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Shouraseni Sen Roy

# Linking Gender to Climate Change Impacts in the Global South

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*To my husband, Oliver Martin, for his  
unrelenting support and always being there.*

# Preface

The Global South is broadly defined as the nations of Africa, Central and South America, and most of Asia including the Middle East. It encompasses at least 150 of the world's 184 recognized states, with many markedly less developed or with severely limited resources. It is widely validated that the impacts of climate change—including heat waves, flooding, drought, and famine—will be felt most strongly by poor communities in the less-developed countries of the Global South, where impacts are exacerbated by poverty and the lack of infrastructure. In general, the challenges and impacts of projected and already-occurring global warming are broadly similar throughout the Global South. In view of the differential impacts of climate change on men versus women, some of the main questions addressed in the book are:

- How does climate change affect access to regional opportunities and resources in the form of education, participation in decision-making processes, food security, and health resources?
- What kinds of obstacles are created by climate change processes that affect women more distinctly than men?

Variability in climatic conditions impacts human and physical systems at different geographic scales and is further complicated by local environmental factors and topography, which affect the vulnerability of resident populations. Negative impacts of climate change are also experienced within relatively small time periods in the form of natural hazards—landslides, floods, hurricanes, and in the long run by the gradual degradation of the immediate environment (damaging effects of long-term increases in temperatures and the frequency of extreme weather events). Adverse impacts of climate change are already evident on agricultural productivity and food security in response to worsening droughts, increasingly vulnerable biodiversity and ecosystems, stressed water resources, human health problems such as infectious diseases spread across newer territories and settlements, migration patterns, energy, transport, and industry. These detrimental impacts of climate change, especially in developing countries, often affect women more than men. A clear majority of the world's 1.5 billion people living on \$1 a day or less are women (UNFPA, 2009),

who rely most heavily on those natural resources susceptible to climate change. In many cases, women also face greater social, economic, and political challenges than males, which limit their coping capacity. Some of the critical issues can be summarized as follows:

- In rural areas women are usually responsible for collecting water for the families as well as fuel wood for cooking and heating. Specifically, in almost two-thirds of developing countries, women and girls are primarily responsible for obtaining water for their households and communities (UNDP, 2009). They often have to walk longer distances to collect water and fuel wood due to lengthening and intensified droughts resulting from deforestation and resource depletion. As distances to water sources lengthen due to increasing droughts, they become more vulnerable to violence and to the vagaries of harsh weather conditions, such as high temperatures. Not surprisingly, this detracts from the time they can spend getting and completing their education.
- Unequal access to resources and decision-making processes, along with limited mobility, exposes women in rural areas to more of the negative effects of climate change. Often, in view of the traditionally limited role of women in decision-making processes at the household, village, and national levels in most cultures, their needs, interests, and constraints are poorly reflected in policy-making processes and governmental programs aimed at poverty reduction, food security, and environmental sustainability (FAO, 2014).
- Mortality associated with indoor smoke from burning solid fuel amounts to nearly 4.3 million deaths per year, with women and children in rural areas at greatest risk (WHO, 2014). About 25% of these fatalities occur in India, where women and children spend more time in homes that burn fuel wood and coal for cooking and heating purposes (UNDP, 2011). Furthermore, it has been noted that some 80% of rural women in Asia are affected by the growing shortage of firewood (UNDP, 2009).
- A greater proportion of women in poor countries engage in subsistence farming and water collection, exposing them more adversely to the effects of environmental degradation in the form of food shortages and malnutrition (UNFPA, 2009).

In this context, two of the major goals identified in the recently adopted Sustainable Development Goals (SDG) by the United Nations (UN) include taking urgent action to combat climate change and its impacts, and achieve gender equality and empower all women and girls (UN, 2015).

Some of the main aspects of these goals include strengthening resilience and adaptive capacity to climate-related hazards, improving education and awareness about climate change-related issues, and incorporating climate change issues in national and local level policies. Through the gender empowerment goal, the UN aims to eliminate all forms of violence against women and girls, harmful practices against women and girls, and ensure full and effective participation and equal opportunities at all levels of decision making and political processes. Thus there is greater emphasis on gender mainstreaming methodology, which consists of integrating a gendered approach into development and environmental efforts



(UNCCD, 2011). It includes women's participation in existing strategies and programs. Furthermore, there is greater emphasis on gender-related issues in climate change dialogues, programs, and projects.

