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Draft Report on Gender and Extreme Weather Events

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We review the scholarly and professional literature and summarize findings on gender and extreme weather events. While the supporting evidence is still limited, some findings are already emerging in this literature. Most importantly, much literature indicated that women, in particular contexts, can experience climate change (in general, and extreme weather events more specifically) in different ways.

This report will discuss what research on worst-case scenario disasters such as Typhoon Haiyan, Gorky, and the Indian Ocean Tsunami can tell us (and cannot tell us) about the gendered experiences of such natural disasters. We also theorize about the potential of narrative for creating more effective gender-responsive climate adaptation and DRR programs, and its potential for more effectively communicating risks and warning messages of impending disasters.

The last part of the report examines some of the stories told by female survivors of Typhoon Haiyan, focusing on their comments pertaining to the gender dimension.

I. Introduction: Gender and Extreme Weather Events

Climate change affects everyone, but how it affects differs dramatically depending on where we live, our income, livelihood, race, age, and gender. People who are socially, economically, politically or otherwise marginalized are especially vulnerable to climate change. According to the International Panel on Climate Change (IPCC), “differences in vulnerability and exposure arise from non-climatic factors and from multidimensional inequalities often produced by uneven development processes.” A person’s vulnerability is therefore not due to a single cause, rather, “it is the product of intersecting social processes that result in inequalities in socio-economic status and income, as well as in exposure. Such social processes include, for example, discrimination on the basis of gender, class, ethnicity, age and disability” (IPCC, 2014b, p. 54). This is why policy makers often refer to climate change as a “threat multiplier,” because climate impacts such as droughts, floods, and other extreme weather events often exacerbate pre-existing risks such as poverty, disease, food and water insecurity, and political instability, thereby amplifying existing social, political, and economic inequalities. (Olsson, et al., 2014, p. 799). Climate change is therefore far more than an ecological crisis, it is also a social justice issue and humanitarian crisis with immediate and far-reaching implications for billions of the planet’s poorest and most vulnerable people.

Women too can be disproportionately impacted when it comes to climate change due to the gender norms and roles that marginalize them socially, politically, and economically.

According to UN Women, women’s “historic disadvantages,” such as their restricted rights, muted voice in shaping decisions, dependence on and unequal access to land, water, and other resources and productive assets make them particularly vulnerable to external threats and stressors such as droughts, floods, and extreme weather events (UN Women, 2015). When we look at gender-disaggregated data on climate impacts from around the world, we see indications of how climate change is acting as a threat multiplier for women, amplifying risks to their health, safety, livelihoods, access to food and water, and economic security.

The specific area of natural disasters provides some evidence of differential impacts borne by women. In cases such as the 2004 Indian Ocean tsunami, Cyclone Gorky in Bangladesh in 1991, and Typhoon Haiyan in the Philippines in 2015 – all catastrophic disasters with casualties in the tens or hundreds of thousands -- the vast majority of victims were women (Sellers, 2016). During disasters such as these, women not only often die at higher rates than men, but those that survive also experience greater risks to their health, safety, and economic security. Several studies have noted, for example, that gender-based violence increases in the wake of a natural disaster (David and Enarson, 2012; Cutter, 2016) and that gender disadvantages in basic living conditions and livelihoods are amplified during and after disasters and humanitarian crises (Fordham and Meyreles, 2014; Cutter, 2016).

Another broad study on gender and natural disaster mortality rates looked at gender disaggregated data from disasters that occurred between 1981 to 2002 in 141 countries and analyzed this data in the context of gender roles and norms in each of these countries. The study concluded that in cases where men and women’s gender roles and norms were not highly differentiated, and where their economic and social rights were more equally distributed, the death rates between men and women were similar (Neumayer & Plumper, 2007, 551-566). This implies that gender equality reduces the vulnerability differential between men and women, and therefore to disaster risk reduction for women.

II. Evidence from the Literature on the Gender Dimension of Natural Disasters

Typhoon Haiyan, the Indian Ocean Tsunami, and Cyclone Gorky are three stark examples of natural disasters in which women died at significantly higher rates than men. In the case of the 2004 Indian Ocean tsunami, roughly 70% of the estimated 250,000 deaths were women (Sellers, 2016; Oxfam, 2005). During Cyclone Gorky, which struck Bangladesh in 1991 killing an estimated 140,000 people, women are reported to have died at a rate of 14 to 1 higher than men (Lindeboom, Alam, Begum, Streatfield, 2012; Bern et al, 1993). Similarly, preliminary assessments of mortality rates from Typhoon Haiyan in the Philippines, which killed an estimated 6,000 people, indicates that 50% more women died than men (Ballera et al, 2015; Sellers, 2016).

What factors led to women dying at such high rates? In the case of Gorky in Bangladesh, researchers attributed the exponentially higher female death toll to three main factors. First, women in Bangladesh typically do not know how to swim. Secondly, Bangladeshi women’s traditional dress – the sari – made it very difficult for women to swim or run away from the storm surge. In

many cases women's saris became entangled in trees and debris, or weighted down by water, acting as an anchor and causing them to drown (Haider, 1994, p. 300). And thirdly, women in Bangladeshi culture are subject to 'purdah' the cultural norm that restricts their spatial mobility. Purdah literally translates to "a curtain" and is used figuratively to signify the separation of a woman's world from that of men's. Because of Purdah, women are often confined to the home and are expected to seek their husband or parents' permission before leaving the house, and not venture out without male accompaniment. (Ikeda, 1995, p. 179). Thus, many women who were home without their husbands when the storm hit opted to stay at home rather than seek shelter, and sadly drowned. In other cases, women and their husbands opted not to evacuate because they feared the cyclone shelters would not provide adequate privacy or safety (p. 179).

