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# Gender and climate change-induced migration: proposing a framework for analysis

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## Abstract

This paper proposes frameworks to analyze the gender dimensions of climate change-induced migration. The experiences, needs and priorities of climate migrants will vary by gender and these differences need to be accounted for if policies are to be inclusive. Among the vulnerable groups, women are likely to be disproportionately affected due to climate change because on average women tend to be poorer, less educated, have a lower health status and have limited direct access to or ownership of natural resources. Both the process (actual movement) and the outcomes (rural–rural or rural–urban migration, out-migration mainly of men) of climate change-induced migration are also likely to be highly gendered.

**Keywords:** climate change, migration, gender, vulnerability assessment

## 1. Introduction

The Intergovernmental Panel on Climate Change (Parry *et al* 2007) argues that climate change will affect human settlements through its impacts on human health, food security and decrease in the viability of natural resource-based economic activity. Realizing the gravity of this phenomenon, the United Nations Framework Convention on Climate Change (UNFCCC) included climate change-induced displacement, migration, and planned relocation in the 2010 and 2011 Conference of the Parties. In fact, paragraph 14(f) of the Cancun Adaptation Framework calls for deeper examination of human impacts of climate change and incorporation of migration policies and measures to address displacement in national adaptation strategies.

It is believed that the effects of climate change on population movements are likely to adversely and

disproportionately impact poor and vulnerable population groups, especially women (CIDA 2002, Hunter and David 2009). While research on climate change-induced migration in itself is scarce, its impact on women is under-explored. Climate change may not only directly impact women through environmental changes such as rise in sea level or increases in temperature, but also make them more vulnerable because of its interaction with socio-cultural factors (The Government Office for Science 2011). For instance, unequal gender relations and access to resources may make women more vulnerable to climate change than men (Masika 2002, p 4). Furthermore, adaptation, that is, the ability to adapt to and cope with changes due to climate change, is also gendered. Adaptive capacities of individuals greatly depend on income, education, health and access to natural resources. Given that women tend to be poorer, less educated, have a lower health status and have limited direct access to or ownership of natural resources, they will be disproportionately affected by climate change (Masika 2002, p 5, Demetriades and Esplen 2010). For instance, it is predicted that climate change will negatively impact food production and availability of natural resources such as water. Scarcity of food can worsen



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women's nutritional status due to their marginalization within households. Also, as women are mainly responsible for gathering water for the household, paucity of water might increase the burden on women. The impact on women is likely to be worse in developing countries because of the deeper economic and social gender divide.

One aspect of gender and climate change that remains a huge gap and requires attention is that of climate change-induced migration. A United Nations Population Fund UNFPA (2009, p 35) report argues that migration requires economic and physical capacities that are not available to everyone. Due to issues pertaining to opportunities, capabilities as well as security, women, children and elderly are usually the ones left behind in the face of an environmental crisis. However, a more thorough analysis of women's vulnerability to climate change-induced migration is required to understand the gender dimensions of factors that lead to climate change-induced migration and the differential impacts that the process and outcomes of climate change-induced migration have on women. The questions that need to be examined are:

- (i) How does gender influence the vulnerabilities that increase the probability of or lead to climate change-induced migration?
- (ii) What are the gender dimensions of the process of climate change-induced migration, that is, actual movement of people; and outcomes of climate change-induced migration, such as rural-rural or rural-urban migration, out-migration mainly of men?

Although studies on gender and climate change-induced migration are scarce, I draw upon literature and studies on gender and climate change, gender and forced migration, and gender and disasters from developing and developed countries to propose a framework. Most literature deals with the impact of sudden climate disasters such as floods, cyclones and hurricanes, and not with the gradual effects of climate change. However, as the frequency and severity of sudden climate disasters is expected to increase, the findings from these studies are pertinent. It should be emphasized that the frameworks are intended to mainly examine the gendered nature of internal climate change-induced migration. However, it may be applicable to cross-border climate change-induced migration such as Nepal-India or Bangladesh-India, though there would be additional legal and institutional constraints.