The disproportionate burden of long-term impacts of climate change on women has recently been highlighted in reports published by various UN agencies, including UNDP, FAO, WHO, and UNESCO. These reports focus on specific impacts of climate change on women in various regions of the Global South, highlighting issues such as human health, agriculture and food security, and indoor pollution. They further highlight the importance of incorporating the differential impacts of long-term climate change on women, and thereby encourage the participation of women in decision-making processes at the local level. This is particularly significant in the case of South Asia, which is undergoing a massive transformation in its socio-ecological sphere related to climate change while traditional patriarchal societies face strong challenges to their gendered power structures. Therefore, this book highlights the gendered differences in the impacts of climate change in the Global South examined under the major themes of health, water, conflicts, extreme weather, food security and nutrition, and changing urban social contexts. It consists of a comprehensive analysis of the disproportionately negative impacts of climate change on women and girls in the Global South in the context of the issues highlighted above.

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# Chapter 1

## Climate Change in the Global South: Trends and Spatial Patterns



The warnings about global warming have been extremely clear for a long time. We are facing a global climate crisis. It is deepening. We are entering a period of consequences.

—Al Gore

Sustainable Development Goal 13: “Take urgent action to combat climate change and its impacts”(United Nations 2016).

### Introduction

In a recently published commentary piece in *Nature* journal, the authors called for “ditching” the global warming target of 2 °C above pre-industrial levels that was signed by over 200 countries in the 2009 Copenhagen Summit (United Nations 2016). They argue that this goal is unachievable and impractical. They suggest that instead of monitoring the global average planetary temperatures, certain “vital signs” should be tracked. These vital signs include concentrations of CO<sub>2</sub> and other greenhouse gases, pollutants such as methane and soot that have local and regional implications, ocean heat content, and high-latitude temperatures. Since it was published in October 2014, this article received widespread coverage particularly in view of the then upcoming COP21 conference in Paris in 2015. It highlighted the issue of climate change and associated impacts, which has led to debates both for and against the authors’ viewpoints. Several scientists, including Stefan Rahmstorf at Real Climate, William Hare at Climate Analytics, David Roberts at Grist, and Jonathan Koomey at EcoWatch strongly urged for more urgent action toward the 2 °C target (Koomey 2015). The net positive result of all of this discussion is that it has brought the climate change debate back to the forefront. It is now widely mentioned in political speeches either in the form of denial or call for action. There is at least one climate change related story daily across all leading news websites. In this regard a major movement started by The Guardian newspaper in collaboration with 350.org, an activist group, is titled “Keep it in the Ground” campaign. The

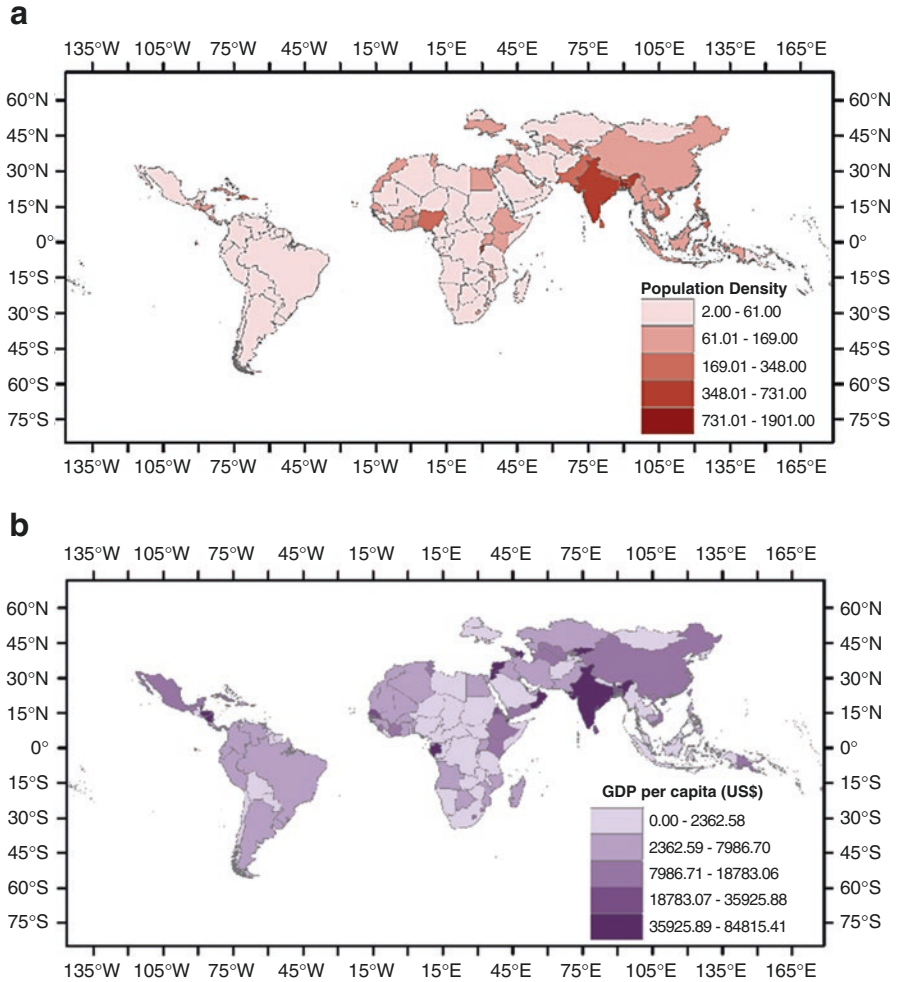
movement has been gaining momentum through the support of major universities and celebrities, while also encouraging divestment of their assets from oil, gas, and coal companies. Some of the major supporters of this campaign include the Rockefeller Brothers Fund, universities such as Stanford, Glasgow, and Australian National Universities, and the British Medical Association. The discussion about climate change was further invigorated by the latest statements on climate change through the papal encyclical in June 2015 by Pope Francis. He emphasized for an urgent need to develop policies to reduce the emission levels of greenhouse gases, and substitute fossil fuels by developing renewable sources of energy.

