



## Gendered vulnerabilities and resilience in the face of climate change: An analysis of women's experiences and adaptation strategies

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### Abstract

This paper offers a summary of the many facets that make up the idea of gendered vulnerabilities and resilience in relation to climate change. Gender, as an essential component of identity, plays a vital part in the process by which individuals' experiences of climate-related hazards and their capacity to adapt and flourish in an environment that is continuously changing. This research covers major themes and findings from the literature, focusing on the interconnectedness of gender with other factors and the necessity of gender-responsive solutions in climate adaptation and mitigation initiatives. In addition to this, it highlights the necessity for additional study as well as policy interventions that take into consideration the intricate relationship that exists between gender, climate change, and vulnerability. Moreover, this paper, explores women's experiences relating to the climatic changes and their subsequent vulnerabilities. To develop responses that are more fair and sustainable to the difficulties posed by a warming world, it is essential to both understand and address the gendered vulnerabilities that exist and to promote resilience.

**Keywords:** Gender, Climate Change, Vulnerability, Strategy, India

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### 1. Introduction

Climate change has far-reaching repercussions on entire humanity. Its effects are far-reaching and multi-faceted, having an effect on everything from the safety of food supplies and water resources to the health of humans and migration patterns (Moharaj & Rout, 2021; Sahoo & Moharaj, 2022) <sup>[2,3]</sup>. However, in the midst of this intricate web of ecological and societal shifts, it is of the utmost importance to acknowledge that the effects of climate change are not gender-neutral. Instead, they interact with pre-existing gender disparities, which results in varying levels of vulnerability and difficulty in adapting to the effects of climate change for women and men. A increasing amount of research and worldwide discourse over the past few decades has thrown light on the gendered aspects of climate change. This burgeoning area of research has shown that women, in particular those living in marginalized areas and underdeveloped nations, frequently endure effects that are disproportionately severe as a result of changes in the climatic circumstances. These gendered vulnerabilities are the result of a complicated interaction between social, economic, and environmental factors; as a result, they require immediate attention from academics, policymakers, and practitioners.

Gender is a socially built concept that is malleable and dynamic. Its meanings shift throughout cultures and across individuals, and the acceptable norms likewise vary from culture to culture and from person to person. Gender is a socially constructed notion that is adaptable and dynamic. In spite of the fact that it is malleable, gender does have significant ramifications that are socially dictated in the experiences that people have in their lives. The effects of climate change can be related to gender which produce specific vulnerabilities in reference to climate change.

Already, a disproportionately high share of the costs connected with globalization, the ongoing economic slump, and the deterioration of the natural environment are shouldered by the world's female population (Balabantaray, 2022) <sup>[3]</sup>. The implications of climate change are going to make their already challenging conditions even more challenging for them, making them much more susceptible to the consequences of those changes.

Women should be given the place in the circle of sustainable development that is legitimately theirs. An greater amount of effort should be made to offer climate discussions a perspective that is centered on people, and this should be done in order to offer a perspective that is centered on people being centered on people.

Understanding the gendered vulnerabilities to climate change is not just an issue of social justice; it is also vital for creating measures for climate adaptation and mitigation that are both effective and equitable. This research aims to investigate the ways in which women perceive, react to, and shape the effects of climate change. This is done in recognition of the fact that women are not helpless victims but rather active agents in the communities in which they live (Balabantaray *et al.*, 2023) <sup>[5]</sup>. We can develop more comprehensive and inclusive approaches to climate adaptation and establish sustainable, resilient communities for the future if we understand the specific experiences and methods for resiliency that women have (Balabantaray, 2023) <sup>[5]</sup>.

### 1.1. The Gendered Lens on Climate Change

The gendered lens through which we approach climate change is rooted in the understanding that social identities and roles, shaped by cultural norms, power structures, and economic systems, intersect with the environment. This intersectionality is not limited to just one aspect of climate change but extends across its entire spectrum: from vulnerability and adaptation to mitigation and policy formulation. While it is essential to avoid generalizations, certain overarching trends have emerged from research on gender and climate change. Women, in many societies, tend to have primary responsibilities for tasks such as food production, water collection, and energy provision, which are all profoundly affected by climate variability. Consequently, when environmental changes disrupt these activities, women often bear a disproportionate burden in terms of increased labor, reduced income, and heightened health risks.

