring seed against shortages due to hail or disease. Community members will also have the opportunity to attend training in fruit production and beekeeping to provide additional sources of income.
Mozambique – Water and food security project in the districts of Changara and Marara (CFGB #2702) **CCM Tete** (Soil conservation and water management; resilient crop varieties)
The dry climate of Changara and Marara means communities in these areas are vulnerable to water scarcity and food insecurity. In order to improve food security in 33 communities, CCM Tete will promote conservation agriculture techniques and introduce drought-resistant crops. Water availability for agricultural production will be increased by constructing sand dams to conserve rainwater.
India – Food support for community mobilization (CFGB #2583) **CASA** (Soil conservation and water management; safety net programming; access to potable water)
Rural communities and agricultural production in India have been impacted in recent years by rainfall deficits and climatic unpredictability. CASA is working with 125 villages to enhance sustainable food production and rural livelihoods through increased availability of water resources and soil conservation. As part of this project, water management structures such as check dams, earth embankments, reservoirs, and irrigation channels are being constructed to control soil erosion from water runoff and divert and collect rainwater for agricultural and irrigation use.
Philippines – Typhoon Haiyan shelter recovery and disaster risk reduction training **EcoWeb** (Hazard resistant construction; disaster management and preparedness)
In 2013, Typhoon Haiyan devastated the central region of the Philippines, displacing over 4 million people. This disaster highlighted the need to enhance resiliency of communities to better withstand hazards. Together with community members, this project designed and constructed resilient shelters that could withstand flooding, heavy rains, extreme heat and winds. Communities and government officials participated in hazard mapping, vulnerability and capacity assessment, disaster risk reduction action planning, and formation of early warning systems.

4. References and Further Reading

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