



Climate change and gender equality in developing states

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ABSTRACT

It is commonly accepted that women can be more vulnerable than men to the adverse environmental effects of climate change. This paper evaluates whether the unequal distribution of costs women bear as a result of climate change are reflected across broader macro-social institutions to the detriment of gender equality and women's rights. It argues that gender disparities in climate change vulnerability not only reflect preexisting gender inequalities, they also reinforce them. Inequalities in the ownership and control of household assets and rising familial burdens due to male out-migration, declining food and water access, and increased disaster exposure can undermine women's ability to achieve economic independence, enhance human capital, and maintain health and wellbeing. Consequences for gender equality include reductions in intra-household bargaining power, as women become less capable of generating independent revenue. Outside the home, norms of gender discrimination and gender imbalances in socio-economic status should increase as women are less able to participate in formal labor markets, join civil society organizations, or collectively mobilize for political change. The outcome of these processes can reduce a society's level of gender equality by increasing constraints on the advancement of laws and norms that promote co-equal status. I empirically test this relationship across a sample of developing states between 1981 and 2010. The findings suggest that climate shocks and climatic disasters exert a broadly negative impact on gender equality, as deviations from long-term mean temperatures and increasing incidence of climatological and hydro-meteorological disasters are associated with declines in women's economic and social rights. These effects appear to be most salient in states that are relatively less-democratic, with greater dependence on agriculture, and lower levels of economic development.

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1. Introduction

It is tempting to assume that climate change equally influences the lives of women and men because the most visible effects occur on societal scales. Yet, because these effects are refracted through the economic, social, and political characteristics of the polity, the reality is that climate change poses a gender-specific set of risks that create disproportionate hardships for women. This paper evaluates whether the unequal distribution of costs women bear as a result of climate change are reflected across broader macro-social institutions to the detriment of gender equality. While existing scholarship has evaluated climate change's effects on women, and on gendered dimensions of climate vulnerability and adaptation in specific locations, questions remain as to the extent that environmental processes associated with climate change affect gender equality and women's rights. This paper addresses this lacuna through an empirical investigation into the impact of climate shocks and climatic natural disasters on women's social

and economic rights across a sample of developing states from 1981 to 2010.

Vulnerability provides a conceptual framework for evaluating the impact of climate change on gender equality. Vulnerability comprises exposure and sensitivity to environmental threats, and capacity to cope with environmental crises (IPCC, 2001). Impoverished populations face higher levels of risk: they are more reliant on ecosystem services for livelihoods; more likely to live in environmentally exposed locations such as a flood plain or on a degraded hill slope; and possess fewer resources to adapt to changing environmental conditions and to recover from disasters. However, the poor are not a homogenous entity. Disproportionate household and familial burdens and a relative lack of control over productive assets can enhance female vulnerability beyond that of men (Goh, 2012). In many cases, discriminatory legal institutions and social customs exacerbate these vulnerabilities by heightening exposure and undermining coping capacity. The result is that women are more likely to be impoverished than men, less capable of adapting to present and future climate change impacts, and less likely to participate in and contribute knowledge to policy-making

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processes that facilitate gender-specific adaptation or mitigation efforts (Van Aelst & Holvoet, 2016).

Building on these insights, I argue that gender disparities in climate change vulnerability not only reflect preexisting gender inequalities, they also reinforce them. Inequalities in the ownership and control of household assets and rising familial burdens due to male out-migration, declining food and water access, and increased disaster exposure can undermine women's ability to achieve economic independence, enhance human capital, and maintain health and wellbeing. Consequences for gender equality include reductions in intra-household bargaining power, as women become less capable of generating independent revenue. Outside the home, norms of gender discrimination and gender imbalances in socio-economic status should increase as women are less able to participate in formal labor markets, join civil society organizations, or collectively mobilize for political change. The outcome of these processes can reduce a society's level of gender equality by increasing constraints on the advancement of laws and norms that promote co-equal status. While we should not expect these findings to apply to all women in equal measure, those of lower socio-economic status and those who rely on agriculture as a means of subsistence and production should be acutely vulnerable.

Empirical analysis substantiates these arguments. I test the relationship between climate change and gender equality with panel data from 1981 to 2010 for all countries classified by the International Monetary Fund as "Developing" or "Emerging Market Economies" (IMF, 2017). The findings suggest that climate shocks and climatic disasters exert a broadly negative impact on gender equality in these countries, as deviations from long-term mean temperatures and increasing incidence of climatological and hydro-meteorological disasters are associated with declines in women's economic and social rights. These effects appear to be most salient in states that are relatively less-democratic, with greater dependence on agriculture, and lower levels of economic development.

