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Gender and Climate Change: Unequal Burdens and Unequal Perceptions

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Abstract

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By Maya Danielle Bornstein

Around the globe, gender norms create a toxic division between men and women, which impact women's access to resources, participation and independence. This is especially true in developing nations, where women feature prominently in the agricultural sector and play a critical role in providing nutrition to their families, lifting millions out of hunger. As our ecosystems suffer from degradation due to climate change, women are particularly susceptible to these changes because of gender roles and barriers. Developing nations that contribute the least to greenhouse gas emissions are often those that experience the greatest repercussions of global warming. In order to gain a better understanding of the association between climate change and gender in the context of development, this study uses a mixed-methods approach to question how and why the effects of global warming may impact women more than men, focusing on countries with a Human Development Index below 0.7. A series of semi-structured interviews with men and women from several developing nations were conducted in order to understand local perceptions regarding the connections between climate and gender. These results were complimented by a quantitative analysis using the Quality of Governance dataset, to determine the whether there was a connection between environmental vitality and different indicators reflecting women's rights. The study confirmed that there are connections between climate change degradation and women's rights, especially pertaining to women's political empowerment, educational attainment, and health outcomes. The results also suggest that men often overlook the disproportionate burden of climate changes on women. This research calls for equitable incorporation of women in policy regarding climate mitigation and adaptation, and a more intersectional approach moving forward in order to dismantle patriarchal systems which lead to oppression.

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INTRODUCTION

"Climate action is more than paperwork and negotiation jargon, it calls for the dismantling of patriarchy and its intersections with neoliberalism, militarism, and fundamentalism. We are seeing the effects of the patriarchy as it chokes the Paris ambition with dirty energy and toxic masculinity. We are not happy with the rise of global macho fascism. Time is up! Here are the demands heard around the world from feminists, as we demand that you respect our right to a safe, democratic, and healthy planet for all. ***We are here listening, and we are rising****."*
(Women's Environment and Development Organization Activist at COP 24)

The Women's Environment and Development Organization members are "listening and rising" because they see two devastating trends: 1) climate change is placing our earth in a state of crisis like never seen before and 2) women will bear the brunt of this crisis. Scientists and climate experts report that if global warming continues to progress, environmental disasters will ensue, with catastrophes such as food shortages, wildfires, nations beginning to drift underwater, and the death of the coral reefs (Pachauri and Reisinger 2007). These catastrophes will hit hardest among those who are responsible for producing food for their families – specifically, women (Terry 2009).

Until recently, the intersection of gender and climate was not recognized or emphasized. However, many women and gender activists have now come forward on an international level to expose the public to the essential connection between climate justice and gender justice, and to demand that women be represented in negotiations, mitigation and adaptation plans. These organizations emphasize that in many societies, social norms dictate that women be responsible for providing nutritional support to their families through food collection, production and preparation. It follows that since climate change impacts weather patterns, crops, and natural disasters, the consequences of these changes disproportionately impact women. Gender norms, prevalent on a global level, have for centuries led to unequal treatment of women and men (Gaard 2015).

My study investigates these claims using data and interviews to assess whether the burden of climate change disproportionately affects women compared to men, and if so, why and how. This paper sets out to address whether and how gender influences the impact of climate on individuals, specifically in developing countries. The results of this analysis will contribute to the emerging research and literature in this field. For the quantitative analyses, I used the Quality of Government Standard Dataset, a compilation of numerous datasets created with the intention of promoting research on the causes, consequences and nature of government structure and quality governance. I employed this dataset to analyze climate, gender equality measures, and development through linear regression fixed effects models.

To complement this statistical approach, I also conducted and coded twelve interviews with men and women from developing nations attending the UN Climate Change Conference, Conference of the Parties (COP) held in Katowice, Poland. Through these interviews, I explored the participants' perceptions regarding the relationship between gender and climate in their home countries. This mixed-methods approach aims to identify relevant connections between climate change and gender norms, and highlight themes related to how and why climate change has a gendered divide. Such research is imperative in order to ensure gender equity in the struggle to combat climate change. It may also identify areas of focus that may specifically help to ensure the well-being and future of women in developing nations.

LITERATURE REVIEW

In this chapter, I provide an overview of climate change to establish how this phenomenon is affecting developing countries in such a way that disproportionately affects women. I then discuss how eco-feminists situate these gender effects in relation to systemic gender inequality. This literature, drawn from previous studies, reports, and articles, provides

context as I begin to discern the links between gender dynamics and climate change, including the role of women in climate solutions and climate policy. This previous research aids in formulating my hypotheses, and pinpoints missing factors relevant to this topic that I will explore through my project.

Gender, Climate, and Development

Overview of Climate Change and Its Connection to Sociological Thought

Climate change is one of the most pressing issues of our time. This scientifically proven phenomenon describes the shifts in climate due to natural variability or human interference (United Nations Development Programme 2013). Global warming is a multi-dimensional problem whose causes and consequences are closely linked with sustainable development. Climate change not only impacts the earth's ecosystem, but also the global economy and social mobility as well. Global warming does not occur in a vacuum, but rather in the context of numerous other risks, including, but not limited to, economic liberalization, globalization, conflict, unpredictable government policies, and risks to health. Inequality and inequity among nations exacerbate the impact of climate change on vulnerable populations (Teller 2016).

Major contributors to the rise in global temperature are closely connected with the emission of greenhouse gasses. The greenhouse effect is a result of gases which absorb and re-emit solar energy that rises from the earth's surface, permitting the temperature to exceed what it would be if there were natural amounts of greenhouse gas in the atmosphere. Greenhouse gases are essential for life on earth, as without them the planet's temperature would average around -18 degrees Celsius (United Nations Development Programme 2013). However, due to hazardous human activities, such as the burning of fossil fuels and over-industrialization, the concentration of greenhouse gasses in the atmosphere has increased markedly, affecting the biophysical

systems crucial to maintaining various ecosystems (Anon n.d. 2019). The primary greenhouse gasses affecting the plant are carbon dioxide (CO_2), nitrous oxide (N_2O), and methane. Large portions of CO_2 and N_2O emissions stem from mass industrialization. CO_2 levels have steadily increased since the 1950's to rates higher than ever before in the history of the planet (Anon n.d. 2019). Through the carbon cycle, carbon circulates through the biosphere transforming its composition, and causes CO_2 to be discharged by humans. CO_2 is essential for plant life. Plants convert the CO_2 into oxygen through photosynthesis. The problem arises when humans produce large amounts of man-made CO_2, while simultaneously destroying forests and other valuable ecosystems that allow the carbon cycle to be successful in transforming CO_2 back to oxygen (United Nations Development Programme 2013). These disturbances to the earth's natural cycles have detrimental effects.

Climate change leads to rising sea-levels and shifts in agricultural production, posing imminent health risks and creating crises in the food-producing areas in which women predominate (Denton 2002; Eastin 2018). For instance, changes in the temperature greatly change farming patterns, which affect people's livelihoods, especially in rural and developing areas. Due to weather inconsistency, crop yields are declining (Arora-Jonsson 2011). Drastic droughts and flash floods occur, which can result in food and water insecurity (Arora-Jonsson 2011; Gender and Alliance 2016). These extreme weather conditions, brought about by climate change, are linked with health concerns. Mortality rates have increased in the recent years due to natural disasters and exposure to heat, flooding, and wildfire (Nelson et al. 2002). Hunger and food security also pose a threat, with unpredictable crop yields. The decrease in water availability has led to vector- and water-borne diseases from various contaminants.

Environmental sociology emerged alongside the New Ecological Paradigm during the 1960's, as a response to the loss of ecosystems and nonhuman species due to industrialization and urbanization in the global North (Pellow & Brehm, 2013). Several key theories define the field of environmental sociology. These include a focus on the inseparability of human and nonhuman natures, and the attention to the roles that power and social inequity play in shaping human interactions with the ecosystem (Pellow & Brehm 2013). Foundational sociology thinkers, such as Karl Marx and Max Weber, developed a theory focused on inequalities in our societies. Their work has been reexamined through an ecological lens, which reveals that Marx's and Weber's writings support environmental sociology, as they focus on the problems of inequality, power dynamics, and modernity that are primarily embodied through capitalism and statecraft economies (Gibson 2009, Foster 1999, Foster & Holleman 2012). Marx's and Weber's writings underscore the power of nation-states, corporations, and bureaucracies exert influence over nature (Marx 1974, 1976; Weber 1930, 1988). Thus, the connection between the inseparability of humanity and the nonhuman world is intrinsically shaped by power structures (Pellow & Brehm 2013). Humans often believe that they have power over nature, or are entitled to land and animals, which often results in destructive treatment of ecosystems for wealth and greed (Pellow & Brehm 2014). Sociological research shows that climate change impacts communities differently, although those faced with systemic structures of oppression are more vulnerable to the threats that climate change poses (Terry 2009).

EcoFeminism

Ecofeminism, a term coined in the 1970's by Francoise d'Eaubonne, draws upon the concept of gender to theorize on the connection between humans and nature (Besthorn & McMillen 2002). The ideology sanctions oppressions such as those based on race, gender, class,

and sexuality. Some academics believe that ecofeminism is the forefront of the third wave of feminist theory. Climate justice is an entry point for gender justice (Hemmati & Röhr 2009). Ecofeminism believes that nonhuman nature and dominionism (domination over nature) are feminist concerns (Hauser & Warren 1997). There is a need for a more intersectional approach in the context of both development and climate reform, as women around the world have vastly different experiences. It is crucial to take into account how class, race, ethnicity, disability, sexuality, religion and culture all impact women's experiences with climate change (Gaard 1993).

Feminist analyses are especially well positioned to address structural inequalities in the climate disasters, and to reveal the gendered character of the global North's overconsumption and the patriarchal hierarchies that are often entangled with development practices (Gaard 2015). In particular, eco-feminists propose that the systemic structure of gender oppression is key to understanding women's greater burden in relation to climate change and other environmental issues. According to eco-feminists, women are marginalized and not included in development process because of gender-biases (Binion 1995). Gendered behavior is enforced through gendered socialization and can pose a threat to achieving gender equality. Gender equality is when women and men and boys and girls are all represented, and all have access without barriers to equal rights, responsibilities, and opportunities (Kennelly, Merz, & Lorber 2001). A gendered approach to issues such as climate change is necessary, as it provides a theoretical and methodological instrument to analyze power dynamics and gender relations in order to propose more equitable solutions (Binion 1995). Two fundamental components which are critical to development, especially with regard to gender, include: 1. The removal of social, cultural, and political barriers that have been placed in front of women and other disadvantaged minority

groups and 2. The careful pursuit of environmental, economic, and social sustainability (Horton 2015).

There is growing evidence that climate change disproportionately impacts women, especially those living in developing nations (Eastin 2018; Gaard 2015; Terry 2009). In the global North, men tend to pollute more than women, and the effects of this pollution are experienced more in developing nations. Women in the global South are also affected by climate change more than men in those countries (Arora-Jonsson 2011). Despite producing the majority of the world's food, women and children still comprise the majority of the world's hungry and impoverished (Gaard 2015). In Africa alone, women comprise almost 80 percent of the agricultural sector. However, 70 percent of the 1.3 billion people living below the poverty threshold in the developing world are women (Denton 2002). Women, food security, and climate change are intrinsically connected. Food price fluctuation and the impacts of climate change are aggravating the problems faced by impoverished women. Due to gender-blindness and the sidelining of the importance of gender discrepancies, the global community often overlooks gender-based climate impacts. This neglect can lead to further climate degradation (Broeckhoven & Cliquet 2015).

