

Uniting Against Climate-Induced Natural Disasters, Such as Displacement, Reproductive Health Challenges, and Violence, on Marginalized Women Through Women's Empowerment, Education, and Leadership

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Background

In the United States, women of Black, Hispanic, or Native American heritage face a vulnerability to the impacts of wildfires that are approximately 60% higher than that of other demographic groups (EJF, 2022). In 2020, The Institute for Economics and Peace estimated that over 1 billion people will be displaced by climate-driven natural catastrophes by 2050, especially BIPOC individuals (National Geographic, 2023). Furthermore, years of research indicate that natural disasters, specifically high temperatures, floods, storms, and heat waves, disproportionately affect women of color (UNDP, 2017).

The last nine years have marked the highest recorded temperatures, with the average global temperature rising by 1.1°C since 1900 (Earth Observatory, 2021). This climate change results from increased greenhouse gasses such as carbon dioxide, methane, and nitrous oxide, which trap heat inside the Earth's atmosphere. Such changes influence not only air temperature but also escalate sea temperatures, increasing the frequency and intensity of tropical storms. Coastal regions vulnerable to hurricanes may face a sea level rise between 0.3 to 1.2 meters over the next century, which could intensify coastal storms and flooding (National Geographic Society, 2023). In the United States, elevated temperatures lead to more severe heat waves and wildfires. Consequently, this results in extended wildfire seasons and increased wildfires every season (Crimmins, 2022). The area affected by wildfires annually has expanded from 5 to 23 percent from 1984 to 2020, while the duration of summer wildfire seasons now extends 40 to 80 days longer than it did three decades ago (Climate Change Indicators, 2023).

Global Impacts of Climate Change on Women

Despite struggling with displacement, reproductive health challenges, and violence, women of color continuously emerge as caretakers of the environment, highlighting the necessity of developing strategies to empower, educate, and foster their leadership for their environmental contributions. Elevated levels of greenhouse gasses caused by human activities have led to a heightened occurrence and severity of extreme weather events, with its repercussions affecting women of various ages and cultural backgrounds across the world (IPCC Special Report, 2017). Systemic sexism significantly contributes to this problem, as women, who have historically experienced marginalization, lower societal power, and status, are frequently disregarded, particularly when they are disproportionately affected by the ongoing climate crisis (Lambrou and Piana, 2006). A 2016 study reported that in 85 low and middle-income countries, women were more likely to be killed by extreme weather events in countries where their socioeconomic status was below men, either due to lack of financial resources or unavailable means to escape. Additionally, 80% of people affected by food insecurity following natural disasters are women, and 70% of people who are more likely to experience mental health-related issues after natural disasters are women (Dunne, 2020). Women are often economically disadvantaged, less educated, weighed down by their caregiving responsibilities, and excluded from governmental and family decision-making processes. Along

with economic disparities and limited access to resources to aid them before and after disasters, women are more vulnerable to climate change (UNDP, 2017).

Disproportionate Effects on Women of Color

Climate-induced disparities present a global concern, particularly for BIPOC women who disproportionately suffer the impacts of extreme natural disasters. For instance, in the 2004 Indian Ocean Tsunami, women accounted for 70% of the 230,000 fatalities, many trapped inside their homes (Okai, 2022). Similarly, Cyclone Gorky in Bangladesh resulted in women constituting 91% of the fatalities (CDP, 2022). Furthermore, in the aftermath of the 1998 hurricanes in Honduras and Nicaragua, women were 45% more likely than men to contract infectious diseases (Robles and Patricia, 2023). After Hurricane Andrew (in Florida in 1992) and Hurricane Katrina (on the Gulf Coast in 2005), women were targets for exploitation, male desertion, and objectification, especially marginalized women such as public housing residents, political refugees, and migrant workers (UN, 2022). Due to their generally lower economic status — according to the United Nations Economic and Social Council, 70% of people living below the poverty line are women (We Do, 2020). Women have uniquely been found to identify disasters and hazardous situations while lacking the necessary resources to address such situations (Donner and Rodríguez, 2011). They play critical roles in disasters as they shoulder the responsibility materialistically, in terms of cooking, cleaning, sewing., and emotionally caring for their community. Notably, the McKinsey Global Institute reveals that if women were given the same opportunities to participate in the global market as men, the global GDP in the US could be boosted by 26% by 2025. Various studies continue to prove that women are positioned to take on environmental preparedness but are historically unrecognized for their efforts. Additionally, countries with more women in legislative roles are inclined to establish protected lands and endorse environmental treaties. Women's effective community mobilization is vital in battling climate change and enhancing disaster risk reduction (UNDP, 2017).