In the case of the Indian Ocean Tsunami, researchers theorize that several factors contributed to the much higher mortality rates among women. Some of the causes of deaths among women were similar across regions. For example, across regions and cultures, many women died because they stayed behind to look for their children and other relatives, or because women more often than the men could not swim, or because the men more often than women chose to climb trees (Oxfam, 2005). However, significant differences can also be seen in the factors that contributed to women's deaths across regions struck by the tsunami. For example, in Aceh Besar, Indonesia, women died at a rate of 3 to 1 over men, while in Pachaankuppam, India, the only people who died were women. Some of the factors that led to women's deaths in Indonesia, India, and Sri Lanka were highly context-specific, and it is important to note these differences.

"Women in Aceh, [Indonesia] traditionally have a high level of participation in the labor force, but the wave struck on a Sunday morning when they were at home and the men were out on errands away from the seafront. Women in India play a major role in fishing and were waiting on the shore for the fishermen to bring in the catch, which they would then process and sell in the local market. In Sri Lanka in Batticaloa District, the tsunami hit at the hour women on the east coast usually took their baths in the sea." (Oxfam, 2005, p. 2).

Research on the aftermath of the tsunami also indicates that those women who survived experienced greater risks to the safety, wellbeing, and livelihoods than men. For example, researchers on the tsunami's effects in India have seen an increase in the number of marriages of girls within their extended families in some of the affected villages in Cuddalore. "There are cases where girls whose marriages had already been arranged before the tsunami, and who have lost both their parents, are now being married off by members of the extended family or the community to other young men. These marriages seem to be contracted in desperation and without involving the girls' consent" (Oxfam, 2005, p. 4). In Sri Lanka, researchers reported that incidents of sexual assault have taken place in displaced people's camps and safety shelters, and that incidents of domestic violence are also on the rise (Oxfam, 2005, p. 10).

In the case of Haiyan, frustratingly little is known about how many more women died than men, or why this may have occurred. One study, entitled "Management of the Dead in Tacloban City after Typhoon Haiyan," was conducted by a team from the Department of Health who was

tasked with identifying, processing, and collecting data on 128 victims of Haiyan. This study reported that the adult male-to-female ratio of victims was 1:1.5, or 50% more females than males (Ballera et al, 2015). These findings are consistent with another integral study, conducted by a different team from the Department of Health, in which 100 cases of people who died during Haiyan in Tacloban City were surveyed. (Ching et al, 2015). This study relied on proxies, such as family members, who answered interview questions on behalf of the deceased in order to assess the risk factors that led to their deaths. Of those surveyed, all victims died from drowning. Ninety-five percent of cases did not evacuate because they did not expect the severity of the storm. While all cases had heard about the coming typhoon, 88% did not understand the warning messages about the storm surge and the magnitude of the threat it posed. Ninety percent reported not knowing that their homes or place of residence was not safe (p. 36).

Sixty-two percent of the deaths surveyed were women. However, this was determined to be a statistically insignificant number. Researchers concluded the being female was not a risk factor during Haiyan, at least not according to this study. These researchers hypothesized that since the study area was a fishing village, with men were its predominant residents, this may have skewed the results. In other words, had there been a more even number of women and men living the area, they might have seen far more female victims. The researchers also speculated that the small sample size of the study may have limited their results (p. 37).

Sixty-eight percent of cases surveyed also did not know how to swim, though this too was determined to be statistically insignificant by the researchers. Sixty-nine percent of deaths were people over the age of 55, which *was* considered to be statistically significant. The researchers concluded that not evacuating before the storm, despite official warnings, was the greatest risk factor for mortality during Typhoon Haiyan.

“Although it was reported that messages about the coming storm were received, it was also reported that the message to evacuate was not understood. The term “storm surge” was used to warn the public before Typhoon Haiyan, but many did not understand what this meant” (p. 37).

What conclusions if any can be drawn from these studies in Haiyan, where the majority of deaths were women? What, if anything, did Haiyan have in common with Gorky and the tsunami, in terms of impacts for women? In many cases, it seems that it was just a matter of women being in the wrong place at the wrong time, as in the example from Batticaloa, Sri Lanka, where the tsunami hit while the women of the village were bathing in the sea. There do seem to be a few common threads, however. It seems that not being a strong swimmer was a common cause of death for women in all three disasters. Also, choosing not leave the house for whatever reason, be that out of fear of the safety of the shelters, or because of “purdah,” or because of wanting to protect family and belongings, was a common cause of death. Also important to note are the common ways in which women are negatively impacted after the disaster. Frequently, female survivors are the ones burdened with additional child-care and work, while not being granted access to the same financial resources and capital to support their families as men. It’s important

to keep these common risks and burdens in mind in the creation of DRR policy and programming.

III. Gaps and Limitations in Gender and DRR Research and Policy

Unfortunately, there are some impediments to understanding how and why climate change and natural disasters are impacting men and women differently. One limitation is the way in which data on gender and vulnerability has been collected and analyzed. Often, studies that seek to assess vulnerability of men versus women do so at the household level rather than the individual level, comparing households that are female-headed to those that are male-headed. This, however, ignores intra-household gender differences in vulnerability. Therefore, claims that women's restricted rights, voice, and access to resources put them at a severe disadvantage cannot be evaluated using this methodology because these claims refer to the distribution of responsibilities and power within households" (Andersen, Verner, & Weibelt, 2016, p. 6).

Another major impediment to understanding of the differential impacts born by women during climate disasters is that not enough data exists yet to analyze. Policymakers and researchers have only recently realized the urgent need for gender-disaggregated data on disasters and begun to make collecting such data a priority in the wake of natural disasters (Bradshaw, 2015a, p. 63). As a result, there has been a great deal of speculation and theorizing on the topic, but not enough empirical evidence to substantiate these kinds of blanket claims. In fact, the most current research on gender and climate change shows that the impacts are not always worse for women than men across all contexts and cultures. As the body of research grows, it is becoming apparent how variable and context-specific gender differences are across communities, cultures, and regions, with women being more severely impacted in some cases and men in others.