Gender Discrepancies in Climate Outcomes

Men and women experience climate degradation differently, and have varying capacities to cope with these issues because of persistent inequalities, cultural norms, pervasive discrimination, women's limited access and control over natural resources, and restricted rights (Broeckhoven 2014). Rural women in developing nations are often heavily dependent on natural resources for their livelihoods. Global warming harms crop production, as it changes harvest patterns and causes detrimental weather conditions. Without these crops, women in rural

communities, who are dependent on cash cropping or plantations (Nelson et al. 2002), struggle to find a source of income and to care for themselves and their families. Though women contribute the most to the agricultural field, they often lack rights to the land (Terry 2009). Women have less equitable access to land and other natural resources as compared to men (Enarson 2000). Development policy still has gaps pertaining to the structural constraints that create barriers to women's ability to control and own resources. Moreover, there has not been a means to ensure that women's proficiency in land or resource management is acknowledged, or that their efforts fairly compensated, through ownership of said land or resource (Denton 2002).

Due to structured gendered norms, women are responsible for collecting food, fuel, and water for their families. When experiencing inclement climate such as droughts and flash floods, women must walk far distances to obtain clean water and firewood, which takes time away from their education and livelihood. Without an education, it is difficult to break the cycle of poverty that these women face. The water that some women walk days to secure can be contaminated and lead to the spread of waterborne illness such as dysentery, diarrhea, and cholera (Denton 2002).

It is primarily women who collect and use the main fuel sources in developing countries, and who bear the brunt of fuel poverty in these nations (Terry 2009). Almost half of the world's population relies on solid fuels such as biomass (wood, charcoal, agricultural residues, and animal feces) and coal for household energy. In certain countries, such as Nepal, Uganda, and Tanzania, wood-fuels comprise 80 per cent of the total energy used (Anon n.d. 2006). Often, these fuels are burned in inefficient open fires and stoves with inadequate ventilation that leads to premature deaths, forest degradation, loss of biodiversity, and climate change (Anenberg et al. 2013). These practices also hinder social and economic progress as women and children spend

hours every day collecting fuel. In 2010, household air pollution was responsible for around 3.9 million premature deaths and 4.8% of lost health life years, making it one of the highest environmental risk factors examined globally (Smith et al. 2014). As the cooks and the fuel collectors, the related indoor pollution causes women to experience higher rates of respiratory complications stemming from traditional fuels (Anenberg et al. 2013).

Climate change itself also poses serious health threats to women. During extreme weather events such as heat waves, storms, wildfires and flash floods, women's mortality rates are higher than that of their male counterparts. (Arora-Jonsson 2011; Terry 2009; Enarson 2000) These higher death tolls are connected to women's socio-economic status, as well as gender norms that dictate acceptable proper behaviors (e.g. not learning how to swim, not going out alone) (World Health Organization 2010). In most developing nations, women are primarily responsible for feeding their families. As climate change worsens, crop yield and clean water availability become more unpredictable. Due to the lack of access to food and water, women and their offspring may face malnutrition (Gaard 2015; Gender and Alliance 2016)

Gender also affects the impact of climate change on mental health. Women are at higher risk for exposure to climate-related mental health concerns. Specifically, stress, depression, and in extreme situations, suicide, can occur because of climate-related disasters (Gender and Alliance 2016). Though mental health challenges tend to be more frequent in both men and women after natural disasters, women are often more susceptible to the onset of stress-related disorders and depression (Gender and Alliance 2016), whereas men are disproportionately more likely to commit suicide (Gender and Alliance 2016). During natural disasters, women are more likely to be excluded from decision making regarding evacuation and shelter. Shelters that lack facilities for women increase the risk of assault. Moreover, after climate disasters, incidents of

gender-based violence increase (Gender and Alliance 2016). Conflict over natural resources leads to safety risks, especially in countries that use rape as a weapon for power (Nelson et al. 2002).

Climate change also impacts women's reproductive and maternal health from family planning to pregnancy outcomes (Hardee 2009). The family planning needs of over 200 million women worldwide remain unmet. This stems from the lack of contraceptives, and an increase in unplanned pregnancies. As the population grows, so do hazardous emissions and resources consumption. It is imperative to strengthen voluntary family planning programs, along with educational and livelihood programs, in order to protect women (Hardee 2009). Pregnancies under dangerous climate conditions can lead to an increased risk of infectious diseases and stress, and increased likelihood of fevers, which can lead to preterm delivery and other serious complications (Gender and Alliance 2016). To mitigate the detrimental health effects of climate change, it is crucial to consider the implications for such changes on the well-being of women.

In many nations around the world, including those developed and developing, women are not equally represented in government and policy. As shown in the above examples, women are unequivocally experiencing the effects of climate change. However, because of systemic sexism and climate constraints, many women in these nations are unable to obtain the same education as their male counterparts (Denton 2002; McCright 2010). Without an education, it is nearly impossible to enter policy work, especially when women are chronically underrepresented in government (Hemmati & Röhr 2009). Therefore, feminists find it frustrating to see that the populations impacted the most by climate change have the least political influence over climate policy and countrywide practices.

Women's Involvement in Climate Solutions

There exists an urgent need to integrate gender analysis into climate policy (Broeckhoven 2014). Fortunately, in some places, women have tools and adaption to mitigate climate change, and are actively involved in pursuing environmentally sustainable solutions (Broeckhoven 2014; United Nations Development Programme 2013). The world's primary farmers are women, and they are most sustainable consumers. They tend to be kinder to the earth than men, and are essential in combating global warming (Hardee 2009).

The Women's Biodiversity Network (IWBN) highlights the specific relationship between indigenous women and biodiversity. IWBN, along with the Women's Environment and Development Organization (WEDO), and the Women's Caucus, have been pivotal in ensuring that women, especially rural and indigenous women, are included in policy decisions, and that their connection to the land is recognized (Broeckhoven 2014). Women's organizations worldwide, but especially in low-income nations, help to protect the environment. Women actively participate in the agricultural sphere, and their dependence on biomass energy make them pivotal stakeholders in effective environmental management (Denton 2002).

More women than men work in the informal sector and in small enterprises - sectors that contribute the least to pollution and other harmful energy consumption (Nelson et al. 2002). Therefore, women's livelihoods are closely interconnected with the state of the environment (Denton 2002). For example, a collective of 5,000 women in over 75 villages in the Andhra Pradesh region in India are working towards a chemical free, non-irrigated, organic agricultural solution as a response to global warming. Such examples can be found all over the world, from Bolivia to Nepal to Kenya and beyond (Hardee 2009). Therefore, it would be detrimental to combating climate change if women's contributions are ignored (Denton 2002).

Women exhibit more concern than do men about local environmental problems, especially those which pose public health and safety risks to community members (McCright 2010). Gender norms help to decode gender-related reactions to climate. For example, in gendered family roles, mothers are expected to care for their children, including their health, food and environment; whereas, men are assumed to provide material wealth and well-being for the family. Aaron McCright (2010) analyzes the effects of gender on climate change knowledge and concern using Gallup polls. McCright's findings suggest that women have greater scientific knowledge about climate science than men. Women also tend to express greater concern about climate change than men do. Yet, though women demonstrate greater comprehension and apprehension, they typically underestimate their climate change understanding as compared to men. Gender, political ideology, party affiliation, educational attainment, age, and race all affect the climate knowledge index score, which stresses the need for intersectional approaches (McCright 2010). Gender differences regarding environmental concerns accentuates the effects of the social roles that men and women are expected to perform in society (McCright 2010; Gaard 2015).

Climate Policy and Gender

Climate change policy has been a slow and arduous process (Hemmati & Röhr 2009). Most of the time, women are underrepresented in the climate policy decision making processes. For instance, as of 2011, in the European Union, women make up only 26% of individuals in high level governmental positions responsible for energy, transportation and environmental policymaking (Gender and Alliance 2016). Only 12% of federal environment ministries globally are headed by women, as reported in 2015 (Gender and Alliance 2016). Since 2015, at the World Energy Council, only 4% of chairs and 18% of secretaries are female (Gender and Alliance

2016). At the UNFCCC COP 24 meeting in 2018, only 37% of official government delegates were female (Anon n.d. 2018). While gender is becoming a more prominent focus at the COP meeting, there is not a proportionate number of women serving as decision makers. Although countries in the global North tend to be closer to incorporating gender equity into their policy and delegations, there is variation among countries in the global South. For instance, several countries in Latin America are generally close to gender parity, while countries in the Middle East and North Africa are the furthest from it. That being said, incorporating gender into policy has improved over the years (Gender and Alliance 2016).

The United Nation's Framework Convention on Climate Change (UNFCCC) hosted the first ever international climate-based response in 1992 in Rio de Janeiro, Brazil. This meeting completely lacked a gender-based perspective (Hemmati & Röhr 2009). Three years later, the UNFCCC established the Conference of Parties (COP), that takes place yearly for global leaders to meet, discuss, and ideally agree upon climate policy. At the first COP in Berlin in 1995, 200 women from 25 countries attended. The international community presented global warming as a gender-neutral issue (Hemmati & Röhr 2009). In 1997 at the COP 3, the Kyoto Protocol became the first world-wide ratified climate agreement. The protocol contains three market-based mitigation mechanisms; carbon emissions trading, the clean development mechanism (CDM), and joint implementation (Terry 2009; Denton 2002). However, this revolutionary accord failed to mention gender.

At the sixth COP, the topic of gender equality in delegation representation finally arose through a side event about the power of feminine values in climate change. Though a significant start to opening a gender dialogue, it was not until the following year at COP 7 in Marrakech that the first official mention of women in the resolution became implemented. Decision

FCCC/CP/2001/13/add.4 called for more nominations of women to UNFCCC and Kyoto Protocol bodies (UN Report). After this decision, women's groups became increasingly involved in attending the negotiations. At the twelfth COP held in Kenya, conversations began to connect the link between women and the role of developing nations in climate mitigation and vulnerability. A major development that occurred the following year, at COP 13 held in Bali, included the creation of the GenderCC, a worldwide network of women committed to climate justice.

Several years later, the renowned Paris Agreement was created in 2015, at COP 21. The Paris Agreement focused on capping global temperature increases to two degrees Celsius, strengthening the ability of developing countries to manage climate change related impacts, and reducing greenhouse gas emissions. Originally, 197 countries committed to ratify the agreement, binding themselves to climate progress. The Paris Accord mentions gender only three times, first in the preamble:

> "Acknowledging that climate change is a common concern of humankind, Parties should, when taking action to address climate change, respect, promote and consider their respective obligations on human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities and people in vulnerable situations and the right to development, as well as **gender equality**, empowerment of women and intergenerational equity" (Paris Agreement, Preamble)

Gender is portrayed through a human rights lens. In Article 7, concerning adaptation, the Paris Agreement calls for a "gender-responsive" approach, that both men and women should be involved in adaptation planning (Article 7). Lastly, gender is mentioned once more in Article 11's focus on capacity building. The declaration states that capacity-building should be country-driven and an "effective, iterative process that is participatory, cross-cutting and gender-responsive" (Article 11). Thus, at last, worldwide policy is beginning to mention gender; although there is still progress to be made.

Slowly, change on an international level is starting to occur. Yet, on a local level, many of the women that are most affected by climate are not represented in their countries' governments. Therefore, it is incredibly difficult to change local climate policy without holistic representation (Terry 2009). Even with the new international focus on gender in recent years, change will not begin until these plans and agreements are enforced and implemented on the local levels. Without this implementation, the state of climate and inequity will continue to worsen (Larson et al. 2018).