Given the renewed interest in climate change related processes and impacts, it is important to first look at the facts from the recent report on climate change by the Intergovernmental Panel on Climate Change (IPCC). During the past few decades, research on climate change has expanded significantly due largely to questions regarding the buildup of greenhouse gases in the atmosphere. The main findings concerning long-term trends in climate change from the recently published Fifth Assessment Report of the IPCC (Stocker et al. 2013) include the following:

- It has been widely validated that the entire globe has experienced warming, although with substantial decadal and inter-annual variability. The average global linear trend for combined land and ocean surface temperatures indicate a warming of 0.85 (0.65–1.06)°C between 1880 and 2012. For the most recent decade, 2003–2012, this trend is 0.78 (0.72–0.85)°C.
- There is significant evidence demonstrating the very likely decrease in the number of cold days and nights, as well as an increase in the number of warm days and nights on a global scale. These findings are further intensified by the higher frequency of heat waves in parts of Europe, Asia, and Australia.
- In addition, increases in number of heavy precipitation events have been recorded in many regions of the world.

Overall, the greatest negative impact of climate change will be on the poor regions of the world, concentrated mainly in the Global South. However, significant uncertainty exists concerning regional variations in climate change impact due to inadequate long-term data records as well as insufficient coverage in these countries. Additionally, the adverse social and economic impacts of climate change are further aggravated by widespread poverty and lack of adequate public infrastructure. Therefore, a better understanding of the impacts of global environmental change will require an integrated international effort to collect, synthesize and analyze the pertinent data in order to determine the most important actions (Stern 2007). Specifically, there is uncertainty as to how local populations and their ecosystems will be affected by and adapt to these changing conditions at various spatial scales, particularly in the vulnerable regions of the Global South.

The Global South, consisting of Africa, Southeast Asia, the Middle East, Mexico, Central and South America, also overlaps with the less developed and poorer regions of the world (Fig. 1.1). It comprises regions at different levels of development along with the highest population density and lowest per capita income levels. Some regions in the Global South are also behind in technology, with massive gaps in



**Fig. 1.1** Spatial variations in the Global South (a) Population Density; (b) GDP Per Capita (US\$)

basic infrastructure for their rapidly increasing populations. Furthermore, there is substantial instability in the political, economic, and social spheres, which will magnify the future impacts of climate change such as severe weather events (including droughts, desertification, floods, and heat waves). This widespread instability will result in displacement of populations, ethnic and regional conflicts, hunger, and infectious diseases. As shown in Fig. 1.1 the majority of the Global South is concentrated in the tropics and subtropics on both sides of the equator. Eight of the ten most populous countries in the world are located in the Global South, which is projected to increase to nine out of ten countries by 2050 (Fig. 1.1a) (Population Reference Bureau 2015). Additionally, the top ten countries with the highest fertility

rate are all located in the Global South, specifically in Africa, along with some of the lowest GDP per capita.