First, this paper reviews literature on how gender influences peoples' vulnerability to climate change and subsequent migration, and proposes a framework which can be used to conduct a gender-sensitive vulnerability assessment. Second, the paper reviews literature to understand the gender dimensions of the actual process of climate change-induced migration and specific migration outcomes, and proposes a framework to examine gender and climate change-induced migration outcomes.

## 2. Gender and vulnerability to climate change-induced migration

### 2.1. Review of literature

Recently, a few studies have examined the linkages between climate change, migration, and gender using empirical evidence. Besides empirically supporting the theories, these studies are also methodologically relevant.

A series of studies were conducted using a monthly panel data collected in the Chitwan Valley of Nepal that covers a period of ten years. (Shrestha and Bhandari 2007, Massey *et al* 2007, Bohra-Mishra and Massey 2010). Though the primary objective was only to study the effects of environmental degradation on out-migration, all the studies disaggregate the effect by gender. The methods and results of these studies somewhat differ. However, a common conclusion is that for women in the Chitwan Valley, an increase in the collection time for fodder and firewood, and decline in agricultural productivity increases the probability of local (within district) out-migration. Climate change-induced migration for women is therefore closely linked with deterioration of natural resources as they are both the primary collectors and users.

In addition to environmental degradation and reduced access to natural resources, climate variability and natural disasters also have an impact on women's likelihood of migration. Using a cross-sectional survey of North Carolina coastal residents conducted in 1999 following the disastrous Hurricane Bonnie, Bateman and Edwards (2002) argue that women are more likely than men to evacuate in the wake of a natural disaster. Their findings indicate that women are more likely to evacuate than men because of socially constructed gender differences such as family obligations and caregiving; greater response to evacuation incentives such as availability of a vehicle and neighbor evacuation; higher exposure to risk due to their low economic status and special medical needs; and higher perceived risk due to caregiving responsibilities (Bateman and Edwards 2002 p 107). In contrast however, in developing countries where women's mobility is highly restricted such as Bangladesh, women are more likely to not evacuate and die due to natural disasters (Fothergill 1996, p 41). Therefore, even voluntary migration of women due to climate change is highly correlated to social contexts.

Women's ability to cope is another aspect of their vulnerability to climate change-induced migration. Lambrou and Piana (2006) argue that women's ability to adapt to climate change depends on their control over land and money; access to credit and safeguards; low dependency ratios; good health; personal mobility; and household entitlements. These arguments are supported by ethnographic evidence which was collected by ActionAid and the Institute for Development Studies (IDS) in a report on the impacts of climate change on poor South Asian women (India, Bangladesh and Nepal) and their adaptation needs and priorities (Mitchell *et al* 2007). The study, which was conducted in the Ganga river basin in the aftermath of massive riparian flooding, also finds that poor women particularly from Nepal were forced to migrate locally due to their low adaptive capacity (Mitchell *et al* 2007, p 16).

Furthermore, studies and surveys conducted in post-Hurricane Katrina New Orleans find that poor women who lacked home or renter's insurance were the ones who not only lost their shelter but also were not re-housed during the post-disaster reconstruction process thus making it difficult for them to return (Enarson 2006).

## 2.2. Conceptualizing climate change-induced migration

Climate change-induced migration, both voluntary and forced, is a gendered and socially embedded process. To examine the linkages between climate change, migration and gender more formally I propose a gender-sensitive vulnerability assessment framework. Drawing upon previous literature on vulnerability to climate change, I define vulnerability to climate change-induced migration as the exposure and sensitivity of groups or individuals to stress as a result of the impacts of climate change which in turn make them susceptible to migration due to their low levels of or absence of capacity to adapt (Adger 1999, IPCC 2001, Brooks *et al* 2005, Adger 2006, Chambers 2006, O'Brien *et al* 2008).