In 2016, the Lima Work Programme on Gender was established. It outlined a two-year plan committed to increasing the participation of women in climate negotiations at national and global levels. This plan continues to seek to, "achieve and sustain the full, equal and meaningful participation of women in the UNFCCC process" (Lima Agreement). Party Members created the Gender Action Plan (GAP) at COP 23, in 2017. (United Nations Development Programme 2013). The GAP emphasizes the importance of considering gender throughout the climate negotiation process, as well as working towards having equal representation of male and female delegates (GAP). The newest gender-focused legislature is set to be implemented in 2019. As the GAP is very recent, and the Lima Plan is still under consideration and review, there is almost no published literature on the impact of the incorporation of gender on climate policies.

Present Study

Worldwide, there is a history of repressive gender norms that have led to patriarchal societies filled with toxic masculinity that hold women back. Though there have been great leaps forward related to gender equality, there is still much progress to be made. When examining most social services and social spheres, it is critical to acknowledge gender in order to ensure a more equitable future. This is easily applied to creating sustainable climate solutions. If the climate continues to worsen, more people will be hurt physically, financially, emotionally, and

socially. The importance of gender responsiveness and its positive effects when well implemented has been demonstrated in several studies. They also show the negative outcomes when it is ignored (Arora-Jonsson 2011; Broeckhoven 2015; Brunce & Ford 2015; Enarson 2000; Smyth 2009; Terry 2009). Gender-based responses will continue to be a pivotal consideration while moving forward with research on gender equity and climate change.

This study aims to address gaps in literature through a mixed-methods approach. Due to how quickly climate is changing and knowledge in this area is expanding, this paper hopes to provide additional context of the current relationship between climate and gender. Previous studies have mainly focused on regional examples of the interaction between climate and gender on a global scale, without much empirical evidence. This paper is unique because it combines qualitative interviews conducted with individuals throughout the global South, with a larger quantitative analysis of a dataset. This approach allows us to see if global perceptions vary from the previous literature and the correlations found from the regression models. The perceptions expressed in the interviews are unique, because they are collected from individuals in the environmental sphere who also live in countries which are heavily impacted by climate change. This study strives to further research on gender and climate for the pursuit of knowledge, as well as to highlight power dynamics that could impact how we approach climate solutions.

Hypotheses

Based on the literature review, evidence shows a connection between environmental degradation and an increased burden on women. Specifically, in regards to my study, my hypotheses include:

H1: The data analyzed from the Quality of Government dataset will demonstrate that the burden of climate change will disproportionately affect women in developing nations over men, as

reflected in different dimensions of gender equity including social rights, economic mobility, political empowerment, school attendance, and health access.

H2: Individuals committed to and involved in climate policy will perceive that climate change will have a greater impact on the daily lives of women than men.

Previous studies have focused on some of the variables included in this study. However, most other studies have analyzed each variable independently, instead of all together. My study will look at all the dependent variables together to determine whether gender equity is related to some dimensions, but not others. The mixed-method analysis will allow me to uniquely compare the results from each component to see if there are discrepancies between perceptions and data.

METHODS

Qualitative Analysis

Data collection

In order to better understand how citizens perceive the impact of climate change on gender dynamics in developing nations, I conducted twelve interviews with men and women from developing nations with a background in climate policy or advocacy. The interviews were mainly carried out at the UN Conference of Parties 24 in Katowice, Poland, although one interview took place at the National Institutes of Health (NIH) in Bethesda, MD. The respondents were from several different regions around the world. The countries of origin included Burkina Faso, Cameroon, Kenya, Bangladesh, India, Brazil, Mexico, and Peru. The interviews were conducted during the month of December 2018. A prepared pre-determined list of questions which addressed gender roles in agriculture, climate change, and environmental

policy can be found in Appendix A. The Institutional Review Board of Emory University approved this study.

Potential respondents were identified using a purposive or judgement sampling approach, (Bernard, 2017) in order to find participants whose views would provide rich data to address questions about climate change and gender in developing countries. In particular, the sampling design identified a site (a climate change conference) and specific respondents who were able to describe the way in which cultural gender structures might specifically impact the experience of women as a result of climate change. To align with the scope of the project, every respondent was from a country designated as a "developing nation".

In order to identify potential respondents, I researched the gender-related events that would be occurring at the conference, and the prominent delegates who would be in attendance. Interviews were established with a combination of pre-set appointment times and spontaneous impromptu meetings. All twelve interviews were audio recorded, either on a hand-held recorder or on the primary investigator's laptop, with the consent of each participant. Each interviews was then transcribed. Occasional notes were taken during the interviews to document observations about tone and other non-verbal cues.

I administered semi-structured interviews, as this format allow researchers to capture underlying causes or drivers that can be further explored (Mertz et al. 2009). My interviews consisted of a set of pre-determined questions that fostered discussion and flexibility. This allowed me to tailor each conversation towards meeting the research objective. During the interview, I utilized the "uh-huh probe" to encourage informants to continue with their narrative. This technique can lengthen informant responses and provide additional data (Bernard, 2017).

The interview guide provided more reliable, comparable qualitative data while speaking to respondents in this study.

I opened each interview with two questions focusing on participant demographics; country and gender identity. Then, I posed a series of questions regarding the agricultural production in the subject's home country and the gender roles involved in agricultural labor. Additionally, I asked questions about the impact of climate change on the participants' specific nation and how they thought this impacted both men and women. Lastly, I posed a set of questions addressing who was in charge of creating climate policy, and the extent of representation of women in government and policy making.

I submitted the project to the Institutional Review Board at Emory University on October 14th, 2018 for approval to ensure and protect the privacy of informants. The study received approval and an exemption on November 29th, 2018. Each of the subjects interviewed provided signed consent, and the only identifiers used were gender and country. All names used in the study were changed to protect the participants' identities, and the interview transcriptions were stored in a locked device. The interviews were completely voluntary, and the respondents were informed that at any time they could skip a question or end the interview. All respondents were given the contact information of both the researcher and the advisor in case of questions or concerns, as well as a copy of the consent form.

Data analysis

After all the interviews were completed, I transcribed the recordings using a computer. The interview scripts were then read through and coded. First, the number of times words associated with females (such as woman, women, girl, etc.) and words associated with men were used were counted. The interview questions were then used as a reference guide to conduct

deductive coding (Ezzy 2013), because the guide had different sections of questions about the agricultural sector, climate change impacts, and gender roles in politics. Next, I examined the data line by line to create categories for ideas that emerged. These categories were employed to deduce seven major themes prevalent throughout the interviews. The most prevalent themes identified included the ways in which women are affected by climate, oversight in women's roles by men, female political representation, political inclinations of females, major agricultural crops grown, observations on climate change, and the urban versus rural divide.

Quantitative Analysis

Data

The quantitative section of this study uses the Quality of Government Standard dataset from 2018. This representative dataset allows me to generalize from a sample to the population of my countries of interest, because it is based on random sampling. The large sample size helps me answer questions more completely, reduces the margin of error, and increases confidence levels and data accuracy. The Quality of Government Institute was founded in 2004 by Professor Bo Rothstein and Professor Soren Holmberg at the University of Gothenburg in Sweden. The goals of this dataset are to help analyze and compare governments across the globe. The Quality of Government Dataset consists of approximately 2,100 variables from more than 100 different data sources. Many of these different sources publish data over varying time intervals. The dataset is available in both cross-sectional and standard time-series versions. In the cross-sectional version, data from and around 2015 is included. There are 19 thematic categorizations of the variables. This dataset was chosen for this research because it contained the most comprehensive set of countries and variables that related to climate change, gender, and development publicly available (Quality of Government 2018). The variables chosen were based

on the previous literature on the subject and how they reflected women's social rights, political empowerment, educational attainment, and health indicators, that connected with themes in the interview guide.

Measures

Dependent Variables

The unit of analysis is the country, with the dependent variable, gender equity, operationalized with six composite measures: The first measure is women's social rights, measured on a scale of 0 to 3 (see Appendix B). It includes components including: the rights to equal inheritance, marriage on a basis of equality with men, education, and to own, acquire and retain property. The second dependent variable is women's economic rights, also evaluated on a scale of 0 to 3 (see Appendix C). The economic rights include factors like equal pay for equal work, free choice of employment, equality in hiring practices, and freedom from sexual harassment in the workplace. The third dependent variable is the Women Political Empowerment Index. This index aims to determine the political empowerment of women. The index is created by compiling the average of the women's civil liberties index, women's civil society participation index, and women's political participation index. The next and fourth variable evaluates the educational attainment of females between the ages of 15 to 24, and is measured by the average years of education documented each year. The fifth variable is the lifetime risk of maternal death which is the probability that a 15-year-old female will eventually die due to pregnancy and childbirth, assuming current levels of fertility and mortality. The last dependent variable is fertility rates. The total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years, and bear children in accordance with age-specific fertility rates of the specified year.

Independent Variable and Controls

My main independent variable is climate change impact, which is operationalized as the Environmental Performance Index (EPI). This index is created from two other indexes: Environmental Health and Ecosystem Vitality, measured as the gross domestic product divided by midyear population. My models also include three control variables. GDP data are in current U.S. dollars. The second control, population density, is midyear population divided by land area in square kilometers. The last control variable is a tenfold politico-geographic classification of world regions, based on a mixture of two considerations: geographical proximity and demarcation by area specialists having contributed to a regional understanding of democratization (see Appendix D).

For the purpose of this research, I chose to define developing nations as countries that have a HDI score of under 0.7. Countries included in the analysis are listed in Appendix E. The United Nations Human Development Programme ranks the HDI scores into four main categories of development; very high, high, medium, and low (Anon n.d.). As this study aims to focus on developing nations, the I coded the data to look specifically at the two lower categories. Any country with a HDI lower than 0.7 is considered in the "medium" category with respect to human development, and those with a score of less than 0.55 are classified as having "low" human development.

After identifying the countries to include based upon HDI scores, I examined the years where all of my variables overlapped, and found that the most recent year is in 2007. It was important to have the same number of observations in each model, so that I could better compare the results. In order to achieve this, I created a filter as to not delete any data. The filter analyzes

the variables when they overlapped in the year 2007 and had a human development index (HDI) below 0.7, without erasing any observations.