Climate-Induced Displacement

Climate-induced displacement refers to people being forced to leave their homes due to the impacts of climate change, often forcibly evacuated to unsafe shelters or remaining homeless (Sineiro, 2020). According to the Internal Displacement Monitoring Centre, 1.7 million individuals were uprooted by disasters in the United States in 2020, with 80% of them being women and children (UNDP, 2017). These internally displaced persons (IDPs), especially women of color, face significant challenges. They lack access to essential resources such as food, water, shelter, and healthcare, often experiencing disruptions in their social support systems, leading to unwanted and poorly spaced pregnancies. Hurricane Katrina, the displacement of Indigenous communities due to flooding, and the Maui fires in 2023 all illustrate the disproportionate impact of natural disasters on marginalized communities. The issue is exacerbated by restricted access to contraception, coupled with external pressures from male counterparts or their families to “increase population” and have more children when they are displaced (Sineiro, 2020). Households led by women face added challenges as they often find it difficult to access federal assistance, especially when dealing with children, housing problems, health issues, and more. After Hurricane Katrina devastated primarily African-American neighborhoods in New Orleans in 2005, residents faced disproportionate vulnerability to flooding and infrastructure restoration. Compared to their white counterparts who experienced a wealth increase, displaced African-American residents with about \$100,000 in damages saw a wealth

decrease of \$19,000 (Patnaik et al., 2020). Predominantly African American neighborhoods, like Tremé and the Lower Ninth Ward, saw less than 40% repopulation in 2010, while other affected areas recovered between 60% to 90% of their population (EPA, 2021). This disparity in recovery efforts contributed to prolonged displacement within the city's African-American communities (Domingue, 2018). Additionally, it is important to note that pregnant women in temporary housing or displacement shelters are highly susceptible to the psychological and physical strains put on their maternal health in the aftermath of a natural disaster, impacting their delivery process and their newborn (Domingue, 2018).

Rising flooding in coastal areas of the U.S. has led to the displacement of indigenous women, exposing them to heightened risks of sexual assault and rape in congested camps (Seltzer and Nobles, 2017). These women endure substandard health and hygiene conditions, as they are often marginalized compared to other communities of color, facing mistreatment, limited resources, physical harm, and neglect within the camps. The Tachi Yokuts Indigenous tribe in San Joaquin Valley, California, was forced to relocate after major floods and droughts in 2022 and 2023. Women were primarily affected; their traditional roles, such as fishing, crafting, and gathering, changed, and they were forced to find new sources of income in their new environment. Their immense cultural knowledge, ceremonies, traditional practices, and social ties within the community were lost, resulting in feelings of displacement, loss, and identity crisis (Hok, 2023). Another example is during the Maui fires in 2023, where African Americans faced a nearly two times higher likelihood of experiencing displacement and encountered a greater risk of managing food shortages and water scarcity when they were displaced (FEMA, 2023). Furthermore, African-American households, along with individuals from various racial and ethnic backgrounds, exhibit significantly lower rates of emergency savings compared to their white counterparts.

Reproductive Health

The impact of more frequent and severe natural disasters, specifically California's wildfires, Hurricanes Katrina and Andrew in Florida, and the Red River Flood bordering Minnesota and North Dakota, on marginalized women's reproductive health is a growing concern that requires immediate action to address current impacts and better prepare for future ones. While "reproductive health" encompasses a wide range of issues, this passage addresses the accessibility of services related to reproductive health, hygiene products, and concerns before, during, and after pregnancy. Climate change places immense strain on healthcare systems due to the destruction of hospitals by catastrophic weather events. Decisions related to Universal Health Coverage (UHC), including funding, resource allocation, and priority setting, prove that Sexual and Reproductive Health (SRH) services, despite their proven effectiveness, are often sidelined in the priorities of many countries. Insufficiently structured approaches, along with a lack of political commitment, perpetuate health disadvantages for women and perpetuate stigmas around sex and sexuality. These factors contribute to SRH services being marginalized within Health Benefits Packages (HBPs), leading to increased cases of issues like low birth weight, premature birth, infant diseases, miscarriages, and other related issues (Women Deliver, 2021). When health infrastructure collapses, health services, and products do not take priority against providing food and caring for their families. Therefore, disasters create challenges for girls and women in accessing essential health and hygiene products, leading to inadequate menstrual hygiene (Patel et al., 2022). This is associated with reproductive and urinary tract infections, posing risks to contraception, maternal and child care, HIV treatments, counseling,