In some cases, males may be more vulnerable to harm from events related to climate change, as evidenced by higher rates of suicide among men, as well as higher fatalities from flooding. While some evidence suggests that men tend to have particular advances in coping with climate shocks, much of the adaptation literature suggests that women and men are both able to adapt, but do so in different ways, such as men tending to migrate while women often use home gardens, small-scale agriculture or forest production collection (Sellers, 2016, 11).

Perhaps a more accurate narrative would be to say that differences rather than inequities exist in the way climate change and climate disasters impact women versus men. In most cases, women's restricted rights, lack of voice in decision making, and lack of access to resources are impacting their ability to cope with and adapt to climate change. Overall, we should assume that climate change will continue to compound and magnify pre-existing gender inequalities if action is not taken to address women's rights, needs, and lack of agency.

Policymakers are also finally beginning to recognize the value of a gender-inclusive approach to Disaster Risk Reduction (DRR) policy and planning. In 2015, the UN adopted the Sendai Framework at the 3rd UN World Conference on Disaster Risk Reduction. The Sendai

Framework is a 15-year, voluntary, non-binding agreement whose goal is the “substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries” (UNISDR Website). It is the first UN DRR framework to include gender rhetoric, though some argue that it still does not do enough to address women’s rights during and after disasters. Sara Bradshaw, a leading advocate for gender-inclusive sustainable development and disaster risk reduction, notes that:

The new framework adopted at the World Disaster Conference in March 2015 saw some mentions of the need for sex-disaggregated data, but this wasn’t uniform. There is some recognition that women are more than ‘victims,’ and leadership is mentioned in a number of places. However, the vulnerability discourse remains dominant and the leadership discourse is somewhat problematic; for example, it promotes ‘empowering women and persons with disabilities to publicly lead...’. It does include one mention of sexual and reproductive health – under discussion of ‘access to basic health care services’, and there is no mention of VAWG [violence against women and girls]. (Bradshaw, 2015b, p. 64).

Bradshaw’s critique of the Sendai Framework suggests that while some small progress has been made in addressing women’s rights and including women’s voices in DRR, not much has changed in the last twenty years. The discourse in DRR policy literature remains largely universalist and unrecognizing of gender (a perspective which, she argues, is actually a male-centered one) (Bradshaw, 2013). Further, Bradshaw argues that in the rhetoric around women and disasters, “women are often constructed as blameless victims, as protectors (of children), or as needing protection (from men)” (p. 99). The lack of women’s agency that this implies, and the power dynamic it potentially reinforces, has long-term implications for men and women’s material and emotional well-being.

III. Potential for Inclusion of Women's Voices in Policy and Action

Conversely, there is great potential for women to participate more integrally in climate change adaptation, both in terms of more gender-inclusive policy creation and more effective action on the ground. Prioritizing women’s involvement in disaster risk reduction, educating and empowering women to take action against climate change in their communities, may present more innovative, different, or foundational contributions that we have yet to fully access. Women, as Bradshaw and others suggest, are not helpless victims of climate change. Just as men in some cases are more vulnerable to climate threats, women in some cases possess greater knowledge, skills, and adaptive capacities. In many cases, women are already leading the fight against climate change by developing new technologies, and new mitigation or adaption strategies. As Christina Figueres, the Executive Secretary of the United Nations Framework on Climate Change states,

what makes women vulnerable also makes them pivotal to climate change action. Whether in developing countries or in developed countries, women stand at the front lines in the battle against climate change: as providers of water, food, and energy or as leaders in

businesses, communities and politics. Women are in a unique position to recognize some of the opportunities that climate change provides” (Figueres, 2014).

Figueres and others who advocate for gender-responsive climate action emphasize that women are powerful agents of change whose innovations and contributions to climate action need to be acknowledged. She stresses the tremendous potential that exists in increasing women’s participation in climate change decision making, planning, and programming. As Figueres states, “women are the secret weapon to tackling the climate crisis” (2014) precisely *because* of their vulnerability, and their position at the frontlines of climate change. In much of the developing world, women serve as the securers of food, water, and energy for their families. In addition to their role as providers, women often take on community organizing activities, ensure the provision and maintenance of collective resources within the community (Moser, 1993). This means that women are in a special position on the front lines of climate change to first spot its threats, recognize the value of adopting adaptation and mitigation strategies, and to encourage other community members to adopt them as well.

For example, as Figueres notes, “fifty percent of women around the world still burn wood, dung, coal and other traditional fuels for cooking inside their homes. The resulting air pollution in unventilated homes releases high levels of black carbon, causing approximately 1.5 million deaths a year, mainly of women and children in the poorest communities in the world.” Initiatives like the Low Smoke Stoves Project in Dufur are working to change these outcomes by educating women about biofuel stoves and other low-smoke, sustainable cooking technologies, and then training them to educate other women in their community to do the same. In doing so, they are providing women in the developing world with opportunities not only to reduce greenhouse gas emissions, improve their health of the health of their families, but also save time and money, freeing them up for more productive work (Figueres, 2014).