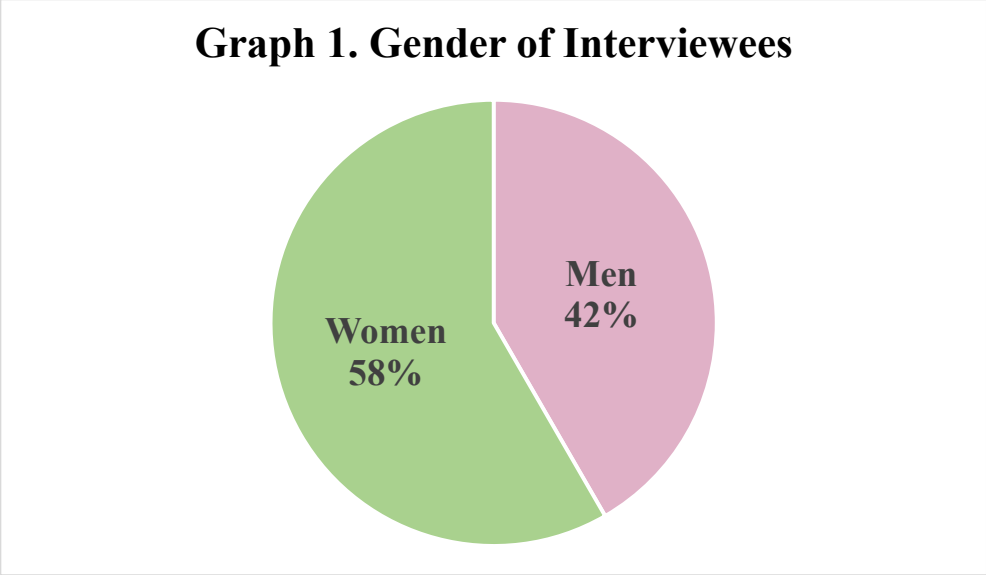
Without the filter, there were 15,192 observations of the variables throughout the entire dataset. With the filter applied, there were 83 observations which overlapped in 2007, in countries with a HDI under 0.7. These 83 observations were used throughout the analysis as the sample size. Then, the continuous variables were summarized, and the categorical variables were tabulated under the filter to find summary statistics for each variable. The summary statistics showed the mean, standard deviation, minimum, maximum, and total number of observations for each variable in the study. Next, simple linear regressions were run between each dependent variable and the independent variable, the Environmental Performance Index, controlling for GDP, population density, and region. Regression analysis is a powerful statistical method used to examine the relationship between two or more variables of interest. I ran six OLS regressions between each dependent variable and the independent variable (Appendix F). Then, I ran a multivariate regression, where I accumulated the variables to test if coefficients differed across models (Appendix G). These OLS regressions reflected any correlations between the gender equity variables and the EPI. The OLS regressions were also run with the filter on, in order to better compare each model. Once the OLS regressions were completed, I ran a multivariate regression test between each variable to see if there was significance between variables. Then, to determine whether there was overall collective significance across models, I ran a multivariate regression that accumulated all of the variables to test all of the sets of coefficients null hypotheses at the same time.

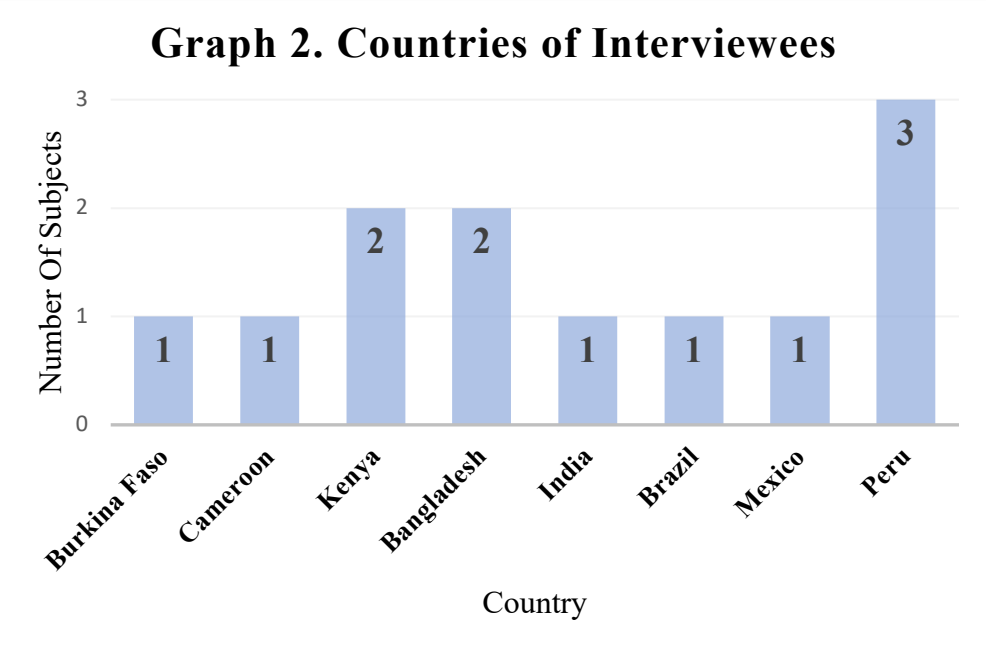
RESULTS

Qualitative Findings

Participant demographics

There was a fairly even gender balance among the twelve respondents whom I interviewed in person. Seven of the subjects (58%) identified as female and five (42%) identified as male.





Crops and climate change

After a brief introduction regarding the research and the participants' background, the preliminary questions focused on agricultural production in the respondent's home country. Some respondents were more familiar with this subject than others. Almost all of the respondents reported that multiple primary crops were grown in their country. There were some specific crops that were more central to a regions' history or culture, such as the large-scale production of corn in Mexico or the production of cassava, a tuber, found in the Amazons of Brazil. However, eleven of the twelve participants reported that a diverse range of crops could be found in their nations. The crops mentioned most often included rice, maize, beans, vegetables, cereals, coffee, tea, and sugar. Andrea, a woman from Peru, explained to me that:

> There is (a custom that) indigenous people do, the diversified crop. It is not only one product, but they do a lot of things in one crop. In that there are some seeds that will produce for their clothes, cocona, cotton, satcha batcha.

The three Peruvian delegates also explained that diversification of crops is better for the land, and, in the words of Diego, a Peruvian male, "it is the most important element for agriculture to be sustainable." Respondents shared that other primary crops grown in their countries include, but are not limited to, kale, spinach, flowers, tomatoes, potatoes, wheat, soy, yuca, peanuts, cocona, plantains, cotton, and acai.

The study subjects were also asked how climate change was negatively affecting their country. The most common answers to this question that both men and women experienced was an increase in unusual weather patterns, which manifested in hazardous storms and droughts. Although droughts and floods might appear to be opposites, the two often were connected. Shamim, a male delegate from Bangladesh explained that:

> the North zone, it is being impacted by drought and at the same time, I am talking about the same time, even at the same day, the south is becoming more affected by cyclone or flood. It is complex and it varies on zone to zone. It is affecting on our varieties of course on production system as a whole.

Similar stories were told in completely different regions of the world. For instance, Jose, a male from Mexico, answered:

> I feel like there are like many hurricanes that are also happening… and droughts as well. Water scarcity is a big issue. Like mainly like within the agricultural sector because they have this, uh, reservoirs so like agriculturers want to keep water. But it's also kind of really risky to keep so much water because dams can fail as well. So, it can be like a big disaster, but on the other hand, there are like many droughts as well… So you'll have either like too much rain or too much drought as well.

Many of the subjects agreed that these new unpredictable weather patterns had harmful implications to their countries. Not only did the storms and floods harm crops, but their repercussions led to economic and health complications too. Importantly, the impacts of climate change were not new to these countries, but rather residents had been facing these challenges for years, if not decades, and many respondents talked about the ways that people have learned to adapt and to address these issues.

Urban versus rural divide

I found that throughout the interviews differences existed between the ways in which urban and rural communities faced climate change in the respondents' home countries. When speaking about gendered impacts of climate change, all 12 respondents brought up how the experience differed between rural and urban communities. Participants such as Awa, a female from Burkina Faso, expressed this as follows:

> It impacts everywhere. But the worst is in rural areas because they have to go the farthest to take water from the rivers. Sometimes, our government try to build wells for communities, but there is still problems because it is not enough. They are doing what they can, but the populations still have to go far to get to water.

As previously discussed, many interviewees explained that women are expected to collect water. An example of how women's responsibilities are impacted differently by climate change in urban and rural settings is food preparation. It is different cooking with water from a faucet in the city, versus water miles away from a well in the more rural areas.

Agricultural production, which interviewees said mainly occurred in more rural areas with lots of open land, still impacts the urban metropolises. Christian, a male from Cameroon, explains that

> in most urban areas, um, they get what is grown in rural areas. That is the thing, what is cultured there, is served in the urban areas. So, that impacts the economy of the country and the way people live in general… If you don't have rain on time, or if you have high temperatures with smaller amount of water during the year, of course, many agriculture, you won't have the production that is expected. And if you don't have the production that is expected that will impact families, it will impact the economy of the country and that has been the case.

Respondents expressed that men and women experience climate change differently in the city versus the rural areas; yet, the affects ultimately end up negatively impacting everyone. While the impact is greatest on rural women and those from indigenous communities, the negative impacts seen by farmers reverberate to the urban areas too.

Other interviewees further emphasized the urban and rural divide regarding gender constraints. In the words of Gabriela,

> There's definitely different roles that men and women play in these urban areas. We see that women have to go after water, you know, drinking water for them, for their kids. So that's a big challenge. Uh, we definitely see that they are more, um, responsible for providing food. So food insecurities is very large in these areas, it's severe, which means that like people spend a day without eating, you know, our kids sometimes spend an entire day without eating. So it's concentrated in houses that are of a single parent, so usually like single moms, and they have less resources to go after food, after the basic needs

Furthermore, several respondents, such as Veronica from Peru, talked about men leaving the rural areas to get jobs in the city. This enabled the men to send money back home and provide

monetarily for their families. However, interviewees added, when this occurred, more of the burden was placed on women. Not only were they responsible for the family and child rearing, but also for crop production and overseeing the land, and they were often left to deal with the burden of natural disasters alone.

Climate affecting women

Overall the terms women/woman/girl/female appeared a total of 188 times throughout the interview transcriptions, whereas men/man/boy/male was referenced to 59 times. The interviews revealed that women's health, education, and social rights are heavily affected by global warming.

In terms of health, several women described how in their cultures, females are responsible for getting water for both food and sanitation purposes. They explained that the process of obtaining water in rural areas experiencing drought can entail days of travel. Therefore, the subjects believed that lack of water can lead to malnutrition, water borne disease, and poor sanitation. Diego, a Peruvian male, also explained that with changing weather patterns, tropical diseases, such as Dengue fever, can spread from migrating mosquitos. Barsha, described how current gender norms in Bangladesh exacerbate the impacts of climate change on women:

> There are other issues, climate induced disaster when those come there are issues of waterborne diseases. The issues of sexual and reproductive health rights for women and I mean also they have to work a long, I mean, compared to men, they actually, they have the care work for the family. They also have to collect water from a far distance, especially in the coastal belt. We have a huge salinity in water. So there are lots of other issues. So definitely woman, uh, disabled people and the oldest people, they are being affected very negatively compared to other counterparts because of all these kind of gender relations are so they are affected more and becoming more vulnerable.

Many other respondents agreed that climate affected women more than men because of the societal expectations of women. These expectations ranged from women's responsibilities to cook, work in the fields, to wifely duties. Many participants, especially the female respondents, believed that natural disaster negatively impacted the health of everyone, but women were the ones who were expected to deal with the well-being of their families, animals, and crops.

The research findings show that the interviewees believe that lack of water directly impacts one's ability to provide food for the family, grow crops, and display hygienic practices, but, in addition, it indirectly affects girls' access to education. When the females are expected to fetch water for their family, this can mean that days are spent searching for water instead of learning in school. When there is not enough water, respondents reported that people in their countries are forced to move and become more nomadic, this also makes it more difficult to attend school regularly. Rahul explains how collecting fuel and water in climate-degraded areas impacts women's education in India:

> (In) India still today, women still go out to collect firewood, to collect water, in the rural areas. With deforestation and with climate change, the water is being moved further and further away because the streams are drying up. The forests are being cut off at a rapid pace. So, they have to go further into the forest to cut, which means girls are also being used, they are pulled out of school once they start getting their period, the menstruation then they move them with the other women who go and collect the rain from the forest or into the streams to do that. So, unless there is access to clean drinking water, or access to energy fuel, for cooking it's going to impact education at a very drastic level.

Several respondents brought up the importance of education, and how access to schooling is taken away from women.