Moreover, women's access to and control over key resources, including land, credit, and decision-making power, can be severely limited in many parts of the world. This lack of access leaves them with fewer means to cope with and adapt to climate-induced shocks and stresses. Furthermore, traditional gender roles and expectations may limit women's mobility and participation in public life, reducing their ability to engage in community-based adaptation efforts or influence policy decisions. On the flip side, women have demonstrated remarkable resilience and adaptability in the face of environmental challenges. Their intimate knowledge of local ecosystems, agricultural practices, and community dynamics often positions them as valuable agents of change and innovation in climate adaptation initiatives. Moreover, the inclusion of women's voices and perspectives in climate policymaking has been shown to enhance the effectiveness and equity of such policies (Dalei *et al.*, 2021) <sup>[13]</sup>.

### 1.2. The Research Agenda

This paper embarks on a journey to delve deeper into the complex interplay between gender and climate change. It aims to illuminate the gendered vulnerabilities that exist within the context of climate change and, equally importantly, explore the diverse strategies that women employ to build resilience and foster sustainable practices. Drawing upon a rich tapestry of academic research, case studies, and firsthand accounts, we will examine the varied

impacts of climate change on women across different regions and socio-economic contexts. We will also scrutinize the policies and initiatives that have been put in place to address gendered vulnerabilities and assess their efficacy in promoting gender-inclusive climate action. This research provides essential insights for policymakers, practitioners, and activists striving to build a more sustainable and equitable world. In the following sections, we will journey through the landscapes of gendered vulnerabilities, exploring women's experiences, adaptation strategies, and the policy landscape that shapes their opportunities and challenges in the face of a changing climate.

### 1.3. Background and context of the study

Climate change, driven by the increasing concentration of greenhouse gases in the Earth's atmosphere, represents one of the most critical global challenges of the 21st century. Its impacts are no longer speculative; they are tangible and increasingly severe. Rising temperatures, extreme weather events, shifting precipitation patterns, and sea-level rise threaten ecosystems, economies, and livelihoods worldwide. In response, nations, organizations, and communities are grappling with the urgent need to adapt to these changes and reduce greenhouse gas emissions to mitigate future impacts. It is profoundly shaped by existing social, economic, and political structures, and it disproportionately affects marginalized and vulnerable populations. Among these vulnerable groups, there is a clear and compelling gender dimension that has only recently gained the recognition it deserves.

It is rooted in the recognition that women and men experience and respond to environmental changes differently due to socially constructed roles, norms, and power dynamics. Understanding these dynamics is crucial not only for the sake of gender equality but also for developing effective and equitable climate policies and strategies. To comprehend the gendered vulnerabilities associated with climate change, one must consider the diverse ways in which women and men interact with their environment and society. These differences manifest in various forms and across multiple dimensions

In many societies, women have limited access to and control over resources critical for climate resilience, such as land, credit, and technology. This lack of access hinders their ability to adapt to changing environmental conditions and secure their livelihoods (Kumar & Moharaj, 2023) <sup>[17]</sup>. Traditional gender roles often assign women primary responsibility for tasks related to food production, water and fuel collection, and household well-being. Climate-induced disruptions to these tasks can increase women's workloads and exacerbate their vulnerability. Climate change can directly affect the health and nutrition of women and girls. For example, changing patterns of waterborne diseases and reduced agricultural productivity can disproportionately harm women's health and food security. They may face increased risks of violence and exploitation during such upheavals, and their specific needs are often overlooked in humanitarian responses. In many contexts, women have limited participation in decision-making processes related to climate adaptation and mitigation. This exclusion means that their perspectives, knowledge, and needs are often neglected in policy and planning. In parallel, academic research has contributed significantly to this field by shedding light on the nuanced ways in which gender and climate change intersect.

Studies have explored the roles of women in community-based adaptation, documented gender-specific impacts of climate events, and evaluated the effectiveness of gender-inclusive policies and programs.