psychosocial support, abortion services, and post-abortion care in crisis-stricken communities (Domingue, 2018). The rise in STIs, if untreated, can result in enduring health repercussions for women, such as infertility, tubal/ectopic pregnancy, and cervical cancer (Women Deliver, 2021).

Additionally, increasing temperatures and unpredictable rainfall can undermine food and water security, impeding women's access to clean drinking water. This situation can lead to dehydration during pregnancy, impairing fetal growth, triggering labor-inducing hormones, causing premature deliveries, and heightening the risk of anemia and eclampsia in pregnant mothers. Deficiencies in both macro and micronutrients can contribute to adverse outcomes like low-weight births, miscarriages, and perinatal deaths (Dunne, 2020). Due to global warming, California is prone to heatwaves and wildfires, and high temperatures are significantly associated with preterm birth and stillbirth for all mothers, specifically for Hispanics, African-Americans, and Asians (Aguilar et al., 2013). There is also a significant correlation between high temperatures, hypertension, and eclampsia during pregnancy, as well as the risk of low birth weight, which is also affected by exposure to air pollution after wildfires (Aguilar et al., 2013). The frequency and intensity of hurricanes continue to increase, affecting millions of pregnant women, new mothers, and newborn babies around the US. Investigations of storms have indicated that African-American mothers exposed to hurricanes are correlated with adverse pregnancy outcomes, including highly premature birth, fetal distress, heightened irritability, and the requirement for ventilator support for infants (UNDP, 2017).

Violence Against Women of Color

The aftermath of natural disasters disproportionately inflicts mental, physical, and sexual violence upon women of color, as shown by harrowing instances such as increased cases of sexual assault, PTSD in the aftermath of hurricanes, life-threatening injuries, and more. Girls and women residing in socially or geographically isolated regions and those living in poverty face heightened vulnerability to gender-based violence, including sexual violence (SAMHSA, 2020). The repercussions of climate change-induced resource scarcity force women to undertake longer journeys for essential resources, amplifying their vulnerability to sexual exploitation, physical abuse, and harm (Women Deliver, 2021). After Hurricane Irma in 2017, marginalized women, lacking resources and transportation, walked long distances to reach the nearest medical facility. This often discouraged them, leading them to prioritize family care over a strenuous 4-5 hour journey for medical supplies (Firger, 2017).

Furthermore, post-disaster mortality risks are 14 times more significant for women and children than for males (Women Deliver, 2021). Research focusing on displaced communities in trailer parks revealed that the incidence of violence against women surveyed tripled in the year following Hurricane Katrina, and these heightened risks endured even two years post-disaster (Sierra Club, 2020). 55% of the women who died after Hurricane Katrina were African American women due to various factors: they were unprepared for natural disasters, had an inadequate amount of resources to protect their families from this hurricane, did not have enough transportation/vehicles to escape their town, and more (SAMHSA, 2020). This indicates that African American and Latino women encounter heightened challenges influenced by various factors, notably the increased responsibility they bear for childcare duties. As a result of systemic racism, they face limited access to higher education, leading to lower-paying jobs and heightened reliance on their male counterparts (Kochhar and Sechopoulos, 2022). Even five years after Hurricane Katrina, there were more deaths among African American and low-income

women near New Orleans due to a lack of access to healthcare and insufficient resources to maintain hygiene (Institute for Women's Policy Research, 2010).