Many women are already disadvantaged in their home country; therefore, climate change exacerbates this inequity. Awa points out that many women in the global South are "structurally poor". Working in agriculture and preparing food are activities that many women in Burkina

Faso use to generate income. These practices, according to Awa are empowering and climate degradation can place these women in jeopardy. On the other side of the globe, Barsha, from Bangladesh explains the ways structural inequality holds women back, and how these effects are worsened by climate variability, explaining:

> due to the social and religious belief of the peoples and that the societal is not favorable to the woman for many reasons. I mean women's mobility are less, woman's access to decision making is restricted and very limited. And women are a very small scale-holders in any kind of farm, and most of the time they don't get the equal wage or equal payment compared to the men.

My respondents also reported that although women work with the land and take on the majority of the burden of crop production, women often don't have rights to the land they work on. Sharon, a woman from Kenya, explained to me that:

> The land comes through inheritance from the man's side. The men also engage. But you see men also, um, especially the rural areas, they're not many men that stay there because they are working in urban areas and coming over the weekends. So that's what tips the balance in terms of the proportion to which women are engaged in crop farming.

I heard this same scenario from many other interviewees, who stated that women are not the inheritors of land, property, or money. Not only are women often unable to own land in many of the countries represented, they can be used as bargaining chips to gain more land or animals. Faith, another Kenyan woman explains that because of climate change:

> Animals are dying faster, so the girls are married off younger so that the father can get more animals, because that is their definition of self-worth, the number of animals they have."

From the interviews, I found that respondents perceive that climate change impacts women's social, cultural, and economic mobility. Especially the women whom I interviewed drew upon their insights and personal experiences related to the inequity experienced across gender lines when tackling climate-related tasks.

Oversight in women's roles by men

An unexpected finding that emerged from the interviews was how perceptions differed on the how climate impacted gender based on the gender of the interview respondents. Every male, with the exception of Rahul, spoke mainly about how climate change impacted both men and women. In contrast, in their interviews, every woman gave concrete examples of expectations that are often imposed solely upon women, such as providing family nutrition, engaging in field work, and even combating domestic violence. For example, as I interviewed the couple Basha (female) and Shamim (male) from Bangladesh together an interesting dynamic arose. When I asked them both about the ways in which climate change impacts specific groups of people, Shamim answered that it impacted rural communities more than urban communities, whereas, Basha said that climate change disproportionately impacts women. When I continued to talk to the married couple about policy this conversation took place:

> Basha: the practical level of women's participation and women's access to the local governments still it is very limited.
> Shamim: But, it's improving, it's improving
> Basha: Yeah, it's improving … there is always a gap in maintaining the gender balance in any policy development.

In their interview, as well as in interviews with many others, most subjects agreed that gender dynamics existed with regard to climate change, but it seemed to be a more pressing issue for the women than the men.

Another difference observed was that the men felt that men engage in more "formal" or "strong" work, whereas, women participate in "informal" and "less strong" roles. For instance, Christian, a male from Cameroon, said that:

> In most rural areas, men are supposed to go to work, more kind of formal work, and women, they go to the farm

When I asked the Peruvian delegation whether their indigenous society was more matriarchal or patriarchal, Diego, a male, said

> There is a lot of cases in which there's a lot of partners, women and men, that share a lot of activities. The men do the strong work and the women do the agriculture.

However, many women disagreed, including one of Diego's female counterparts Veronica, who is also part of an indigenous community in Peru. She explains that:

> There are two types, because the person who is more in charge of the family, is the women because sometimes the men go out because they have to work, they go for a very long time, like 6 months sometimes of the year. The person who stays in the family, taking care of the education, the health, and how to feed the family is the women, 100%, they assume these kinds of responsibilities of the home. And sometimes it happens that the man doesn't get back to the community. Sometimes because they have to go out and work they don't come back and uh the woman has to stay with the kids. But there are 2 types, the ones that go, but there is also the type of family that its integral and well conformed and the man is the one doing the work that is related to take care of the animals, and the women is the one who is looking for the seeds. So the women are working with the traditional products that we talked about, potatoes and petuca. The women are the ones who are more active with this production of the crops.

Faith from Kenya, does not agree that men are put in the "stronger" tasks, and says that in her experience, women are often performing the more strenuous tasks in her farm back home:

> for them, women. especially where I come from, they are doing the preparation work which is the hard work. Digging up the farm and like in my village nobody uses machinery, so it's using your hands, and I don't know what to call it in English, but yeah, you just digging up the earth with a tool. With a farm implement in the hand, know the seasons, like what, what is planted when and also for the women is to figure out the storage, uh, for the, for the harvest so that it lasts you until the next harvest. For the men, mostly, its the domestic animals, they will be responsible for fetching grass for the cows.

Speaking with the respondents from Peru, India, and Brazil, who were either part of indigenous communities, or working closely with them, revealed that they believed that although gender divides still existed, both men and women were essential in the agricultural sphere and in mitigating climate change.

Female political representation

Despite carrying a heavier burden from the effects of climate change, women are not equally represented in the national and local political bodies that are in charge of creating climate change policy. In different countries, various departments and ministries oversee climate related affairs, such as the Ministry of Climate in Burkina Faso or the Ministry of Environment in India. Sometimes, other ministries get involved in climate negotiations, as the topic relates to many fields. Though the government has the greatest role in creating policy to mitigate the impacts of global warming, women are universally underrepresented in this field. For example, in Burkina Faso, Awa explained that of the almost 30 ministers in government, only six are women. Even in the few countries that had minimum quotas for female representation in politics, or a female prime minister, such as Bangladesh, there was still not have equal representation of women, Barsha elaborated that:

> I've been in many kinds of program and project intervention where it is mentioned that at least 30 percent of a woman's representation needs to be insured. But anyway, in papers sometimes you see that by number, by using quantitative indicators they try to mention or try to adjust the 30 percent or try to ensure the participation of 30 percent of woman. But in terms of qualitative participation, in terms of the qualitative changes that are happening to a woman's life, that I think we need to go far. I mean, there are lots to do, lots of things to achieve.

Several interviewees could not give exact numbers of the female to male ratio in government, but there was a clear divide. Christian, a male from Cameroon, believed that over 90% of the Cameroonian government is composed of men. Rahul, an Indian male, also agreed that there were more men than women in government roles. He highlighted that discrepancies that existed further within the women who are represented in government:

> the representation is very different because a lot of the women that work in the tribal areas and the rural areas are still illiterate, but they still participate, and they are still leaders in

> their own sense of that as opposed to a woman in Mumbai. So we got this wide range, literate educated women who are in government as well as somebody who's a born leader.

Though the findings show that women are not equally represented in policy, many interviewees told me about ways in which women are working to change policy through activism, civil organizations and groups, and disaster relief initiatives. These efforts stem from the grassroots level led by women from both rural and urban communities.

I asked the respondents about the types of policy issues that the women in government tend to engage in. The main topics that arose were health, education, and climate. Interestingly, many people spoke about the connections between these sectors. Rahul explained that the fields women are most involved in in India include:

> health and education are where women are playing an important role. But the thing is key is to make a link to climate change through health and education as well, looking at sustainability education, looking at the sustainable healthy living

Others agreed that issues such as health and education overlap with climate, especially with respect to gender. Other respondents were eager to share examples of female government officials who were involved in climate policy. For instance, in Brazil, Gabriela reported that prominent women such as Marina Silva have been representing environmental issues for a long time. Jose also mentioned that the head of the National Water Commission in Mexico is a woman. Although there are several strong women leaders in these developing countries advocating for gender and climate justice, many interviewees still believe that there is a long way to go to ensure fair gender representation in policy.

Quantitative Analysis

Descriptive Statistics

Table 1 displays basic descriptive statistics related to the variables used in my regression analyses. It also shows the distribution of these variables.

Table 1. Summary Statistics of Variables

	mean	*s.d.*	*min*	*max*	*n*
Dependent Variables					
Women's Social Rights	0.72	0.63	0.00	3.00	83
Women's Economic Rights	0.95	0.64	0.00	3.00	83
Women Political Empowerment Index	0.65	0.14	0.24	0.89	83
Educational Attainment of Females (15-24)	6.65	2.55	1.62	11.87	83
Lifetime Risk of Maternal Mortality	2.05	1.90	0.04	9.22	83
Fertility Rates	4.27	1.45	1.56	7.57	83
Independent Variables					
Environmental Performance Index	54.18	12.31	34.17	78.20	83
Control Variables					
GDP Per Capita	1851.32	2255.25	170.80	15761.84	83
Population Density	96.71	150.67	1.67	1163.33	83
Region of Countries	4.39	2.08	1.00	10.00	83

Observations included if year is 2007 and the country has a Human Development Index below 0.70
Source: Quality of Government Dataset 2018, University of Gothenburg

The dependent variables are used to examine women's equity. Though the women's social and economic rights indexes range from 0 to 3, their means are incredibly low. This indicates that on average in the countries examined, women's social and economic rights are limited, and that systematic discrimination based on sex may have been built into law. Out of all the dependent variable analyzed, educational attainment of females between the ages of 15 to 24 has the largest standard deviation of 2.55, indicating that it could potentially have the largest variation. The average GDP per capita in countries with a HDI score under 0.7 is 1851.32. However, the GDP has a very large standard deviation because some countries are still more developed than others.

Looking at trends throughout developing nations, I found each country has its own unique approach to climate and gender relation.

Table 2. Observations in Regions (Categorical Control Variable) in 2007, in Countries with a Human Development Index of less than 0.70

Variable	Total (n=83)	
	#	%
The Region of the Country		
Eastern Europe & Post-Soviet Union	3	3.61
Latin America	11	13.25
North Africa & the Middle East	6	7.23
Sub-Saharan Africa	45	54.22
East Asia	2	2.41
South-East Asia	6	7.23
South Asia	5	6.02
The Pacific	3	3.61
The Caribbean	2	2.41

Table 2 expands upon the control variable, which accounts for regional variation. The table shows what percent of the observations are from which region. The reference region used in the regressions is Western Europe and North America. Most of the observations (54.22%) of countries with an HDI under 0.7 in 2007 are from nations in Sub-Saharan Africa. This suggests that the region of Sub-Saharan Africa may have the largest number of developing nations. There are also many observations (13.25%) from Latin America. Regions such as Eastern Europe, East Asia, the Pacific, and the Caribbean's have less observations (under 4%) but are still important in representing developing nations.

Regression Models

After running simple linear regressions on each dependent variable separately with the filter on, I found that the effect of the Environmental Performance Index on gender equity was statistically significant for four of the measures: women's political empowerment, females' educational attainment, fertility rates, and lifetime risk of maternal mortality. The two measures

that were not significantly affected by the EPI were the women's social rights index and the women's economic rights index. I also ran the regressions with all respondents with non-missing data on my specific models. The results largely remained the same.

Given the importance of women's participation in the political bodies making climate change policy identified in the qualitative analyses, I first consider the relation between the EPI and the participation of women in politics. Table 3 shows the regressions of the correlation of EPI and women's political empowerment. The test shown were run both with and without controls. The Women's Political Empowerment Index was strongly correlated with the EPI as the p-value was 0.000 The standard error was relatively small in the OSL regressions.