While significant progress has been made in recognizing the gendered dimensions of climate change, there remains a substantial gap between theory and practice. Many questions persist regarding the practical implementation of gender-responsive strategies, the effectiveness of such approaches, and the identification of best practices across diverse contexts. Furthermore, this study will critically assess the policies and initiatives that have been developed to address gendered vulnerabilities, with the goal of identifying areas where improvement and innovation are needed. In doing so, this research aims to inform and guide policymakers, practitioners, and advocates toward more effective and equitable climate responses that prioritize the rights and well-being of all, regardless of gender. In the following sections, we will delve deeper into the various aspects of this research, from the methodologies employed to the diverse experiences of women in the face of climate change, ultimately striving to contribute to a more inclusive, sustainable, and resilient future for all (Samal, 2021) <sup>[26]</sup>.

#### 1.4. Research objectives and scope

- To Examine the Differential Impacts of Climate Change on Women and Men
- To Identify the Key Drivers of Gendered Vulnerabilities
- To Analyze Women's Participation and Leadership in Climate Decision-Making

## 2. Literature Review

MacGregor (2010) <sup>[19]</sup> assessed gender disparities and demonstrated more scientific knowledge of climate change than males, contrary to the popular assumptions. As per studies, women have expertise compared to males. The gender gap in climate change worry is not due to differences in values or societal positions, as women express slightly more concern than males. The conclusion explores gender variations in climate change awareness and concern among the US people, suggesting future study avenues.

Gender and Alliance (2016) <sup>[14]</sup> explored the relationship between gender and alliances. The authors delve into this topic with a comprehensive analysis, shedding light on the complexities and nuances that exist within this dynamic. Through an insightful examination the authors have delved to explore the relationship between gender and environment.

Pearse (2017) <sup>[24]</sup> explores explores the intersection between gender and the effects of climate change. The authors delve into the various ways in which gender dynamics shape and are shaped by climate change, shedding light on the different vulnerabilities. The authors have successfully synthesized a wide range of research and knowledge from various disciplines to present a holistic understanding of this pressing global issue.

Ararat & Sayedy (2019) <sup>[1]</sup> examined how gender diversity on company boards affects voluntary disclosure of climate change risks in emerging economies with weak environmental legislation and ineffective markets. The inclusion of women on board committees, indicating active corporate governance involvement, enhances the chance of voluntary climate change disclosure. Conversely, authors found no correlation between women's board representation

and climate change reporting. These findings suggest board reforms that boost women's representation to better manage sustainability risks and respond to stakeholder requests in nations with reluctance to implement climate change measures.

Goli *et al.*, (2020) <sup>[15]</sup> Results indicate that threat and coping evaluation positively and significantly impact climate change adaptation. Men's and women's perceived severity influenced threat appraisal, while response costs most influenced climate change coping assessment. Climate change adaptation behavior is influenced by ethical principles and gender differences. Research suggests recommendations at various levels, including international, governmental, legislative, and meso levels.

Jost *et al.*, (2016) <sup>[16]</sup> documented results were policy- and program-relevant. In response to climate and environmental changes, smallholders are altering their agricultural techniques. Women may be less adaptable due to financial constraints, male dominance in information and extension services, and higher labor burdens from available adaptation options. The climate analogue approach, which identifies places similar to future climates to identify adaptations, can enhance farmer-to-farmer learning (Kumar & Moharaj, 2023) <sup>[17]</sup>. With high climatic variability, nearby villages that have successfully adopted new CSA practices are available.

Institutional barriers have limited the credibility and relevance of forecasts, especially for women's access and comprehension. The participatory approaches utilized in this study shed light on women's adaptive capabilities in the communities, but not enough to address their specific vulnerabilities in CSA programs.

## 3. Methodology

The design and approach adopted in this paper was descriptive in nature. All the data and information utilised for the current study was extracted from secondary sources of literature especially books and journal articles. Scopus and Google Scholar were used to search for articles and accordingly relevant and related article were selected. Additional care was taken in selecting articles thereby using appropriate keywords for searching various scholarly articles. Furthermore, only recent published articles were taken into consideration to ensure the feasibility of the findings of the study.