Hurricanes and similar disasters can intensify the correlation between sexual violence and mental health, as factors such as poverty, displacement, insufficient shelter, and inadequate law enforcement further underscore the severity of this issue. A survey conducted by the National Sexual Violence Resource Center discovered that nearly one-third of recorded sexual assaults after Hurricane Katrina and the subsequent 2005 Hurricane Rita on the South-Eastern coast took place in evacuation shelters, where women had been forced to relocate. Women and girls accounted for 93% of the victims injured, assaulted, raped, or targeted after this hurricane (Finger, 2017). Counties that experienced more significant storm impacts reported elevated rates of sexual assault in the subsequent years when compared to similar counties with less exposure to such disasters (Sierra Club, 2020). The World Health Organization indicated that women are the largest group of people affected by post-traumatic stress disorder (PTSD), which is linked to elevated charges of sexual violence worldwide (Dunne, 2020). Post-hurricane research uncovered elevated levels of PTSD, psychosocial distress, and depression, especially among Black women facing housing damage or lower incomes, persisting four years after Hurricane Katrina (Paxson et al., 2012).

Why this is Important

In the face of escalating climate crises, it is essential to involve women in crafting community-driven, gender-inclusive responses to climate change, with a heightened emphasis on empowerment, education, and leadership to prevent the exacerbation of climate change. The Committee on the Elimination of Discrimination Against Women underscored this, stating that "Gender equality is essential to the successful implementation, monitoring, and evaluation of climate change policies" (UN Nations Economic and Social Council, 2011). However, within conservation and preservation organizations, board positions are held by white males, with approximately 95% of board members identifying as White. This imbalance extends beyond gender, impacting ethnicity as well. The lack of representation, particularly of non-white women, on environmental NGO boards complicates the decision-making process. NGOs, Non-Governmental Organizations, are meant to advocate for the people they serve. However, if they neglect to amplify women's voices and ideas, they fall short of genuinely representing the populations they aim to serve (Fletschner and Kenney, 2011). A recent study by the McKinsey Global Institute (MGI) underscores the potential for a substantial boost in yearly global GDP, up to \$28 trillion or 26% of the US economy by 2025, if women's market participation were on par with men's (Madgavkar et al., 2016).

Moreover, research reveals that nations with higher female representation in legislative bodies are more inclined to establish protected land areas and ratify environmental treaties (UNDP, 2017). This originates from women's heightened concern and attention towards environmental issues, along with their recognition of their importance. National polling on climate change affirms that women are more likely to acknowledge the reality of climate change and proactively address it than their male counterparts (Sierra Club, 2020). Augmented female involvement is a linchpin in the fight against climate change, as women's demonstrated capacity to mobilize communities across various stages of risk management promises substantial strides in disaster risk management and reduction (UNDP, 2017). Furthermore, studies demonstrate that closing the yield gap between women's and men's farming practices could prevent

approximately 2 billion tons of CO₂ from being released into the atmosphere by 2050 (Dreyfuss, 2018).

Leadership: Fighting for a Change

Women of color have a long, widely unrecognized history of fighting for environmental conservation and justice. So, empowering women in various aspects of leadership holds immense potential for combating climate change and encouraging positive impacts on multiple levels of society. Women-led organizations are pivotal in accelerating the transition to renewable energy resources and fostering more equitable energy. Evidence suggests that women play a significant role in improving forest conditions and conservation efforts, contributing to preserving Earth's biodiversity while minimizing additional burdens on already vulnerable communities (Madgavkar et al., 2016). Women's participation in community-based conservation led to a 25% reduction in deforestation rates in certain US regions, promoting sustainable forest management. They helped with tree planting initiatives, awareness campaigns regarding the usage of less timber, and harvesting of non-timber forest products (Women Owing Woodlands, 2020).

Additionally, research from the US Forest Service shows that women-owned forestry businesses in Oregon prioritized sustainable practices, resulting in an 85% adoption of eco-friendly logging techniques and a 20% reduction in carbon emissions for the whole state (Women in Forestry, 2001). Initiatives like Women Owing Woodlands (WOW) have focused on empowering women landowners in the U.S. to engage in forest conservation and sustainable management practices (Women Owing Woodlands, 2020). The World Wildlife Fund assists women in developing nations in obtaining improved access to education, healthcare, and sustainable means of livelihood, starting with promoting women's roles in conservation tactics. They help with scholarships, adult literacy programs, support maternal and child health programs, sustainable agriculture training, resources to learn about microfinancing, and more (Skinner et al., 2023).