Table 3. Regressions between Women's Political Empowerment and the Environmental Performance Index

	Women's Political Empowerment		
OSL Results	**Estimate**	**S.E.**	**P>|t|**
Baseline EPI (without controls)	0.003	0.001	0.009**
Environmental Performance Index	0.007	0.002	0.000***
GDP	-0.000	7.620	0.134
Population Density	0.000	0.000	0.152
Region			
Latin America	0.186	0.082	0.027*
North Africa & the Middle East	-0.019	0.089	0.836
Sub-Saharan Africa	0.239	0.085	0.006**
East Asia	0.223	0.114	0.054
South-East Asia	0.212	0.091	0.023*
South Asia	0.112	0.106	0.294
The Pacific	0.189	0.110	0.090
The Caribbean	0.350	0.115	0.003**

*** p<0.00 **p<0.01 *p<0.05

Comparably, the EPI also significantly correlated with the Women's Political Empowerment Index (WPEI) in models both with and without controls (Table 3). For every 1 unit increase in the EPI, the Women's Political Empowerment Index increases by 0.006, when everything else is

held constant. Thus, although this effect is highly significant, it is not a very large effect. The findings show that the association between the variables is highly significant in two main regions of the world: Sub-Saharan Africa and The Caribbean. It is also significant in Latin America and South-East Asia.

The interviews also showed that climate change was related to women's access to education. When I regressed the educational attainment of females between the ages of 15 to 24 on EPI, I found a strong significant effect in models both with and without controls.

Table 4. Regression between Educational Attainment of Females (15-24) and the Environmental Performance Index

OSL Results	Estimate	Standard Error	P>|t|
Baseline EPI (without controls)	0.160	0.015	0.000***
Environmental Performance Index	0.133	0.022	0.000***
GDP	0.000	0.000	0.417
Population Density	0.002	0.001	0.122
Region			
Latin America	-2.162	0.998	0.034*
North Africa & the Middle East	-3.696	1.084	0.001**
Sub-Saharan Africa	-2.745	1.031	0.010*
East Asia	-0.463	1.380	0.738
South-East Asia	-1.442	1.107	0.197
South Asia	-3.879	1.288	0.004**
The Pacific	-0.471	1.334	0.725
The Caribbean	-1.363	1.401	0.334

*** p<0.00 **p<0.01 *p<0.05

For every 1 unit increase in the EPI, educational attainment increases by 0.133. In areas where females between the ages of 15 and 24 completed more years of schooling, there was a corresponding increase in EPI.

Women's fertility is another indicator of women's equality and access to opportunities and resources that could be affected by climate change. The results in Table 5 support this

assumption. The table shows that in the model with controls, for every unit increase in the EPI, women's fertility decreases by -0.056. This result is significant at the 0.000 level. Table 5 also shows the regression run between EPI and risk of maternal mortality, because fertility rates and pregnancy related deaths are inherently connected to women's health.

Table 5. Regressions between Women's Health Indicators and the Environmental Performance Index

	Risk of Maternal Mortality			Fertility Rates		
OSL Results	**Estimate**	**S.E.**	**P>|t|**	**Estimate**	**S.E.**	**P>|t|**
Baseline EPI (without controls)	-0.102	0.013	0.000***	-0.082	0.009	0.000***
Environmental Performance Index	-0.066	0.019	0.001**	-0.057	0.013	0.000***
GDP	-0.000	0.000	0.279	-0.000	0.000	0.614
Population Density	-0.002	0.001	0.148	0.000	0.001	0.107
Region						
Latin America	0.398	0.867	0.647	-0.062	0.607	0.919
North Africa & the Middle East	0.177	0.941	0.852	0.325	0.659	0.623
Sub-Saharan Africa	1.704	0.896	0.061	1.069	0.628	0.093
East Asia	-0.323	1.198	0.788	-1.273	0.839	0.134
South-East Asia	0.143	0.961	0.882	-0.109	0.673	0.871
South Asia	0.648	1.119	0.564	0.016	0.784	0.983
The Pacific	-0.945	1.159	0.418	-0.171	0.812	0.834
The Caribbean	0.461	1.217	0.706	-0.337	0.852	0.694

*** p<0.00 **p<0.01 *p<0.05

For every unit increase in the EPI, women's risk of maternal mortality decreases by -0.066. This result is significant at the 0.001 level. These findings show highly significant correlations between EPI and these women's health indicators.

Most of the variables analyzed in this study are connected to women's social rights such as education, health, and political empowerment. However, when I ran the regression between the Women's Social Rights Index and the EPI, the results were not significant. As shown in Table 6 the p-value without controls was 0.076, and with controls was 0.793.

Table 6. Regression between Women's Social Rights and the Environmental Performance Index			
OSL Results	**Estimate**	**Standard Error**	**P>|t|**
Baseline EPI (without controls)	0.010	0.006	0.076
Environmental Performance Index	0.002	0.009	0.793
GDP	-2.240	0.000	0.951
Population Density	-0.000	0.001	0.620
Region			
Latin America	0.210	0.394	0.595
North Africa & the Middle East	-0.811	0.427	0.062
Sub-Saharan Africa	-0.342	0.407	0.404
East Asia	0.025	0.544	0.964
South-East Asia	0.384	0.436	0.382
South Asia	-0.459	0.508	0.369
The Pacific	-0.286	0.526	0.588
The Caribbean	0.002	0.552	0.997

*** p<0.00 **p<0.01 *p<0.05

For every 1 unit increase in the EPI, the Women's Social Right's Index increases by 0.002, which is very minimal, further supporting that the correlation was insignificant between the two variables.

Table 7. Regression between Women's Economic Rights and the Environmental Performance Index			
OSL Results	**Estimate**	**Standard Error**	**P>|t|**
Baseline EPI (without controls)	0.014	0.006	0.018*
Environmental Performance Index	0.006	0.009	0.548
GDP	-6.130	0.000	0.876
Population Density	0.000	0.001	0.614
Region			
Latin America	0.377	0.421	0.374
North Africa & the Middle East	-0.124	0.457	0.787
Sub-Saharan Africa	-0.059	0.435	0.892
East Asia	0.540	0.582	0.356
South-East Asia	0.390	0.467	0.406
South Asia	-0.369	0.544	0.500
The Pacific	-0.190	0.563	0.737
The Caribbean	0.547	0.591	0.358

*** p<0.00 **p<0.01 *p<0.05

The other dependent variable which did not show a high significant correlation with EPI was the Women's Economic Rights Index. As seen in Table 7, the correlation between EPI and women's economic rights variable was significant without controls with a p-value of 0.018. However, once I factored in the controls, the results no longer became significant with a p-value of 0.548. Both the Women's Social Rights Index and the Women's Economic Rights Index differed from the other variables in that they were not cross sectional. This may have impacted the results of the regression.

Connections Between Models

After I ran the regressions, I wanted to determine if the coefficients are different across models and to test for unequal variance. OSL regressions can have Type I errors, so this test could help to rule this out. I ran a multivariate regression where I accumulated the tests in order to examine if the coefficients are jointly significant across models. The equations of the multivariate regression can be found in Appendix F, which shows the code run in Stata 13.1. By accumulating the regressions, I showed that F = 8.01 and the Prob>F = 0.000. This means that the F test rejects the null hypotheses, and that the variables are highly significant across models. Though some of the regressions were insignificant, when all of the variables were tested together, this test indicated that they are all connected.

DISCUSSION

Climate degradation impacts men and women differently due to structural inequity that limits women's resources (Broeckhoven 2014). This project adds to existing literature on the subject of climate change and gender by analyzing perceptions of men and women from several different developing nations and international databanks. Using this unique mixed-method

approach provides new and important information about gender and climate change, revealing that: 1) climate change impacts women more than men because of their divergent roles in production and consumption; 2) among climate policymakers and activists, men are much less likely to recognize the greater burden borne by women; 3) in developing nations, the burden of climate change is greatest precisely on nations where women have the least political equality to make structural changes. This section will further examine the study's findings and draw upon previous research to explain the relevance of gendered impacts of climate change.

Support for Hypotheses

The findings in this study support aspects of the main hypotheses posed initially. From both the qualitative and quantitative analysis, we understand that the burden of climate change is greater for women than men. The first hypothesis is supported by the findings of a relation between the political involvement, educational attainment, and health of women and the Environmental Performance Index. Although the variables for women's social and economic rights did not independently show statistically significant correlations with EPI, the qualitative data and multivariate regression show a connection between all of the selected predictors of women's equity. As postulated in the second hypothesis, many respondents elaborated that the reasons for the disproportionate impact on women does indeed stem from gender roles and norms that limit the access of women to the same resources as men, and confine them to domestic labor. These gendered divisions make it much more difficult to have a gender-based response to climate, especially when many males still do not fully acknowledge the extent to which climate change affects women.

Political Ramifications

This study demonstrates a highly significant relation between the Environmental Performance Index and the Women's Political Empowerment Index. These finding indicate a potential connection between better environmental outcomes and more political rights for women. If an increase in the Environmental Performance Index variable is related to an increase in women's political empowerment, then the reverse is also true. A decrease in environmental vitality and health leads to a decrease in political equality. The qualitative interviews revealed that in each country represented, there were gender gaps, and governments were primarily dominated by males. In most nations, women are not equally represented in policy (Denton 2002; McCright 2010).

It is critical to take a feminist approach towards representation and government, because a feminist approach examines the creation and impact of power structures. The qualitative findings and previous literature show a power imbalance between men and women, especially in developing nations. By including women who are systemically disenfranchised, a feminist approach is imperative for ensuring equity between genders. When policy is created for people not included in the decision making process, it is not highly effective for those most greatly impacted by the condition that the policy aims to address (Yuval-Davis 2006). Instead, it maintains male dominance in societies (Binion 1995). As previous studies and the literature reason, women are disproportionately affected by climate (Alston and Whittenbury 2012; Hemmati and Röhr 2009); therefore, they should be involved equitably in climate policy. According to the quantitative findings of the current study, when the Environmental Performance Index rises, women are better incorporated into government and have more political empowerment. These findings, along with the previous literature, indicate that having more

women involved in policy reform and climate governance can greatly contribute to climate change reduction. This connects the need for both local governments and international groups such as the UNFCCC and UNDP to continue to promote the inclusion of women in policy arenas, especially in relation to climate (Alston and Whittenbury 2012; UNDP 2009).

Educational Attainment

Education is an essential component of the global response to climate change. Education, often one of the many resources women are deprived of, is imperative to empowering women and giving them the tools to be independent and to create innovate climate solutions (Subrahmanian 2005). In addition to the need for more women in policymaking, many respondents to the in-depth interviews also discussed important linkages between environmental degradation and restrictions of access to education for girls. Many spoke about how it was often the women's responsibility to obtain water and fuels in rural communities. Due to extreme weather conditions such as droughts, females would have to walk for hours to days in order to procure water for their family. According to the interviewees, time spent collecting water, cooking, or working on the land is prioritized over sending those girls to school. These findings are consistent with the results from my own quantitative analyses. The study's quantitative findings from 2007 show a highly significant relationship between the average number of years of education among women between ages 15 and 24 years in developing nations and the EPI in those countries. The positive correlation suggests that the more years women are enrolled in school between the ages of 15 and 24 in countries with a Human Development Index of less than 0.7, the better the environmental health and vitality outcomes.

The literature also confirms the results concerning the links between gender, climate change, and women's education. In particular, David Wheeler and Dan Hammer find that female

education and family planning are critical for enhancing sustainable development. Investments in girls' schooling and consensual family planning are cost effective ways to reduce carbon emissions, compared to other strategies such as nuclear and wind energy (Wheeler and Hammer 2010). The scholars conclude that investing in women will support global climate funds.