However, this region also offers many opportunities in the form of emerging technologies, natural resources, and innovative approaches to dealing with impending climate change. For instance, sea level rise is considered to be one of the most menacing effects of global warming. This would affect a major proportion of the population in the Global South, due to the high density of population concentrated in the low lying coastal areas in the larger continents. As a result of sea level rise some of the smaller islands in the Caribbean and Pacific risk disappearing entirely. Sea level rise would also have massive detrimental impacts for the small island nations whose economies greatly depend on tourism. It is estimated that 25% of the population across the African continent will be affected by sea level rise (Juma 2010). On the other hand, desertification is another major impact of climate change that will affect major areas of the Global South, including the Middle East, Southern Africa, Central and East Asia. There is evidence that the recent conflicts in Darfur were aggravated by desertification (Juma 2010). Conversely widespread flooding in parts of northwestern Pakistan, Bangladesh, the Philippines and other parts of Asia has been caused by unusually extreme heavy precipitation events and hurricanes. This has resulted in cutting off large populations' access to food and relief for days and weeks. Additionally, the adverse impacts of climate change are magnified on vulnerable populations including low income communities, women, and children. Furthermore, the access to limited essential resources, including access to clean drinking water and livelihood opportunities, is compromised to a greater extent for the people living in the Global South. Therefore, it is important to examine regional scale long term trends in climate change related processes and their impacts in the Global South.

The focus of this chapter is to gain an in-depth understanding of long term trends in climate change processes and future predictions across the Global South. According to the latest report of the IPCC, the climate system has experienced increased rates of warming over the last three decades, compared to all decades before 1850. The recent period from 1983 to 2012 was the warmest 30 year period over the last 1400 years in the northern hemisphere. This was followed by the recent announcement by the National Climate Data Center (NCDC) that the average temperatures over land and oceans in 2014 were the highest observed temperatures since record keeping started in 1880. It was also noted that there was substantial inter-annual and decadal variability, with periods of weaker trends or hiatus in warming since 1998. Specifically, the decade of the 2000s has been identified as the warmest decade in instrumental record. These observations are based on measurements from a variety of sources including ground-based station observations, remote sensing (including satellites), and other proxy sources. There is also a general consensus about the aggravating role of anthropogenic activities related to the buildup of greenhouse gases on the resulting long term trends in climatic conditions across the earth's surface.

This warming is not only restricted to the land surface but also extends to the oceans, which have experienced significant warming at various depths during



multiple time periods. For decades the oceans have absorbed 90% of the earth's heat generated by greenhouse gas emissions. This warming of the oceans has been identified as one of the main contributors to the total overall heating rate in the climate system. As the oceans slowly start releasing the heat back to the atmosphere it will lead to a greater rate of warming of the earth's atmosphere. These long term trends in the climate system have been further modified by variability at the inter-annual and inter decadal scales.

Despite the overall long term trends in surface and ocean temperatures, there are substantial differences when these trends are examined at the regional scale. For example, the tropics are more vulnerable to the direct and immediate impacts of climate change and its associated variability. Therefore, in the following sections the different aspects of climate change processes and related spatial variations in the Global South are highlighted through some basic questions. These questions are addressed through a review of various scientific publications and relevant case studies from the Global South.

## **How Much Has the Earth Warmed?**

There is widespread consensus about the increasing trend in temperatures throughout the globe. As mentioned above there is a clear positive trend in the long term temperature records across the earth, particularly over the last two decades. Based on the analysis of several datasets the trends in average temperatures are the highest over the Global South, which is densely populated and characterized by relatively lower levels of development such as parts of Africa and Asia. However, based on the overall trends demonstrated from all datasets, it is evident that nearly the entire earth surface, including land and oceans, experienced positive trends over the time period of 1901–2012. The only exceptions occur in parts of the northwestern Atlantic Ocean. Some of the areas of highest positive trends are clustered over northern Africa, interior Asia, eastern part of the South America, and higher latitudes in northern North America and the Southern Ocean.

However, the spatial patterns of the overall trends are more informative at the decadal level trends. The data quality improves significantly since 1951 for all regions, specifically across the Global South. During 1911–1940, the positive trends are mostly concentrated across the western half of the earth surface, including the Atlantic Ocean. The middle period from 1951 to 1980 experienced an overall neutral to negative trend across most of the earth's surface. In general the positive trends were more concentrated over the oceanic areas in the southern hemisphere. However, the trends are mostly reversed for the recent-most period of 1981–2012, during which positive trends are observed in all regions of the earth except the eastern Pacific Ocean. This has been attributed to the multi-decadal oscillation in the northern Pacific Ocean, referred to as the Pacific Decadal Oscillation (PDO), and a weak El Niño Southern Oscillation (ENSO), which will be discussed in a later section. Again, the strongest positive trends are concentrated over Asia and northern Africa.