The Low Smoke Stoves initiative is just one example of how climate action can dovetail with sustainable development goals, having triple-bottom-line benefits for developing economies, climate action, and social justice. (For more examples, see Boxes 1 & 2 in Appendix: *Digital Stories of Women on the Frontlines of Climate Change*). This is the fundamental assumption of a gender mainstreamed approach to climate action: that empowering women to be agents of change and including them at all levels of decision making around climate action can have multifold benefits,

from raising healthier and more educated children, to strengthening and expanding national economies and improving businesses’ bottom line; from making more environmentally friendly legislation to pursuing more sustainable consumer choices. Promoting women’s empowerment and advancing gender equality are drivers for a global community that is more adept at mitigating, adapting and building resilience to a changing climate (Aguilar, Granat, & Owren, 2015b, p. 2).

Why shouldn’t policymakers and planners make gender mainstreaming a priority then, if

only positive outcomes can come from it, while potentially disastrous outcomes could come from taking a gender-blind approach? As we previously mentioned, one impediment to understanding and incorporating gender mainstreaming into DRR is that it's very hard to generalize about gendered experiences of disasters. These experiences are highly localized and context-specific, depending on things such as the time or season in which the disaster struck, and the cultural, economic, or political context in which the disaster struck. Secondly, as previously mentioned, there are limitations to the way in which empirical evidence on the gender dimension of natural disasters has been collected. Thirdly, even when gender mainstreaming language is incorporated into policy, it's not always made a priority or enacted effectively. Given these limitations, what other strategies might be employed to help us both better understand the problem and to save lives? Digital storytelling and narrative might hold the key. At the very least, narrative and anecdotal evidence might help to fill in some of the gaps in research on women's experiences during extreme weather events, and to capture and amplify women's voices and opinions on how best to address their unique needs during and after climate disasters.

V. A Gender Analysis Framework for Climate Change and DRR

Understanding how gender norms and roles contribute to differences in vulnerability is the first step toward enabling gender-sensitive adaptation or DRR programs. Norms and roles vary by culture, community, age, class, or socio-economic status, thus it's necessary to take a context-specific approach to analyzing how gender plays a role in the impacts of natural disasters on communities. That said, there are certain commonalities among women across the globe that make them especially vulnerable to external threats and stressors such as climate-related disasters. Gender analysts refer to these commonalities as women's "special condition," meaning "the social, economic and cultural factors and mechanisms which keep women in a situation of disadvantage and subordination with regard to men" (ICUN, UNDP & GGCA, 2009, p. 17). Women's historic disadvantages include restricted rights, muted voice in shaping decisions, dependence on and unequal access to land, water, and other resources and productive assets. Research has found that climate change tends to compound and magnifying these existing patterns of gender disadvantage (UNDP, 2007, pp. 81-82).

Women's traditional social and familial roles also put them at increased risk. Traditionally, women play central roles in both families and communities, often while simultaneously shouldering jobs or other productive work. This is what Caroline Moser in her book *Gender Planning and Development: Theory, Practice, and Training* refers to as women's "triple role," meaning the multiple roles women often perform simultaneously in the areas of production, reproduction, and community affairs. In contrast, men are often less involved with household activities or community affairs, and more engaged in production and community politics (Moser, 1993).

Moser's gender analysis theory, which has come to be known as The Moser Framework, is often cited by gender mainstreaming advocates and those working around women and sustainable development. According to the Moser Framework, women's traditional reproductive

roles include childbearing, rearing, health care and caring for the elderly, and any domestic tasks required to guarantee “the maintenance and reproduction of the labor force” such as the provision of food, water, and fuel (March, Smyth, & Mukhopadhyay, 1999, p. 57). In addition to their reproductive roles, women often take on community roles, such as organizing activities that ensure the provision and maintenance of collective resources, such as water, land, and soil. Traditional productive roles include the activities that produce goods and services for consumption or trade, such as growing crops for sale, barter, or household consumption. Both men and women can be involved in these activities. However, women often carry out these productive roles within the domestic sphere and alongside their reproductive roles, in a household farm or home garden, for example, which makes their contributions less visible and less valued than men’s productive work (Moser, 1993; March, Smyth, & Mukhopadhyay, 1999).

Threats from natural disasters can have a compounding impact on women’s triple roles, often turning them into triple burdens. Take, for example, a woman living through a drought in Machakos, Kenya, who consequently has to walk up to fifteen miles a day to collect water for her family (see Box 1 in Appendix). Doing so deprives her of the time she needs to care for her family members, which in turn impacts both her family’s wellbeing and her own, as walking for long distances also poses risks to her health and physical safety.

Or take, for example, Anna Ngau of the Kayan tribe in the Borneo Tropical Forest of Malaysia, whose community is experiencing unprecedented and prolonged flooding. While her husband is away for long stretches of time in search of logging work, Anna must single-handedly care for her home and family as she wades through a foot-and-a-half of water. As she explains, she doesn’t have time to do farming, or collect water or food from the forest, because she alone must do all the housework while responding to daily crises that arise from the flood (See Box 3 in Appendix).

And yet despite her increased burden, Ann Ngau and the other women of her tribe are coping. They are developing new systems and technologies for home farming, foraging, and fuel collection, and establishing social networks to support each other and share resources. Their resiliency and capacity to adapt to the impacts of extreme flooding speaks to Figueres' point that women living on the frontlines are the unsung heroes in climate disasters and that they possess key knowledge, strategies, and adaptive capacities that the rest of the world could stand to learn from.