Fertility rates are associated with the educational attainment of women, according to scholarly and quantitative findings. A study from the Guttmacher Institute in the International Family Planning Perspectives found that women in developing nations who had access to education, employment, and other essential resources, had lower fertility rates than those without access to those rights (Anon 1986). Such studies help to explain the relation between the Environmental Performance Index and fertility rates that I found in the quantitative analyses. In particular, my findings showed that when fertility rates were lowered, the EPI rose. Lower fertility rates can be a sign of women having access to education, family planning tools, and possibly contraceptives. Of the 41 least developed nations that have National Adaptation Programs of Action planned, 37 report of that population increase exacerbates the impact of climate change in their countries (Hardee 2009). 20% of women said that they have enough children, but that they do not have access to contraceptives. More than 200 million worldwide have an unmet need for family planning (Hardee 2009). Having children at young ages impedes the ability of women to continue their education, because often they are expected to provide the primary child care.

Women's Health Outcomes

Unplanned pregnancies also bring about many other health concerns among women, which are exacerbated by climate change (Gender and Alliance 2016; Hardee 2009). A statistically significant negative relation was found between the Environmental Performance

Index and a women's lifetime risk of maternal mortality. This relation could potentially imply that the less likely a woman is to be at risk of maternal mortality, the higher environmental and health vitality.

Many of the interviewees also highlighted the connection between climate change and women's health outcomes. The interviewees perceived there to be a higher risk of malnutrition, water borne diseases, and sexual and reproductive complications among women in rural areas in developing nations because of climate variability. Studies show that climate change does indeed have serious health implications for women. Women's mortality rates are higher than their male counterparts during a natural disaster (Arora-Jonsson 2011; Terry 2009; Enarson 2000). The findings in this study continue to connect the impact of climate change to gendered health outcomes. A possible explanation for this association stems from the inherent inequity which persists in male dominated societies (Horton 2015).

Discrepancies in Social and Economic Outcomes

The two variables in this study that were not significantly affected by the Environmental Performance Index were the women's social rights measurement and the women's economic rights measurement. However, here the interviewees' perceptions did not match the statistical analysis. The research participants focused on how social norms in their countries of origin were restrictive on women's rights. For instance, many respondents explained that women are expected to be at home, cook, gather water, and take care of their family. Some of the interviewees also mentioned that women did not have equal access to land ownership because of inequitable economic restrictions. Both the women's social rights measurement and the women's economic rights measurement were measured on a scale of 0 to 3. The limitations of this rating scale may have contributed to the lack of correlation with the EPI. It may have also been difficult

to measure how social and economic rights are incorporated consistently between countries. Although the regressions were not significant individually, when the multivariate regression was run across all the variables, the F value was statistically significant across models. This indicates that there is significance across all of the variables when analyzed together. The significance across models could suggest that economic and social rights are connected with the other variables analyzed with regard to ecological vitality.

Gender Roles and Viewpoints

From a feminist perspective, my findings about gender inequalities and gendered perceptions may not be limited to issues regarding the effects of climate change, but may reflect more widespread patterns of gender differences in perceptions of women's work and the gender division of labor. For instance, one key findings of my project was the systematic differences in perception between male and female interview respondents regarding whether climate change has a greater impact on men or on women. In the majority of cases, women responded that climate change impacted women more; whereas, men thought it impacted both genders almost equally. This finding is similar to research by the Pew Research Center that finds that in the U.S. there is a significant gender gap in how mothers and fathers describe their household's distribution of labor. Whether or not women were working outside the home, the study revealed that they did more household labor than their husbands. However, the men were around 10% more likely to report that their domestic chores were equally divided in the relationship than women (Parker, Horowitz, and Rohal 2015). A potential reason for why men do not perceive that women are involved in more work than men, is that women are often responsible for mental and emotional labor. This work is not as highly regarded in most societies, and are roles that are heavily gendered (Kluwer, Heesink, and van de Vliert 2002). Women are often responsible for

not only carrying out at least half of the tasks, but are also involved in organizing schedules and keeping track of chores (Valenti 2015). Much of women's work is "invisible" to men, including fetching water, cleaning clothes, and preparing food, all tasks that are directly impacted by climate.

Much of the previous literature cited in this paper clearly defines different ways that climate change unequally impacts women (Arora-Jonsson 2011; Dankelman 2002; Gaard 2015; Gender and Alliance 2016; Hardee 2009). The same gender divide seen in household labor can be applied to this study. Though climate change is shown to impact women more than men, especially in terms of health access, educational attainment, and financial stability, men in the study were more likely to perceive that the repercussions were equivalent. This could be because many of the factors acknowledged by women but not men were connected to very gendered roles, such as providing nutrition for the family, childrearing, and family planning. Over the years, gender has become a much more pressing issue, as gender injustice is being uncovered and highlighted through feminism and LGBTQ studies. Although there are indications that things are improving, as reflected by the respondents acknowledging that climate change impacts both men and women, until men and women acknowledge the inequity, it will be difficult to continue to make strides towards future gender equality.

Limitations

A few notable limitations arose while conducting this analysis which may have impacted the findings. With regard to the qualitative investigation, the interviews were mainly conducted with individuals at the UN Climate Change Conference in Poland. The attendees of the COP probably had the means, influence, or connections to be able to travel to and attend this meeting, and therefore might not represent the average resident of their home country. This was taken into

consideration, and therefore the interviewees were asked about their general perceptions on climate and gender, rather than just their personal experience. It was also difficult to arrange interviews with individuals at the conference, because as delegates, many were required to attend mandatory meetings throughout most of the day. Many of the people I followed up with after the conference never responded to my requests for an interview. Some men and women whom I spoke to told me they were not allowed to make comments on behalf of their countries. Interviews for this study were collected over a short period of time, not always providing adequate time to develop rapport with respondents from the different communities.

Interviewing more people in developing nations would definitely add to this research. By interviewing people in their countries of origin, a more holistic approach could be taken to highlight the individuality and variance of communities, as well as to examine common trends. Speaking with individuals not necessarily involved in climate change policy or activism would provide additional insight into unbiased narratives of how climate impacts the daily life of respondents. As all of the interviewees were knowledgeable about climate change, as they were able to elaborate on the subject and understood the connections between climate and social rights. Though I communicated with all of the respondents either in English or with the aid of a translator, there were times when interviewees may have had difficulty in expressing their thoughts fully, as English was often not their primary language. Additionally, the concept of gender differences is a highly nuanced and sensitive topic that is rarely discussed. If at any time during an interview a participant was visibly uncomfortable, further gender related questions were shortened and were not forced. Being a female researcher asking questions regarding gender could have influenced the responses from participants as well. Due to the uneven number

of men and women, as well as the fairly limited number of interviews, this study cannot necessarily be accurately generalized to a larger population.

There were also limitations to the quantitative analysis. The data from the Quality of Government Dataset is taken from databases all over the world. Therefore, the variables are not always consistent in terms of years, global coverage, and measurement. In order to look at the same number of observations through a linear regression model, 1) many observations were omitted to ensure that the correlations could be compared, and 2) the linear regression only allowed me to analyze one year of data at a time. The one year where all of the variables overlapped was in 2007, even though the dataset has some observations from as recently as 2017. The women's social and economic right's variables were not cross-sectional like the other dependent variables, and this may have skewed the results. If additional time and resources were available, other forms of regressions, such as a panel regression could potentially have been beneficial when exploring the data and seeing how climate and gender relations change over time. While it was not possible to conclude causation, background research using previous studies and theories provided insights and depth that strengthened the results.

CONCLUSION

As hypothesized, there are many societal roles in place for men and women that influence how climate degradation affects individuals differently depending upon their gender. The results find a significant relation between climate outcomes and women's political empowerment, educational attainment, and health. Personal perceptions show a divide between resources in urban versus rural areas, that women and indigenous peoples are especially susceptible to the burden of global warming, and that there is an oversight made by males when speaking about gendered impacts. Due to globalization, patriarchal institutions, and governance, the women of

the global South are impeded from having equal access to rights and resources. That is not to say they are not strong; in fact, it is quite the opposite, women are at the forefront of adaptation and mitigation efforts. The previous studies have shown that rural women are probably the most connected to the land, and therefore best understand how to help it heal, inspiring them to work towards carbon neutral solutions.

Moving forward, it is crucial to consider how to incorporate gender in climate solutions. In order to combat climate change, the global community must make efforts to reduce pollutants and global warming. Women play a vital role in climate change reduction as the predominant stakeholders in agricultural production, and through many other gender-based initiatives. Mitigation efforts are grouped into two main categories: 1) the reduction of greenhouse gas emissions, and 2) the apprehension, fixing and sequestrations of carbon (United Nations Development Programme 2013). The world needs to drastically limit its greenhouse gas emissions to stabilize the global climate. It is essential to avoid reaching a "point of no return" where nations are inundated by water as the sea level rises, drastic natural disasters occur frequently, and the natural resources disappear (Terry 2009). Countries such as China, the U.S., India, and Russia produce the highest amounts of greenhouse gas emission. However, it is predicted that in the future, emissions will predominantly come from developing countries, partly due to population growth and the absence of clean energy subsidies. Ideally, efforts have been made in low income countries to skip the toxic stages of development, and instead to build using more sustainable energy such as solar panels and windmills (Terry 2009). People consume energy both directly, such as by burning fossil fuels for domestic energy and transport, and indirectly, through product purchases, which produce hazardous pollution during their manufacturing, transport, and disposal (Terry 2009).

Reducing greenhouse gas emissions and carbon usage relies heavily on a case-by-case initiative. Consequently, the gender impact of mitigating and combating climate change vary from region to region. Ideally, policies and measures that aim to mitigate climate change should be holistic in evaluating human perceptions, values, and behavioral choices, in order to more suitably address the need of women and men. The UNFCCC believes that it is absolutely essential to address equity issues in order to allow developing countries to commit to climate-change mitigation in the future (Hemmati & Röhr 2009).

Modern society is beyond the point of completely solving the global warming crisis. Therefore, the global community must not only mitigate climate issues, but also adapt to the changes in the atmosphere that we are currently experiencing (United Nations Development Programme 2013). Adaptation is the ability to alter in response to the effects of an event to minimize negative repercussions (Gender and Alliance 2016). Humanity in general, but particularly at-risk and impoverished communities, must be prepared for the effects of climate change (United Nations Development Programme 2013).

The most effective way for impoverished countries to adapt to climate change is through gender-equitable sustainable development. This approach would allow such nations to have the needed flexibility and resources, including skilled, educated and healthy men and women (Terry 2019). For example, a joint report by ActionAid and Institute of Development studies describes the response of rural women to erratic monsoons in the Ganges River Basin. They responded to the monsoons by growing different crops, and finding alternatives to livelihood activities such as fish-farming. In the study, women clearly stated that the support they needed included access to training and information, as well as agricultural extension advice (ActionAid 2007). Gender serves as an important dimension in both vulnerability and adaptation. There is limited reporting

of adaptations being developed in response to climate change focusing on women, the elderly, or children (Bunce and Ford 2015). However, considering gendered roles in climate change responses, many initiatives suggest that women's groups are at the forefront of mitigation and adaptation efforts. (United Nations Development Programme 2013) Adaptation and mitigation policies should also include attention to gender issues (Eastin 2018).

Although women are engaged in creating climate solutions, the burden cannot be placed solely on their shoulders. Climate change impacts women more than men, but it is not just a women's issue. Presenting it as such is highly problematic (Broeckhoven 2014). It is critical to acknowledge and account for the ways in which women both help the environment, and are vulnerable to climate change. However, rhetoric that reiterates statements about poor women in developing nations being vulnerable to climate, and women in developed countries being environmentally conscious, can reinforce troublesome stereotypes and biases about the global North and global South divide (Arora-Jonsson 2011). Productive gender-focused approaches must incorporate how women work with the land, but still hold both genders accountable for implementing solutions and breaking down gender constructs that limit women's opportunities and resources.