In terms of exposure the value attributes of the hazard, that is, its magnitude, frequency, duration and areal extent will be important determinants of who will be affected and thus, who will most likely be confronted with migration choices, when and for how long. For instance, if the climatic disaster is sudden and high in magnitude, there might be a sudden spike in climate change-induced migration from that particular affected region, but it may only be temporary. However, if the climate change impact is gradual and irreversible such as rising temperatures or sea levels over a relatively large area, then migration might occur over a period of time and may be permanent, with those having the capacity moving first and the poorest being left behind.

Similarly, in terms of sensitivity, certain regions and communities would be more sensitive to climate change-induced migration as compared to others. For instance, communities settled around river banks might be less sensitive to climate change-induced migration as compared to those settled in low-elevation coastal zones (LECZs). And in terms of adaptive capacity, communities, which have traditionally devised ways and methods to adapt to climate change, or which are constantly and proactively adapting themselves, might be less likely to migrate.

## 2.3. Framework to examine gender and vulnerability to climate change-induced migration

Previous studies have used the indicator approach to operationalize the three dimensions of vulnerability to climate change (Yohe and Tol 2002, Brenkert and Malone 2005, Brooks *et al* 2005, Hanh *et al* 2009). I follow a similar approach and draw upon the literature to propose a framework to operationalize and examine gender and vulnerability to climate change-induced migration. Figure 1 lists these indicators and potential gendered impact. A crucial advantage of the indicator approach is that it takes into account the multi-dimensional nature

of vulnerability. The framework also specifies the phase during which women are most likely to be vulnerable. For instance, when a high-intensity environmental disaster strikes, women in culturally conservative societies could be more vulnerable before or during migration because they might feel ashamed to leave the house or are less likely than men to know how to swim (Nelson *et al* 2002). Further, women might be more vulnerable post-migration due to lack of education or livelihood-generating skills.

## 3. Gender dimensions of the process of climate change-induced migration

There is very little research done on how women are affected during the actual process of climate change-induced migration. However, some understanding can be gained from the limited literature and research conducted in developed countries. The main issues facing women during climate-induced displacement are security and adequate emergency relief (Gururaja 2000, Enarson 2006, Mitchell *et al* 2007, Brown 2008, Brody *et al* 2008).

Brown (2008, p 34) states that just like other internally displaced women, climate-induced women migrants are at a greater risk of sexual and gender-based violence. Evidence on this can be found in the ActionAid and IDS report (Mitchell *et al* 2007 p 10), where many women state lack of safe shelters upon being evacuated or forced to migrate as one of their primary concerns. There are also other issues of safety and security arising from women's health status and disintegration of social networks. Mitchell *et al* (2007, p 10) observe that women suffer from psychosocial impacts of natural disasters to a greater degree as compared to men. The extra burden of looking after their family members even when they themselves were in great distress resulted in many women to suffer from anxiety and post-traumatic stress. Further, the breaking of social ties and separation of families also had a severe impact on these women. Similar signs of stress were also observed among the women who were displaced by Hurricane Katrina in New Orleans (Enarson 2006). In addition to these, often women are not allowed direct access to relief aid because they are not the 'head of the household' (Spring 2008). Such exclusion is likely to make them more vulnerable.

A related issue is that of providing timely and adequate emergency relief to women who have been displaced due to climate change. A study by Enarson (1999) conducted in-depth interviews and focus groups sessions with women who were displaced due to two major natural disasters in the US—Hurricane Andrew that hit Miami in 1992, and the 1997 Red River Valley flood. She found that temporary trailer camps provided by emergency relief workers were not designed for the needs of women and children. There were no provisions for their safety, and mental and reproductive health (Enarson 1999, p 16). Another qualitative survey of African American women displaced by Hurricane Katrina found that they had difficulties in receiving timely emergency