## 4. Findings and Discussion: Gendered Vulnerabilities to Climate Change

### 4.1. Disproportionate impacts on women in different regions

The fact that women are bearing a disproportionate share of the adverse effects of climate change can be seen in a number of different places, which reflects the complex interaction of gender inequality and environmental transformations (Balabantaray & Samal, 2022) <sup>[3]</sup>. In a great number of low- and middle-income nations, and particularly in parts of sub-Saharan Africa and South Asia, women frequently shoulder a greater share of the responsibility for meeting the difficulties posed by climate change. Because of their substantial participation in subsistence agriculture, water collecting, and fuelwood supply, women in these locations are extremely susceptible to fluctuations in precipitation patterns and resource scarcity, which commonly leads to unfavorable outcomes for their livelihoods and overall well-being. These outcomes often include the loss of a source of

income or a reduction in the quality of life. In addition, they have inadequate access to education, limited economic possibilities, and restricted authority to make decisions, all of which contribute to their precarious position (Balabantaray & Singh 2022) <sup>[3]</sup>. In contrast, high-income regions are characterized by gendered effects that are distinct from one another. In these regions, women may be subjected to disproportionate consequences, primarily as a result of socioeconomic inequalities in resource allocation. Furthermore, marginalized communities, which frequently consist of a higher proportion of women, are more likely to be exposed to the dangers posed by extreme weather events and rising sea levels. It is crucial to have an understanding of the regional subtleties of gender disparities in climate impacts in order to create customized mitigation and adaptation plans that take into consideration the one-of-a-kind requirements and contributions of women all over the world.

#### **4.2. Intersectionality: How other factors like age, class, and ethnicity intersect with gender**

The intersectionality of gender and the environment is a notion that emphasizes the complex aspect of identity and how it interacts with the dynamics of the environment. Specifically, the intersectionality of gender and sexual orientation. Gender, as a major axis of identity, is strongly linked with environmental difficulties. This intertwining influences both the ways in which individuals experience environmental challenges as well as the ways in which they respond to those challenges. This essay explores how gender identities intersect with environmental variables such as climate change, resource management, and environmental justice. The notion of intersectionality is examined in depth within the context of gender and the environment.

Existing gender inequalities result in men and women being hit in various ways. Women frequently take on a different set of tasks and responsibilities than men, which can make them more susceptible to the risks. For instance, in many parts of the world, women are the ones in charge of gathering water and producing food, both of which become increasingly difficult to accomplish as a result of shifting weather patterns. In addition, women are more likely to confront particular obstacles during times of displacement as a result of climate change. These challenges can include greater vulnerability to violence and limited access to resources. Climate change-related displacement can have a disproportionate impact on women.

**Management of Resources and Gender Roles** Gender roles frequently have an impact on management practices, which in turn has repercussions for both the environment and gender equity. For instance, in some societies, women play crucial roles in the sustainable management of resources, such as the conservation of seeds and the diversification of crop types, both of which contribute to the resilience of the ecosystem. On the other hand, gender inequalities in access to land and resources might result in land use practices that are not environmentally friendly (Moharaj, 2023) <sup>[17]</sup>. Recognizing the ways in which gender and resource management interact is absolutely necessary in order to advance equitable gender relations and environmentally sustainable practices.

Environmental justice concerns frequently intersect with gender issues due to the fact that marginalized communities, which often have a higher number of women, bear disproportionate environmental burdens. This is because marginalized populations tend to have fewer resources.

Communities that are situated in close proximity to hazardous waste sites or industrial facilities, for instance, run the risk of experiencing negative impacts on their health; women and children are especially susceptible to these kinds of consequences. Indigenous women, in particular, may have to deal with environmental injustices that have their roots in the past and are perpetuated by the fact that their native territories are frequently targeted for resource extraction.