Men generally will go on to a much more leadership capacity, but women are really the true champions for climate change actions. They are the ones getting their families together, their children together, their husbands mobilized. And they do it so willingly and open-heartedly....I would like them to express themselves, articulate themselves, and celebrate how they build resilience. They *are* coping. They are not waiting for anyone to come and tell them how to do this, they are finding technologies, they are finding ways forward. They are working very hard at the ground level, at the grassroots level. For me, doing this research, it’s [about] coming to them and embracing their ideas of stewardship and the work they are already doing within their communities. It’s not an easy task [what

they are doing], especially not when you have to do it invisibly.
(<https://vimeo.com/163574307#t=733s>)

Here, Bisan echoes Figueres point that these women are not helpless victims but “true champions for climate change action,” whose triple role in the productive, reproductive, and community domains position them at the frontlines of climate change, making them the problem solvers and invisible leaders in their community’s response to climate threats. The impediment for these women, Bisan implies, is not a lack of understanding of how to adapt or how to lead their community forward, but a lack of visibility and voice. This speaks to the purpose of a gender-responsive approach to both development and climate action, which is not simply to provide aid to women in poverty and the developing world, but to learn from how women are already building resilience, to empower them to leadership roles, and to include them and their ideas in all levels of decision making and adaptation planning.

There is a compound injustice at play: not only are women being disproportionately affected by climate change and during climate shocks, but their voices are not being heard by government, policy makers, planners, and in disaster response, and thus their need for things like access to resources, technology, safety, information and education, are not being met. One solution to this problem is increased female participation and leadership at all levels of climate change planning, problem-solving, and communication. This raises new questions, however, not only about how to go about amplifying women’s voices and empowering them to be agents of change, but also whether it is reasonable and just expect women in the developing world to take on an active role in climate action.

One of the fundamental assumptions of climate justice is that those who suffer the greatest burdens from climate change are often the ones who have contributed least to the problem. Sujatha Byravan and Sudhir Chella Rajan have labeled this phenomenon “asymmetrical impacts,” implying that there is an unequal burden on the developing world and poor communities, which is “all the more unfair because they play only a minor role, if any, in causing the climate problem, and certainly have not reaped the benefits of fossil-fuel intensive economic development” (2010: 246). Take, for example, a woman living in on the coast of Barguna in the Bay of Bengal in Bangladesh (see Box 4) whose village will soon be swallowed up by the sea. Her community’s livelihood is primarily subsistence fishing. Her husband was killed while fishing during a typhoon, and now she alone must support her family. She consumes very little and produces very little in the way of carbon emissions. Her carbon footprint is practically non-existent. Is it fair to expect her to see climate action as her responsibility, or to have the time to address climate change, when she is facing the immediate threats of sea-level rise, food insecurity, loss of livelihood, and displacement? In her own words:

No land, no trees. there is nothing there. Everything is gone. Our mothers and sisters are all widows. Do you want our sons to lose their fathers? Why are the tidal waves happening?

If you didn't make the earth so warm, this wouldn't be happening.

Most would argue that it falls on those in the developed world who are the main contributors to the climate crisis to mitigate the effects of climate change and to assist vulnerable communities in responding and adapting to climate crises. And yet we need women from the frontlines to participate in the movement too, so that their unique needs and vulnerabilities can be addressed, and so that they can communicate and educate their communities about climate change adaptation and disaster response.

There are proven benefits to women's increased participation in climate action, both for women themselves, and for their families, communities, and the environment. Take, for example, the Fairtrade Kabngetuny Farmers' Cooperative Society "Women in Coffee" program in rural Kenya, which has embraced gender mainstreaming in its operations. Through this program, women like Zeddy Rotich are learning to adopt climate smart agricultural practices (CSAs) such as planting shade producing trees to keep coffee plants cool, and new technologies such as dung-powered stoves that replace traditional wood-burning stoves, thus reducing the need to cut down trees and the emissions of harmful gasses from burning wood for fuel.

VI. Emergence of the Gender-Responsive Climate Action Movement

Within the last five years the body of data and research on the gendered impacts of climate change has grown exponentially, from a few dozen case studies to thousands from all over the world. The frameworks used to analyze and evaluate the gendered impacts of climate change have their roots in the gender and development (GAD) movement. This is a gender-sensitive approach to policy and planning for international development that first emerged between the 1970's and 1980's, out of joint effort of the United States Agency for International Development (USAID), the Harvard Institute of International Development, and the World Bank. GAD is "a case-study based methodology to identify how women have been left out of development on the grounds that 'women are key actors in the economic system, yet their neglect in development plans has left untapped a potentially large contribution'" (Moser, 1993, 2). Gender mainstreaming is a similar approach to policy and planning but with broader applications that was first proposed in 1985 at the United Nations Women's Conference in Nairobi, Kenya and later established as a major global strategy for the promotion of gender equality in the Beijing Platform for Action from the Fourth United Nations World Conference on Women in Beijing in 1995. The UN Economic and Social Council defines gender mainstreaming as

the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women's as well as men's concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality (Gender

Mainstreaming: an Overview, UN, 2002).

It is only within in the last decade, however, that analysts, policymakers, humanitarian aid organizations, and funders have begun to apply this approach to tackling climate change and have begun to collect and analyze sex-disaggregated data on climate change and natural disaster impacts (Benelli, Mazurana, & Walker 2012). Data on mortality rates from recent catastrophic natural disasters such as the heat wave that swept Europe in 2003, and the 2004 Indian Ocean tsunami (women made up 70% of the deaths in both instances) served as a catalyst for broader and more in-depth research into the gender-differentiated impacts of climate change (Aguilar, Granat, Owren, 2015a). Initial research revealed that stark inequities exist across the globe in the way climate change and natural disasters are affecting women’s health, safety, livelihoods, food and resource access, and economic security. This has led in the last few years to the development of several new initiatives, organizations, and programs designed specifically to raise awareness of gender issues among climate decision makers and take a gender-responsive approach to policy, programs, and financing.