Vulnerability Component	Indicators	Gender dimensions or differential impacts on women	Phase of migration	Case example (where available)
Exposure	Climate variability  Frequency of environmental disasters	Due to cultural constraints on women's mobility, there is evidence that women are more likely than men to die during environmental disasters or during the process of migration	Pre- or during migration	Women in Bangladesh were found to be more vulnerable during cyclones because cultural norms prevented them from leaving their homes on time and learning to swim (Nelson <i>et al</i> 2002)
Sensitivity	Water sensitivity	Due to women's distinct roles in water collection and use, water stress would result in increased burden on women due to increase in time spent and distance traveled to collect water before and after migration	Pre- or post-migration	Water stress due to climate change is expected to cause further difficulties for women in West Africa (Denton 2002)
	Land sensitivity	Women's informal rights to resources could decrease or disappear as access to land and natural resources dwindle due to climate change-induced migration	Post-migration	Many women were permanently displaced post-Hurricane Katrina due to lack of housing ownership (Willinger 2008)
	Food sensitivity	Due to household-level differences in food distribution, low productivity due to climate change may result in further deterioration in nutritional status for women post-migration	Post-migration	Women's pre-disaster low nutritional status in Bangladesh was found to have worsened post-disaster (Cannon 2002)
	Economic sensitivity	Due to women's low economic freedom, they have fewer resources to cope with the adverse impacts of climate change or engage in migration	Pre-migration	Post-Hurricane Andrew, poor female-headed households were less able to provide immediate relief to their families (Enarson and Morrow 1997)
	Perceived sensitivity	Women tend to perceive migration risks more seriously because of their engagement in caregiving and preparedness activities	Pre- or during migration	Post-Hurricane Bonnie, women were found to be more likely to feel threatened and evacuate due to their caregiving roles (Bateman and Edwards 2002)
Adaptive capacity	Education	Women are generally less educated than men and have fewer vocational skills, which would make it difficult for them to find formal employment after being forced to migrate	Post-migration	Post-cyclones and floods, displaced women in Bangladesh were forced into labor-intensive and low-paying jobs due to low levels of education (Kakissis 2010)
	Health	Women's low nutritional-status may put them at high health risk both following the environmental disaster as well as after migrating to a new place	During and post-migration	Post-El Niño, displaced women in Peru were found to be disproportionately exposed to epidemics and health risks such as peri- and post-partum illnesses (Reyes 2002)
	Livelihood diversification	Women primarily engaged in agricultural labor have limited fallback options to spread their risks and therefore lack the adaptive capacity to cope with climate change-induced migration	Post-migration	Women from the fishing community in the Philippines facing climate disasters were forced to work as domestic helps due to lack of skills (UNFPA 2009)
	Safety nets and social safeguards	Communities where women effectively engage in collective natural resources management may also have better adaptive capacity to recover from the climate disaster and avoid migration	Pre-migration	Mama Watoto Women's Group in Kenya has successfully addressed issues of loss of biodiversity and scarcity of fuelwood through collective participation and cooperation (Aguilar <i>et al</i> 2009)
			Pre-migration	Strong social networks of women with extended family members or neighbors may prevent individuals and families from seeking shelter elsewhere
	Technological capacity	Women having access to agricultural technology such as new crop varieties, may be better able to adapt to climate change and avoid migration	Pre-migration	Positive effects of technological capacity on climate change adaptation were found among women in the Ganga Basin in Bangladesh, India, and Nepal (Mitchell <i>et al</i> 2007)
Women having access to TV, radio, or mobile phones may be able to forewarn their families and the larger community of the impending climate risks and consequently avoid migration or relocate to safer locations		Pre- or during migration	Providing mobile phones to vulnerable communities in the Lower Mekong Basin in Vietnam was found to increase the effectiveness of response to the 2008 flood season (Ospina and Heeks 2010)	

Source: Author analysis

Figure 1. Framework to operationalize and examine vulnerability to climate change-induced migration and their gender dimensions.

aid suggesting that gender interacts with race to make some women even worse off (Murakami-Ramalho and Durodoye 2008, as cited in Hunter and David 2009).