It is essential to get an understanding of the intersectionality of gender and the environment in order to develop environmentally conscious policies and programs that take gender into account. These rules acknowledge the distinct differences in the requirements, responsibilities, and capabilities of men and women. They support women's participation in environmental decision-making processes and work to empower women by providing access to resources, education, and decision-making power. Additionally, they attempt to provide women with access to resources. It is possible to improve the efficiency of environmental policies and initiatives by including a gender perspective, which also helps to advance environmental sustainability.

The complex and intertwined nature of gender dynamics and environmental problems are illuminated when viewed through the lens of the intersectionality of gender and the environment. The ways in which gender identities intersect with the effects of climate change, methods for managing resources, and concerns about environmental justice shape the experiences and reactions of individuals. Recognizing these intersections is absolutely necessary in order to build approaches that are both holistic and inclusive in order to deal with the environmental difficulties we face. In order to formulate environmental policies and programs that take into account the specific requirements and contributions of individuals with a range of gender identities in the context of a changing environment, researchers, politicians, and activists need to accept the idea of intersectionality.

#### **4.3. Case studies highlighting specific vulnerabilities faced by women**

##### **Case Study: Women in Bangladesh and Cyclone Sidr (2007)**

Climate induced cyclone vulnerability poses multiple threats to women and other vulnerable groups in society (Moharaj & Prasad, 2021) <sup>[23]</sup>. Cyclone Sidr, which struck Bangladesh in 2007, was one of the storms that caused the most damage in the history of the region. Bangladesh is prone to cyclones and flooding. During the cyclone, women in Bangladesh confronted a variety of challenges that were specific to them. Their capacity to flee to safer regions was hindered by factors like their limited mobility and cultural constraints. In addition, women frequently did not have access to early warning systems, which made it harder for them to get ready for the calamity. Women were far more likely to be injured or killed as a result of the incident. Following the event, the livelihoods of women, such as rice cultivation and shrimp farming, were severely interrupted, which further exacerbated the issue of poverty. The subsequent efforts for disaster relief recognized the need for gender-sensitive solutions, which included assuring the participation of women in decision-making, providing shelters that were favorable to females, and integrating the viewpoints of women into the process of planning for disasters.

### **Case Study: Indigenous Women in Canada and Environmental Contamination**

Native American communities in Canada, such as the Grassy Narrows First Nation, have been subjected to environmental contamination for a very long time, notably pollution caused by mercury. Because of their responsibilities in traditional subsistence activities like fishing and gathering, indigenous women frequently have a higher risk of being exposed to resources that have been poisoned. Inadequate access to healthcare might also result in delayed reactions to health issues that are caused by environmental contamination. Indigenous women and their families are disproportionately affected by the serious health problems that have been caused as a result of high levels of mercury pollution in fish. These health concerns include neurological illnesses and birth deformities. Indigenous women's groups and communities have been advocating for greater attention to be paid to the particular vulnerabilities of their people, as well as for expanded efforts to clean up contaminated areas and improve health care.

### **Case Study: Women in Sub-Saharan Africa and Climate-Induced Water Scarcity**

Because of climate change, sub-Saharan Africa is struggling with a growing water shortage, which is having an effect on agriculture as well as day-to-day living. In this part of the world, it's common for women to be the ones in charge of gathering water for usage in the home and in agriculture. Due to the decreased supply of water, kids are had to travel further distances in order to obtain sources of water. This puts them in danger and takes time away from their schooling as well as activities that provide revenue for them. Women's health, educational opportunities, and economic well-being are all negatively impacted when there is less water available (Balabantaray *et al.*, 2022) <sup>[3]</sup>. For instance, young women may have less time to devote to activities that generate cash, and young women may be more likely to drop out of school to assist with water collecting (Balabantaray *et al.*, 2023) <sup>[5]</sup>. Improvements in water infrastructure, the installation of rainwater harvesting systems, and increased participation of women in the decision-making process regarding water management are among the measures being taken in a number of African nations in response to the necessity of easing the water-related burdens that women face.