Furthermore, the formation of the Salisbury Colored Women's Civic League in 1913 addressed sanitation issues and helped improve the lives of Black people. Wangari Maathai, a Kenyan environmentalist activist, established the Green Belt Movement in 1982 to focus on environmental conservation and women's empowerment (The Green Belt Movement, September 2022). The Women's Earth and Climate Action Network (WECAN) was launched in 2015 to engage women in climate justice and advocate for women's leadership in climate solutions (We Can, 2018 to 2023). In the aftermath of Hurricane Katrina, women took the lead and comprised a significant portion of community-driven recovery efforts and grassroots advocacy campaigns. For example, the Women of the Storm organization was composed of women from the New Orleans area who brought attention to the needs of the Gulf Coast and advocated for disaster recovery funds and resources (WECAN). In general, in their role as primary caregivers, women can enhance the overall health of their families and contribute to increased financial stability. (Women Deliver, 2021). Additionally, initiatives like #NoDAPL led by Indigenous women and two-spirit individuals have been instrumental in shedding light on the impacts of fossil fuel expansion on native lands. The #NoDAPL stands for the "No Dakota Access Pipeline," whose construction posed significant environmental risks, including potential oil spills that could contaminate water sources. The women of the Standing Rock Sioux Tribe utilized social media to spread awareness about this issue and prevent it from happening, ensuring that they address the impact of increased fossil fuels on climate change (Lambrou and

Piana, 2006). The World Bank emphasizes that normalizing women's involvement in disaster risk management and response can improve outcomes and more positive, enduring gender dynamics within communities. The Resilience and Gender Equality Network (RAGEN) research shows that when women are actively engaged in disaster risk reduction and response, communities experience reduced vulnerability and enhanced resilience due to the unique perspectives and skills that women bring to the table (Dhar et al., 2023). By recognizing and nurturing the leadership potential of women, we not only enhance forest sustainability and conservation efforts but also bolster overall family health outcomes through increased participation in the economy. This ripple effect extends from individual and family well-being to community, regional, and global levels, offering a multifaceted approach to mitigating climate change.

Education Allows for Awareness

Education is a powerful tool in preparing and empowering BIPOC women to take a leading role in the fight against climate change and foster thriving, secure communities, allowing them to play a large part in addressing climate challenges. Environmental justice depends on education, given that over two-thirds of the global illiterate population are women, with rural girls facing double the education deprivation compared to their girls in more fortunate, urban environments. Every additional year of education increases girls' potential earnings by 10–20%. Young girls must support environmental initiatives, understand crucial environmental historical events, and commit to sustainability. Furthermore, enhanced education and increased leadership roles of women and girls could contribute to an 85-gigaton reduction in atmospheric CO₂, showing the power of education, not only in environmental preservation but also in other benefits to combat global warming (Kwauk, 2021). Alarming, over 130 million women worldwide lack access to education, yet higher levels of education for women are associated with reduced childbirth rates (Dreyfuss, 2018). To prevent health issues and shield women against sexual violence, providing information in multiple languages to survivors of disasters can offer reassurance that they are not alone and that support networks exist (North, 2017). Blue Ventures, an organization dedicated to ocean conservation, acknowledges the central importance of the sexual and reproductive health of girls and women in the pursuit of a sustainable planet. Through this endeavor, Blue Ventures has achieved an impressive 10% increase in contraception adoption, served over 45,000 individuals, and averted 4,500 unintended pregnancies by empowering local women to provide community-based family planning support. It is crucial to prioritize inclusivity and conduct specialized consultations for marginalized women and individuals, ensuring that health concerns are openly addressed (Women Deliver, 2021). Implementing education for BIPOC women involves integrating climate change curricula in schools, conducting targeted campaigns, utilizing online platforms, and advocating for inclusive policies. This approach ensures early environmental awareness, expands access through technology, and promotes equal education opportunities for all. These steps empower BIPOC women to combat climate change and foster resilient communities.