In 2007, the United Nations Development Program (UNDP), United Nations Environment Program (UNEP), International Union for Conservation of Nature (IUCN), and Women’s Environment and Development Organization (WEDO) founded the Global Gender Climate Alliance (GGCA). The GGCA is “a unique alliance comprised of nearly 100 members—UN, intergovernmental, and nongovernmental organizations from around the world, working together to ensure climate change decision-making, policies and initiatives at all levels are gender responsive and improve the lives and livelihoods of women and men” (Aguilar, Granat, Owren, 2015a, p.2). The first task of the GGCA was to create the *Training Manual on Gender and Climate Change*, “one of the first comprehensive collections of information on gender and climate themes—ranging from the normative international policy framework to support then-nascent gender-responsive decision making, to gender mainstreaming across adaptation, mitigation, technology, and finance” (Aguilar, Granat, Owren, 2015a, p.10). In 2016, GGCA published the Gender and Climate Change literature review, which references over 600 case studies. this is the most comprehensive review of gender and climate change to date.

VII. Gender-Responsive Climate Action Programming and Financing

Global development financing institutions such as the Rockefeller Foundation and the World Bank Group (WBG) have also begun to address the gender dimension of climate change in both their research and funding operations. Both organizations have been trailblazers for Gender and Development since the 1970s, though it appears they have ramped up their efforts in the last few years in light of new findings that previous gender mainstreaming efforts were not achieving their intended outcomes (Fofack, 2014, 84). In response to this, the WBG established the Advisory Council on Gender and Development in 2011, which serves to assist the WBG in promoting gender equality, by closing gender gaps in education, health, promoting women’s ownership/control over key assets like land and finance, and enhancing women’s voice and agency (World Bank Group website).

Similarly, the Rockefeller Foundation has made gender equity one of its top priorities, and identifying and addressing gender disparities a key tenet of its strategy and grant making. The Foundation “applies a gender lens to all its work, including climate resilience and agriculture, while supporting women as agents of change.” In September 2012, the Rockefeller Foundation awarded a grant to the United Nations Climate Change Secretariat to launch Momentum for Change: Women for Results, an initiative to inform governments, the media and the public about “the role of women in solving climate change” (Rockefeller Foundation website).

Several climate-specific financing institutions have also begun to adopt a gender-mainstreaming approach to policy and programming. Climate financing refers to the funding of projects designed to mitigate and adapt to climate change in developing countries and vulnerable communities that “lack the necessary resources to develop infrastructure and institutions to address its effects. Such projects include renewable energy development, habitat restoration, sustainable infrastructure development, and capacity building to develop climate-resilient livelihoods practices” (Sellers, 2016, 7). The Green Climate Fund, the Global Investment Fund, the Global Environment Facility, The Clean Development Mechanism, and the Adaptation Fund, all have adopted specific gender policies and action plans within the last five to ten years. As an example, the Global Environment Facility’s gender action plan includes:

Conducting gender analysis and social assessment during project design; consulting with women as project stakeholders; including gender in the statement of the project’s intended objective; developing project components with gender targets; collecting sex-disaggregated data; and creating a budget item for gender-related activities (GEF, 2008).

The question remains, however, as to whether gender-mainstreamed financing, policies and programs are achieving their intended outcomes and impacting the women they intend to serve. Not much literature exists yet, either in academic papers or in reports published by NGOs, on the impacts and outcomes of these gender-responsive approaches. “Many in the advocacy community strongly believe that gender mainstreaming improves outcomes for women and men, yet there is a strong need to document whether and how this is true” (Sellers, 2016, 8). Evaluating the impacts of gender-mainstreaming programming should be a top priority in the next few years, in order to insure that the goals of gender-responsive climate action are being met and if not to make course corrections.

VIII. The potential of ICTs and Participatory Communication for Climate Action

This literature review examines existing research on the use of Internet Communications Technologies (ICT) programs for social change within climate vulnerable communities, with a particular focus on their efficacy and applicability for women living within these communities. What are the best practices and key outcomes of participatory climate change communication programs in “frontline communities?” Could ICTs be an effective way of amplifying the voices of women living within vulnerability communities and bringing increased visibility and voice to their

experiences and needs? What additional benefits might exist for women who engage in participatory climate change communication using internet technologies such as digital storytelling? What is the benefit to society and the environment by amplifying the voices of women in these communities?

While ample literature exists on the use and efficacy of participatory ICT programs for social change and community development, not much yet exists on their use for climate change communication by and for women specifically. There is, however, ample literature on the use of ICTs with women in the developing world, as a tool not only for communication about issues impacting women but for their economic and psycho-social empowerment. This review seeks to integrate an analysis of these two applications of ICT programs: those that focus on aiding and empowering women in developing countries, and those that focus on the creation and dissemination of climate messages within frontline communities. The goal is to create a rationale for their use with women living on the frontlines of climate change, as both a tool for communication about the gendered experiences of climate change and a means of empowerment. Additionally, this literature review seeks to research best practices of these two applications, with the ultimate goal of developing an effective female-driven ICT program that empowers women to be change agents in their communities and brings global attention to the gendered impacts of climate change.

In her article entitled “ICTs in Climate Change Communication in the Pacific Islands,” Usha Harris conducts a case study of a participatory video training program in Fiji that attempted to convey messages about climate impacts to local Pacific Islanders and mobilize them to take action. She argues that the inclusion of local voices in both the creation and dissemination of climate messages was essential in order to effectively reach locals about the impending threats of climate change and galvanize them to take action (Harris, 2016, p. 47). She further theorizes that ICT strategies such as digital storytelling are the most effective means of including local voices, and that it is through this inclusive, dialogic approach to climate communication that climate action can best be achieved (48).

Harris grounds her analysis and discussion within the framework of Communication for Development (C4D) (47). This is a concept that first emerged in the 1970s and has its roots in the Participatory Action Research movement and the Pedagogy of the Oppressed championed by Paulo Freire. Freire stressed that people should be regarded as agents rather than objects, able to teach and help themselves through dialogue with one another (Freire, 1970). According to Freire, the process of raising questions and engaging in dialogue sparks a “critical consciousness” both in individuals and communities, which enables a shift from reflection to action.