Though there is yet no research on this, a potential problem pertaining to security and emergency relief is

international climate change-induced migration and the debate over whether climate migrants need to be given 'refugee' status. There is a clear division amongst the development and human rights community. One side favors the inclusion of climate migrants in the 1951 Refugee



Convention in order to provide them with protection similar to that provided to refugees. While the other side argues that the existence of 'environmental migrants' itself is exaggerated and their need for refugee-like protection is politically motivated (Stavropoulou 2008, p 11). This debate can have serious repercussions for women who are already facing the adverse consequences of climate change-induced migration and not receiving enough relief aid.

To understand the potential gravity of the problem let us take the example of the India–Bangladesh migration corridor. A report by the US National Intelligence Council on climate change and cross-border migration (US Office of the Director of National Intelligence 2009) predicts that people affected by climate change in Bangladesh will most likely migrate to India. Currently, there are about 15–20 million people who have migrated to India from Bangladesh, most of them being illegal immigrants. India's anti-immigration position and the fact that it has not ratified the 1951 Refugee Convention, exposes the entire climate migrant population and particularly the women to high personal security risks. There are numerous cases where illegal women migrants from Bangladesh have been 'sold' as wives or trafficked because they were not provided any protection due to their illegal status (Ramachandran 2005, p 7–8).

Thus, women are differentially impacted during the process of climate change-induced migration. There are safety and security issues pertaining to internal as well as international migration. Climate change policy aimed at climate migrants needs to be sensitive to these issues and also incorporate legal and human rights frameworks necessary to assist women climate migrants.

#### 4. Gender dimensions of the outcomes of climate change-induced migration

Climate change will result in different migration outcomes depending on the degree of vulnerability. Specifically, there would be temporary versus permanent climate change-induced migration. Even within these there are variations in adaptive strategies such as internal (local) versus international, and rural–rural versus rural–urban. An important sub-component of these from a gendered perspective is out-migration of men. Less is known about climate change as a push factor for these migration outcomes, and even less is known about their gender dimensions. Again however, we can draw upon the limited literature, case studies, and experiences of countries in other regions.

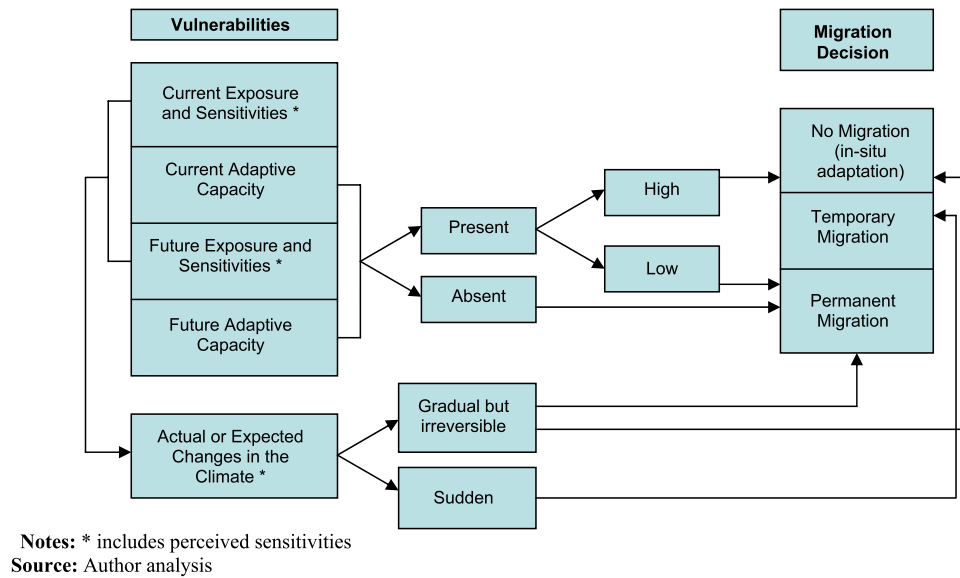
Hunter and David (2009, p 21) argue that migration outcomes are not uniform across men and women. This is especially true when the effects of climate change are felt gradually and a member of the family, usually a male member, migrates in search of alternative livelihoods. Even when women are not the ones who are forced to migrate in search of livelihoods, climate change-induced migration has an impact on them. In a study conducted in the Sonora state of Mexico, where many communities are engaged in processing fruits and vegetables, it was found that declines in water availability due to climate change reduced the prospects