Real Stories of Leadership, Education, and Empowerment

Highlighting the real-life stories of women leaders and educators showcases their empowering efforts to make a change within BIPOC communities, showing how to respond to climate change-induced natural disasters effectively, increase access to sustainable education, and remain resilient during these challenges. Julia Collins, founder of Planet FWD, employs a

database to evaluate the environmental impact of agricultural products across North America. She aids companies in offsetting their carbon footprint through verified carbon credits, implementing renewable energy sources in factories, and crafting products from recycled and upcycled materials. This initiative benefits a diverse range of women, including Black and Latinx individuals (Gunn et al., 2023). Another example of perseverance in the face of adversity is Sharon Lavigne, an environmental activist based in Louisiana, USA. After Hurricane Ida in 2021 in Louisiana damaged Sharon's home, she directed her efforts toward gathering supplies for fellow community members who also experienced losses or damage. Following this incident, she channeled her efforts into combating environmental injustices in her community, with a specific emphasis on advocating for equitable treatment of women of color. She organized community meetings, and door-to-door campaigns and aided in the fight for environmental justice (Daja E. and Kutz, 2023). Regina Benjamin, former U.S. Surgeon General, recognized that the health impacts of climate-induced disasters were significant and required targeted attention. She emphasized the need for strategies to protect vulnerable populations and advocated for policies that addressed heat-related illnesses, vector-borne diseases, and mental health challenges following disasters. She sought a coordinated approach between the health sector and disaster preparedness agencies, ensuring people of color, especially women, were safeguarded. In the aspect of unity, after the 1994 International Conference on Population and Development and the 1995 Fourth World Conference on Women, various alliances were established to enhance displaced women's ability to receive high-quality reproductive health services. These included the Inter-Agency Working Group on Refugee Reproductive Health (IAWG) and the Reproductive Health for Refugees Consortium (RHRC), demonstrating a fraction of the progress achieved so far and the potential for more improvements (Creel, 2002). While progress is being achieved in addressing environmental injustice for women of color, the fight against this issue should not slow down or stop and ensure that women are empowered, equitably treated in the workplace and home, receive proper education, presented opportunities for environmental action, and given a voice in the community.

Conclusion

This article has emphasized the profound impacts of climate change on BIPOC women worldwide, focusing on the extent of displacement, reproductive health challenges, and the reality of brutal mental and physical violence. Due to extreme weather changes and natural disasters, millions of women worldwide are left in substandard housing, socially marginalized, economically insecure, burdened with caregiving responsibilities, and lacking political power or voice (Lambrou and Piana, 2006). These difficulties underscore the urgent need for safe, secure environments free from the threat of natural catastrophes and their immediate repercussions. Through the lenses of education, leadership, and empowerment, this paper has highlighted opportunities for navigating the adversities caused by climate change, emphasizing women enduring hurricanes, wildfires, and floods. However, this paper does not address individuals outside the gender binary; while their challenges are not the central focus, they merit further investigation. Significant environmentalist politician and former UN Secretary-General Ban Ki-moon states, "Saving our planet, lifting people out of poverty, advancing economic growth... These are the same fight. We must connect the dots between climate change, water scarcity, energy shortages, global health, food security, and women's empowerment. Solutions to one problem must be solutions for all" (McCloy, 2019). By setting aside our differences and having all genders, ethnicities, and backgrounds come together, this issue can be solved. This



article sheds light on the disproportionate impact of natural disasters on women, while also recognizing that the binary framework may not include the experiences of non-binary and trans individuals. By acknowledging the unique challenges faced by those outside the male/female binary, more inclusive research is needed in this field to promote a more comprehensive understanding of the different vulnerabilities and resilience strategies across gender identities. Climate change is an unrelenting force that will continue to worsen unless change occurs now. It is crucial to recognize and address the specific challenges faced by marginalized women in the wake of climate-induced natural disasters. By empowering women through education and leadership opportunities, we can work towards more inclusive and sustainable communities. When women are equipped with knowledge and leadership roles, they utilize social media to highlight environmental injustices and establish sustainable platforms. Additionally, women help advocate for environmental education, enhance disaster preparedness, and drive policy changes that prioritize sustainability and equity. Empowered women contribute to communities by bolstering their resilience and awareness, equipping them to address environmental challenges. This approach not only supports the resilience of women in the face of environmental challenges but also contributes to a better future for everyone. With concerted efforts, we can create a world where every woman, regardless of ethnicity and culture, can have a comfortable and prosperous life.

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