This participatory approach to communication is hard to define succinctly as it can take many forms. It has been described in similar ways but with various nuances by several different theorists. In their book, *Development communication: Human change for survival*, Fraser and Restrepo-Estrada define participatory communication as

the use of communication processes, techniques and media to help people toward a full awareness of their situation and their options for change, to resolve conflicts, to work towards consensus, to help people plan actions for change and sustainable development, to help people acquire the knowledge and skills they need to improve their condition and that of society, and to improve the effectiveness of institutions (1998: 63).

Some of the key elements of participatory communication programs include a focus on “horizontal” communication; a focus on collaborative processes, identifying solutions and developing strategies for change within the community rather than applying models of change from outside the community; and recurring cycles of reflection and action (Tufte & Mefalopolis). These ingredients, according to Tufte & Mefalopolis in their World Bank working paper entitled, “Participatory Communication: A Practical Guide,” create a recipe for success in any participatory ICT program. Successful PC programs “allow for the sharing of information, perceptions, and opinions among various stakeholders and thereby facilitates their empowerment,” especially those who are most vulnerable and marginalized. “Participatory communication is not just the exchange of information and experiences, it is also the exploration and generation of new knowledge aimed at addressing situations that need to be improved.” (Tufte & Mefalopolis).

Harris’ case study highlights how these key elements of participatory media and communication for development can be put into practice in the context of climate change action with successful outcomes. In this participatory video training program, which was conducted in partnership with the Pacific Gender Climate Coalition, a small regional NGO, facilitators from Cook Islands, Fiji, Guam, Kiribati, Niue, and Papua New Guinea participated in an eight-day “training of trainers” workshop in participatory media production techniques (53).

The group was asked to collaboratively identify key themes and topics on climate change. They then divided into teams of two to develop story ideas. Hands-on training in all aspects of video production and digital editing continued throughout the week. For their final project, each participant identified a community with which they could produce a 5–10-minute story exploring a climate change theme... Two media students from Fiji National University worked alongside the participants as production assistants. This created an intergenerational knowledge exchange... Participants planned to include communities by asking them to share their stories such as through a then-and-now approach, looking at how things have changed over time through the eyes of village elders. This may include evidence of coastal erosion and its impact on heritage sites by comparing old and new photographs, or this may include the ways in which communities have adapted to these changes. Another important aspect of this workshop was a commitment by the participants to share their skills in camera and editing with two other people in their geographic area or area of expertise so that the knowledge would not be lost. (Harris, 2016, p.54).

IX. Haiyan Survivors' Interviews

We illustrate how a specific focus on gender can be incorporated into Disaster Risk Reduction research. In June and July, 2017, four female survivors of Typhoon Haiyan were interviewed by the research team. The interviews covered the entirety of their experience: how they survived, those they had lost, their reflections on the experience, and their advice for others at risk. These interviews are being transcribed and analyzed as part of the Final Report for Phase 2 of the project. In addition, 10 minute video segments are being prepared, with English subtitles, to be uploaded onto the project's online portal, which is found at: environmental-communication.space.

This discussion only takes up the portion of the interviews that took up the specific experiences of women. The interviewer began that part of the discussion by mentioning several studies that suggested that women were possibly more affected than men (in terms of fatalities and, for the survivors, emotional trauma and difficulty of recovery). Note that since two follow-up interviews are still being conducted, the quotations below are taken from only two of the interviews (with respondents identified as R and Z).

The women spoke about how women might experience the calamity differently than men. The following summarizes key themes, and relevant passages, from the interviews.

1. Some women can be more physically challenged.

Z: Men, women would not survive. But there will be a great(er) chance for men to survive because they're strong. It really needs strength. They could endure more in terms of battling maybe, (doing) hard tasks. But for women, it is really difficult. I survived because I had skills in terms of gymnastics, in terms of swimming, in terms of strength. I have good enough reserved strength inside and I have willpower. Another thing is, once if you're in the water, you will really be overwhelmed by fear. You will really give up. I did. I gave up when I could not breathe anymore. I just prayed for miracles, and it happened. My having survived is due to a miracle. I may have all the skills in the world that I needed but I was really at the brink of death. Sure, physical willpower will save me. It was a miracle for me. But for the others, it really needs a strong mind, willpower to survive. Without it, you will be dead. In the case of Coleen, it was a miracle she survived. She was unconscious already, carried by the water. In the case of the girl, she will not survive because she was in the water. Luckily, she was on top of a cabinet. Some of the women, I heard, died because they really don't have the skills and it's really very hard once you're under. You will panic and no more. You will just give up easily.

R: And women don't know how to swim... Yes, she doesn't know (how to swim). Her children started to panic, she struggled to put her family to safety first, which is why more women died compared to men. For example, me. I know how to swim. Just imagine, from here to there. Just

like that, when I crashed over there, with just a single wave, my clothes were even...

... But majority of (the men), especially here in our area where most people are divers, people who catch fish. They're good. Catching fish is their livelihood.

... The men, yes. That's why more men survived here compared to us women. Because the men here work as anglers, fishermen, so they know how to swim. Meanwhile, the women don't know how to swim. Such is the case.

(And referring to women's livelihoods) Nothing. They just watch over their children. Help their children prepare for school. Majority of them are unemployed. I'm one of them, but then my daughter is all grown up.