in the food processing industry forcing a lot of men in the community to migrate. However, this increased the workload of women, as many of them had to care for their families in addition to working part time in the food processing industry (Buechler 2009, p 51). Similarly, in Nepal, as more and more males migrate from mountainous regions and rural areas to newly developed cities, more and more women are becoming heads of households, remaining in areas prone to flooding and are therefore most vulnerable to climate-related disasters (UNFPA 2009, p 33). A study on climate change and migration in Somalia and Burundi by Kolmannskog (2009) found that men in many pastoral families migrated in search of work due to severe drought conditions. Consequently, women who were left behind faced increasing risks of expulsion from their families and communities, and sexual violence. In contrast, drawing upon the literature on gender and migration, Brown (2008, p 34) posits that male out-migration due to climate change can also have positive impacts such as increased autonomy and decision-making power for the female members of the family.

Women who are forced to migrate due to climate change with their families or by themselves also face unique problems. It was found that women from poor families in rural Bangladesh, who migrate to cities such as Dhaka are often forced into long hours and low-paying jobs such as domestic servants and sweatshops due to their lack of education and skills (Kakissis 2010). Similar observations were made in the Philippines where women from the fishing communities, who were grappling with the harsh impacts of climate change, migrated locally to work as domestic helps for affluent families (UNFPA 2009, p 3). In a report titled *Katrina and the Women of New Orleans*, Willinger (2008) combined data from the US Census and the American Community Survey to find that post-Katrina there was a decrease of approximately 60% in the number of female-headed households, especially of those who were African American and had children under age 18. She further finds that the main reasons due to which many of them could not return were affordability of housing and health care, and lack of employment opportunities. Thus, climate change-induced migration can potentially push women into a poverty trap or permanently displace them from their homes.

Drawing upon the broader literature on gender and international or cross-border migration, it can be said that overcoming cultural barriers while maintaining their identities will be a significant problem for women climate migrants. Ramachandran (2005, p 9) finds that many women who migrated to India from Bangladesh had to or were forced to assume Hindu religious markers, such as vermilion on their forehead, to evade detection and deportation. The increasing threat of climate change in Bangladesh and tightening of the immigration policy in India will only intensify these problems. Concerns regarding loss of culture and identity were also observed among women in Kiribati, where inhabitants are increasingly facing the risk of resettlement due to sea-level rise (UNFPA 2009, p 30).

Thus, migration outcomes of climate change are also gendered. On one hand they may seem to be empowering



**Figure 2.** Analytical framework to examine gender and climate change-induced migration decisions.

women, while on the other they may actually exacerbate their socio-economic status and make them worse off. Gender distinctions in vulnerabilities not only determine who migrates, but also, for who is it easier to return and restore their lives.

The framework in figure 2 links vulnerabilities with migration outcomes and serves as a guide to examine gender and climate change-induced migration decisions. For instance, women facing high exposure but having very low adaptive capacities are likely to be forced to migrate permanently such as the women affected by Hurricane Katrina, who were not able to return due to lack of housing, relief aid, and employment opportunities. Most migration decisions are likely to be internal or within country because of the lack of resources to undertake international migration following a climate change disaster, and social and economic ties (Bohra-Mishra and Massey 2010).

### 5. Conclusion

In conclusion it can be said that the experiences, needs, and priorities of climate migrants will vary by gender and these differences need to be accounted for if policies are to be inclusive. Governments, donor organizations, and the civil society should shoulder the responsibility to initiate efforts that promote women’s education, health, agricultural knowledge and rights that will reduce the impact of climate change on women. In thinking about vulnerability to climate change-induced migration in developing countries, researchers should focus on women as being one of the most vulnerable groups. Inter-disciplinary studies on climate migrants explicitly delineating the experiences of and effects on men and women are required for a more nuanced understanding of the gender dimensions. The frameworks proposed in this paper are intended to provide a way forward.

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