2. Gendered vulnerability to climate change

Scientists now agree with a high level of certainty that contemporary changes to the Earth's climate are unparalleled in recorded human history (IPCC, 2014). Increases in average global temperatures are fueling environmental processes that decrease the predictability of rainfall and moisture content of soils, elevate the intensity of environmental hazards, reduce biodiversity, and alter wildlife migration. Although some areas in far northern latitudes might experience benefits in the form of prolonged growing seasons, the macro-level impacts of climate change—increasing seasonal variability, glacial melting, rising sea levels, and altered precipitation patterns—are expected to increase proximate risks from storms, droughts, floods, landslides, fires, disease epidemics, and heat waves across much of the world. These effects will be especially pernicious in developing nations located in tropic and sub-tropic latitudes that rely on agriculture for subsistence and livelihoods, because these states are acutely vulnerable to climatological hazards that undermine agricultural productivity, and because they possess fewer resources to invest in adaptation. The poor, who tend to rely most heavily on ecosystem services, will be among the hardest hit, especially (but not exclusively) in rural areas where reduced water availability and agricultural output diminish livelihood options, undermine food security and subsistence capabilities, and necessitate outward labor migration.

Although these processes affect both women and men, the nature and degree of the impacts can vary accordingly. Prior scholarship in feminist political ecology and disaster studies offers insight

into the causal drivers of gender disparities in climate change vulnerability (Mies & Shiva, 1993; Mies, 1998; Rocheleau, Thomas-Slayter, & Wangari, 1996; Salleh, 1997; Terry, 2009). These works assess how social and economic structures that ascribe distinct roles to women in society also expose them to distinct constellations of environmental risk. Gender imbalances in the division of labor and asset ownership, and the persistence of discriminatory laws and social norms that restrict women's rights and opportunities magnify the hardships women face in adapting to environmental conditions that reduce livelihood opportunities and heighten resource scarcities.

Gendered divisions of household labor common across the developing world disproportionately amplify women's vulnerability to climate change. While both sexes contribute to household preservation, men's responsibilities generally include cash-cropping or wage labor, while women's concern the management of resources necessary to ensure family nutrition and health—tending subsistence crops and small livestock, collecting water, and gathering fuel wood (FAO, 2003). When a climate shock disrupts income flows or food cultivation, or necessitates changes to water supplies or the distribution of crops, women often face greater challenges with adaptation. Buechler (2009), for example, finds that reduced water supplies due to higher temperatures in Sonora, Mexico amplify women's household responsibilities, as their traditional role as caregivers require them to remain stationary while men migrate to find employment. At the same time, decreasing employment opportunities in agricultural processing sectors diminish women's livelihoods, which undermine their economic self-sufficiency and reduce their ability to participate in customs such as gift giving that confer social status among female community members. In this case, the combination of rising household burdens, declining access to subsistence and financial resources, and limited opportunities to participate in the workforce and develop human and social capital serve to exacerbate gendered disparities in climate change vulnerability.

Inequalities in the ownership and control of tangible assets such as land, housing, livestock, and agricultural inputs can magnify these effects. Naraya, Patel, Schafft, Rademacher, and Koch-Schulte (2000, 5) argue that: "poor people rarely speak of income but focus instead on managing assets—physical, human, social, and environmental—as a way to cope with their vulnerability, which in many areas takes on gendered dimensions." Assets, especially land, are critical because ownership can provide physical protection, a way to mitigate and manage crises, and adapt livelihood strategies to changing environmental conditions (Deere and Doss, 2006). Across much of the developing world, land ownership is overwhelmingly male. In Africa, women are responsible for between 50 and 80% of agricultural production, but hold title to less than a 20% all agricultural land (FAO, 2016).¹ This disparity can create acute hardships for women when climatic changes undermine agricultural livelihoods, because ownership increases access to formal credit markets, which can enable individuals to cope with lost harvests, invest in new livelihood strategies, or purchase agricultural inputs that can reduce production volatility (Nuryartono, 2005).

This "gender-asset gap" can magnify female vulnerabilities in other ways as well (Deere & Doss, 2006; Deere & Leon, 2003). Dillon and Gill (2014) find that gender inequalities in access to agricultural technologies (irrigation equipment, motorized tillers,

¹ There is considerable interstate variation in land ownership: in Mali, women hold only around 5% of agricultural land titles; in Zambia, the number is around 15%, and Malawi, 32% (FAO, 2016). Figures are similar for South and Southeast Asia, and Latin America, and much lower for the Middle East (FAO, 2016). However, even when women technically "own" assets, husbands or extended family members can often mediate control. See for example: Quisumbing, Roy, Njuki, Tanvin, and Waithanji et al. (2013).

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