2. Some women can be isolated from channels of communication.

As one interviewee suggested, some women were more isolated from risk communication about the storm surge and evacuation because of physically spending time at home:

S: News...? Of course, since they are not exposed in their communities, they are more focused in their houses, in their house, in their household to take care of the kids.. They wash clothes, so more of their chores at home, they have limited access to news.. maybe because we are used to the culture that women are just home. It's like we are contented that they are just there. Like the decision making (power) for the whole community they are already dedicating it to other people... Ok.. yes i mean if they're not busy since we have a notion that women are only at home the whole day.. But actually, it's not because, to take care of the house, it's a fulltime job. You wake up in the morning you take care of your kids, your husband and when they leave for school or work, you wash the dishes, you clean the house, it's like your rest is to take a nap and watch tv.. Something to relax you.. Not news... So many things are done by mothers or by women who just stay.. Of course, since you are tired the entire day... you just sleep... Very dangerous since she herself who is at home she's very busy...

3. Women have to deal with multiple concerns.

The theme of women's multiple, consuming responsibilities was a recurring theme. One interviewee said that, during the first rush of water from the storm surge, many women were caught trying to save their children, as she recounted what happened to her neighbor:

R: Because firstly, women are always concerned about the welfare of her family. Secondly, they let their children out first. And women don't know how to swim. They're concerned about their children.

...That's because the water suddenly rose. Her children started to panic, she struggled to put her family to safety first, which is why more women died compared to men.

... When they (the men) found out that there's a storm surge coming, when the water rose up, they hurried to put themselves away from danger while the women, they went to save their children first.

... Just like what happened to one of our neighbors, Mana Charit. She was so worried about her husband, kept saying, “Oh my, where’s my husband?” and I kept saying, “Mana Charit, climb up here quick!” So she climbed up to where we were. But in the end, she was the one who died. Her husband, on the other hand, was safe and sound in the mountains, across Rendisa. I mean, why would she keep worrying about her husband? Free yourself from worries. In the end, she’s the one who got swept away by the waves when we jumped over there. She got separated from us.

... It’s because women are slower and tend to panic easily. Men, on the other hand, remain calm, even in the face of tragedy. They just remain calm. Us women, we’re slower. We easily panic, especially when it comes to our children. That’s why more women died than men, here in our area.

4. Some women can lack the confidence to deal with these events.

Z: Yes, it’s very natural that women would give up easily and will have difficulty surviving. Men have the tendency to play with it, even. “I can handle this, I can manage this. I will not give up”. But for women, when faced with such kind of ferocious strength, ferocious weather, and scene, they would give up easily. I did when I was trapped already. I gave up. I said, this is my last. But, I prayed. So all that was left in me during that time when I gave up was a miracle from God. But afterwards, I was able to recover. I’m by myself again, but praying to God, to help me. But as we heard before, you have to do your thing, and God will have mercy on us. So I really had to fight for my life. I really had to do everything to survive, not to give up.

...Actually, until now. Whenever I pass by that area, my tears would run down. I’m not totally healed. So every morning I would pass by that area, I would remember. And so, what I do, before, I would stop looking around. So when I am near here, it’s good that I have a cellphone so I would be busy with my cellphone. Otherwise, every time that I would see the bridge, I would see where I was, my tears would run down.

5. Women can be more resilient.

Z: I saw some women in San Jose, they were in a group, already drinking tuba. When I conducted a home visit for my students, for the UP STFAP – STS now. And I saw some women, they were drinking, they were gathering. They lost their houses, they lost a lot, and some were parents who lost kids. In fact, one mother lost a kid. She’s a teacher in San Joaquin. Her two sons studied in UP, one is now teaching there. She lost a son, and she’s coping. I mean, it was very easy for women to recover. But for men, I saw, it’s difficult. Even one of my colleagues, he had to leave the place because he lost his wife and two kids. He said, “Ma’am Sen (not sure about this), I cannot come to work sensibly and sit here and remember them being here. So I had to go somewhere. I had to be relocated. So he transferred.

...Maybe because women are more used to accepting things as they are. It happened, we can do nothing about it. But for men, they have to recover things. Losing somebody, to them, is really very painful. Women can (more) easily adjust, maybe. I think the adjustment of women is quicker and easier. But for men, it’s really very difficult. That I think so, emotionally. For them, it is. So, physically, men may be a stronger vessel but they’re weak when it comes to emotions – handling

emotional problems.

...It's because I have seen women who lost husbands and children, and they were able to go on and still smile. Have that smile on their face. They were able to continue for the sake of those that were left to her. So, they have that easy patch on their scratches. They can patch it up easily. But for men, it's really very difficult. That's because, maybe, men may not show their emotion, but maybe they think of it more deeply.

Appendix A: Digital Stories of Women on the Frontlines of Climate Change

Box 1: Stories from the Frontlines of Machakos, Kenya

Learn how women in **Machakos, Kenya** are being impacted by drought, and how walking for long distances poses threats to their health and safety.

Women’s Enterprises International is working with women in Machakos to “learn to earn and save money to solve the water problem together.”

□ Watch here: <https://vimeo.com/110295122>

Box 2: Stories from the Frontlines of Kabnetuny, Kenya

Learn how women like [Zeddy Rotich](#) are adopting **Climate Smart Agriculture** practices

the **Fairtrade Kabnetuny Farmers Cooperative Society** - “Women in Coffee” program embraces gender mainstreaming in its operations

□ Watch here: <https://vimeo.com/channels/994465/145641417>

Box 3: Stories from the Frontlines of Malaysia’s Tropical Forest

Learn more about how women in **Kayan and Penan tribes** in the **Borneo Tropical Forest of Malaysia** are learning to cope with and adapt to extreme flooding in the short film, “**Women of the Forest: The Hidden Burden of Climate Change.**”

□ Watch here : <https://vimeo.com/163574307#t=393s>

Box 4: Stories from the Frontlines of Bangladesh

Learn how women like Mamtaz Begum in the Bay of Bengal are coping with rising waters and frequent typhoons

□ Watch here: <https://vimeo.com/123518175>