Lastly, this paper calls for an intersectional approach when continuing to address climate concerns. There is definitely a connection between women, development and climate. In addition, other identities and social positions including urban/rural location, race, religion, sexuality, indigenous roots, class, ability, and more also need to be taken into consideration when speaking about social issues and how they pertain to climate. The interconnection between climate change and humanity requires an insightful analysis of the relationship between humans and nature using inquiry from different academic fields. An intersectional approach, developed

within critical feminist theory, will be beneficial in combating climate change and addressing persistent inequity. Different individuals and groups relate differently to climate change because of power structures based on context-specific and dynamic social categories. Intersectionality creates a pathway which does not make overarching generalizations, but instead enables solidarity and agency. An intersectional approach not only explains the power structures in play, but it seeks to challenge them. The search for justice is intrinsically connected to uplifting marginalized and oppressed community members to restore equity. When these members of the global community's voices are listened to and incorporated, we will be closer to obtaining climate justice and protecting our earth.

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APPENDICES

APPENDIX A: Interview Questions

Demographics and Agriculture

1. What country are you from?
2. What country do you live in?
3. What are the main crops grown in your country?
4. Can you talk about the ways in which women are involved in agricultural production? What about men? How are men involved in agricultural production?
5. Would you say that men or women are more responsible for agricultural production in your country?"

"Now I'd like to ask you some questions about the impact of climate change on your country"

Impact of climate change

6. How does climate change negatively impact your nation?
7. Do you think climate change effects people differently? How so?
8. Do you think climate change impacts women or men more, why?

"**I have a few questions about how climate change policy is established in your country."**

Establishing policy for climate change

9. Who is in charge of making climate policy in your country?
10. What types of policy issues do women tend to engage in? What about men?
11. How many women hold positions of power in that committee, government, etc.?
12. Do you think men and women are equally represented when it comes to your countries response to climate change? If no, what is the representation?

"Thank you so much for your time."

13. Do you have any additional thoughts or questions for me?

Appendix B. Women's Social Rights Rating Chart	
0	There were no social rights for women in law and that systematic discrimination based on sex may have been built into law
1	Women had some social rights under law, but these rights were not effectively enforced
2	Women had some social rights under law, and the government effectively enforced these rights in practice while still allowing a low level of discrimination against women in social matters
3	All or nearly all of women's social rights were guaranteed by law and the government fully and vigorously enforced these laws in practice.

Appendix C. Women's Economic Rights Rating Chart	
0	There were no economic rights for women in law and that systematic discrimination based on sex may have been built into law
1	Women had some economic rights under law, but these rights were not effectively enforced
2	Women had some economic rights under law, and the government effectively enforced these rights in practice while still allowing a low level of discrimination against women in economic matters
3	All or nearly all of women's economic rights were guaranteed by law and the government fully and vigorously enforces these laws in practice

Appendix D. Region Classifications	
1.	Eastern Europe and post-Soviet Union (including Central Asia)
2.	Latin America (including Cuba, Haiti & the Dominican Republic)
3.	North Africa & the Middle East (including Israel, Turkey & Cyprus)
4.	Sub-Saharan Africa
5.	Western Europe and North America (including Australia & New Zeeland)
6.	East Asia (including Japan & Mongolia)
7.	South-East Asia
8.	South Asia
9.	The Pacific
10.	The Caribbean (including Belize, Guyana & Suriname)

Appendix E. Countries Included in Quantitative Analysis		
Country Name	**HDI Score**	**Region**
Afghanistan	0.433	South Asia
Algeria	0.697	North Africa & the Middle East
Angola	0.468	Sub-Saharan Africa
Benin	0.444	Sub-Saharan Africa
Bolivia	0.632	Latin America
Botswana	0.646	Sub-Saharan Africa
Burkina Faso	0.345	Sub-Saharan Africa
Burundi	0.319	Sub-Saharan Africa
Cambodia	0.511	South-East Asia
Cameroon	0.466	Sub-Saharan Africa
Cape Verde	0.615	Sub-Saharan Africa
Central African Republic	0.338	Sub-Saharan Africa

Chad	0.338	Sub-Saharan Africa
China	0.672	East Asia
Colombia	0.683	Latin America
Comoros	0.461	Sub-Saharan Africa
Congo	0.527	Sub-Saharan Africa
Congo, Democratic Republic	0.377	Sub-Saharan Africa
Cote d'Ivoire	0.423	Sub-Saharan Africa
Djibouti	0.427	Sub-Saharan Africa
Dominican Republic	0.692	Latin America
Ecuador	0.698	Latin America
Egypt	0.651	North Africa & the Middle East
El Salvador	0.659	Latin America
Equatorial Guinea	0.592	Sub-Saharan Africa
Eritrea	0.406	Sub-Saharan Africa
Ethiopia	0.378	Sub-Saharan Africa
Gabon	0.651	Sub-Saharan Africa
Gambia	0.426	Sub-Saharan Africa
Ghana	0.53	Sub-Saharan Africa
Guatemala	0.589	Latin America
Guinea	0.371	Sub-Saharan Africa
Guinea-Bissau	0.398	Sub-Saharan Africa
Guyana	0.618	The Caribbean
Haiti	0.462	Latin America
Honduras	0.597	Latin America
India	0.556	South Asia
Indonesia	0.641	South-East Asia
Iraq	0.638	North Africa & the Middle East
Kenya	0.506	Sub-Saharan Africa
Kyrgyzstan	0.624	Eastern Europe and post-Soviet Union
Laos	0.518	South-East Asia
Lesotho	0.447	Sub-Saharan Africa
Liberia	0.394	Sub-Saharan Africa
Madagascar	0.491	Sub-Saharan Africa
Malawi	0.4	Sub-Saharan Africa
Maldives	0.641	South Asia
Mali	0.36	Sub-Saharan Africa
Mauritania	0.475	Sub-Saharan Africa
Mongolia	0.673	East Asia
Morocco	0.589	North Africa & the Middle East

Mozambique	0.372	Sub-Saharan Africa
Namibia	0.589	Sub-Saharan Africa
Nepal	0.492	South Asia
Nicaragua	0.607	Latin America
Niger	0.298	Sub-Saharan Africa
Nigeria	0.481	Sub-Saharan Africa
Pakistan (1971-)	0.513	South Asia
Papua New Guinea	0.469	The Pacific
Paraguay	0.654	Latin America
Peru	0.699	Latin America
Philippines	0.655	South-East Asia
Rwanda	0.438	Sub-Saharan Africa
Sao Tome and Principe	0.531	Sub-Saharan Africa
Senegal	0.435	Sub-Saharan Africa
Sierra Leone	0.367	Sub-Saharan Africa
Solomon Islands	0.489	The Pacific
South Africa	0.616	Sub-Saharan Africa
Sudan	0.444	Sub-Saharan Africa
Suriname	0.691	The Caribbean
Swaziland	0.514	Sub-Saharan Africa
Syria	0.651	North Africa & the Middle East
Tajikistan	0.592	Eastern Europe and post-Soviet Union
Tanzania	0.468	Sub-Saharan Africa
Thailand	0.699	South-East Asia
Timor-Leste	0.566	South-East Asia
Togo	0.441	Sub-Saharan Africa
Uganda	0.453	Sub-Saharan Africa
Uzbekistan	0.644	Eastern Europe and post-Soviet Union
Vanuatu	0.582	The Pacific
Yemen	0.48	North Africa & the Middle East
Zambia	0.504	Sub-Saharan Africa
Zimbabwe	0.421	Sub-Saharan Africa
Zimbabwe	0.699	Sub-Saharan Africa

Appendix F: OLS Regressions Stata Code

```
* Women's Social Rights Index
regress ciri_wosoc epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate ciri_wosoc_mf = (e(sample)==1)
label variable ciri_wosoc_mf "DV: ciri_wosoc"

* Women's Economic Rights Index
regress ciri_wecon epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate ciri_wecon_mf = (e(sample)==1)
label variable ciri_wecon_mf "DV: ciri_wecon"

* Women's Educational Attainment
regress gea_ea1524f epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate gea_ea1524f_mf = (e(sample)==1)
label variable gea_ea1524f_mf "DV: gea_ea1524f"

* Maternal Mortality Rates
regress wdi_lrmd epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate wdi_lrmd_mf = (e(sample)==1)
label variable wdi_lrmd_mf "DV: wdi_lrmd"

* Fertility Rates
regress wdi_fertility epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate wdi_fertility_mf = (e(sample)==1)
label variable wdi_fertility_mf "DV: wdi_fertility"

* Women's Political Empowerment
regress vdem_gender epi_epi wdi_gdpcapcur wdi_popden i.ht_region if (year==2007 & undp_hdi<.7)
generate vdem_gender_mf = (e(sample)==1)
label variable vdem_gender_mf "DV: vdem_gender"

* See how many data points are in each model:
tab1 *_mf
egen totmods = rowtotal(*_mf)
label variable totmods "Total # of Models in which Country-Year Appears"
tabulate totmods

*Create filter:
generate filter = (totmods==7)
label variable filter "=1 If Country-Year Used in All Models"
tabulate filter
tabulate filter totmods

*Summary statistics with filter:
*Dependent variables
summarize ciri_wosoc if filter==1
summarize ciri_wecon if filter==1
summarize vdem_gender if filter==1
summarize gea_ea1524f if filter==1
summarize wdi_lrmd if filter==1
summarize wdi_fertility if filter==1
*Independent variable
summarize epi_epi if filter==1
*Control variables
summarize wdi_gdpcapcur if filter==1
summarize wdi_popden if filter==1
tabulate ht_region if filter==1


*Regressions of each model including only those data points common across all models
regress ciri_wosoc epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1

regress ciri_wecon epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1

regress vdem_gender epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1

regress gea_ea1524f epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1

regress wdi_lrmd epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1

regress wdi_fertility epi_epi wdi_gdpcapcur wdi_popden i.ht_region if filter==1
```

Appendix G: Multivariate Regression Stata Code

```
*Run multivariate regression on variables:
mvreg (ciri_wosoc ciri_wecon ciri_wopol vdem_gender gea_ea1524f wdi_lrmd wdi_fertility)
 = (epi_epi wdi_gdpcapcur wdi_popden i.ht_region) if filter==1, corr

test epi_epi

*Test to see significance between each model:
test [ciri_wosoc]epi_epi = [ciri_wecon]epi_epi
test [ciri_wecon]epi_epi = [ciri_wopol]epi_epi
test [ciri_wopol]epi_epi = [vdem_gender]epi_epi
test [vdem_gender]epi_epi = [gea_ea1524f]epi_epi
test [gea_ea1524f]epi_epi = [wdi_lrmd]epi_epi
test [wdi_lrmd]epi_epi = [wdi_fertility]epi_epi

*Accumulating variables to test them across models:
test [ciri_wosoc]epi_epi = [ciri_wecon]epi_epi
test [ciri_wecon]epi_epi = [ciri_wopol]epi_epi, accumulate
test [ciri_wopol]epi_epi = [vdem_gender]epi_epi, accumulate
test [vdem_gender]epi_epi = [gea_ea1524f]epi_epi, accumulate
test [gea_ea1524f]epi_epi = [wdi_lrmd]epi_epi, accumulate
test [wdi_lrmd]epi_epi = [wdi_fertility]epi_epi, accumulate
```