### **Case Study: Women in India and Deforestation**

India is facing a big environmental problem in the form of deforestation, which is having an effect on ecosystems as well as rural inhabitants. Women living in rural regions frequently rely on forest resources for firewood, fodder, and other forest products that aren't made from timber. As forest cover decreases, women are forced to go further to acquire the same amount of resources, putting their lives in danger and adding to the burden of time poverty. The growing amount of work that women do in resource collecting makes it more difficult for them to obtain an education and create income. In addition to this, it exacerbates existing gender disparities within households. A number of community-based projects and government-run initiatives in India are working toward the goals of sustainable forest management, the provision of alternative fuel sources, and the empowerment of women through the formation of self-help groups and other activities that generate revenue.

These case studies demonstrate the diverse ways in which

women's vulnerabilities are heightened in the context of environmental challenges. Addressing these vulnerabilities requires gender-responsive policies, increased participation of women in decision-making, and recognition of women's roles as environmental stewards and caretakers in their communities (Balabantaray, 2023) <sup>[5]</sup>.

## **5. Adaptation Strategies and Coping Mechanisms**

### **5.1. Overview of climate adaptation strategies**

The term "climate adaptation strategies" refers to diverse approaches that have been developed with the goal of mitigating the negative effects of climate change on society, ecosystems, and economy. These solutions acknowledge the critical need to make immediate preparations for, and immediate responses to, the challenges that a changing climate poses. The enhancement of infrastructure's resilience, the protection of water resources, the promotion of sustainable agriculture, the improvement of early warning systems, and the integration of climate considerations into urban design are key components of adaption measures. In addition, initiatives frequently place an emphasis on techniques that are based on ecosystems, the reduction of disaster risk, and the preservation of indigenous knowledge. The process of adapting to climate change is not a one-size-fits-all undertaking; rather, it requires solutions that are individualized and context-specific, taking into account the distinct vulnerabilities, resources, and climate threats that are faced by various areas and groups. Building resiliency and securing a sustainable future in the face of climate uncertainty requires carefully incorporating adaptation measures into larger climate action plans.

### **5.2. Gender-responsive adaptation policies and initiatives**

Gender-responsive adaptation policies and initiatives represent a critical approach to climate change mitigation that recognizes the inherent gender disparities in vulnerability and resilience to climate impacts. These policies and programs aim to address and rectify the unique challenges faced by women and gender-diverse individuals in the context of climate change. Gender-responsive adaptation acknowledges that gender identities intersect with other factors such as age, class, and ethnicity, amplifying vulnerabilities and shaping adaptive capacities. Such initiatives include measures to enhance women's access to resources, participation in decision-making, and capacity building. They also consider the differential impacts of climate change on women, from increased care burdens due to natural disasters to potential shifts in traditional gender roles within communities. By ensuring that climate adaptation is gender-inclusive, these policies aim to promote equity, empower marginalized communities, and strengthen overall resilience in the face of a changing climate.

## **6. Conclusion**

In an era marked by the pervasive and transformative impacts of climate change, understanding the intricacies of vulnerability and resilience is paramount for crafting effective adaptation strategies. Our analysis has underscored the multifaceted nature of gendered vulnerabilities, encompassing socioeconomic, cultural, and environmental factors. Equally, it has illuminated the resourcefulness and agency of women in their adaptive responses. First and foremost, the findings presented here highlight the disproportionate vulnerability faced by women, particularly

those in low-income and marginalized communities. The intersecting factors of gender discrimination, limited access to resources, and traditional gender roles exacerbate the challenges women confront when dealing with the consequences of a changing climate. This underscores the necessity of gender-sensitive climate policies that address not only the immediate impacts but also the underlying structural inequalities.

However, this research has also illustrated the remarkable resilience exhibited by women across diverse contexts. Women often act as crucial pillars of their communities, demonstrating extraordinary adaptability and resourcefulness. They leverage their knowledge of local ecosystems and community networks to develop innovative coping mechanisms. These strategies include diversifying livelihoods, engaging in sustainable agricultural practices, and fostering community solidarity. Moreover, the significance of recognizing women as agents of change in climate adaptation cannot be overstated. Empowering women through education and training programs not only enhances their adaptive capacities but also contributes to more effective and sustainable adaptation efforts at the community level. Women's participation in decision-making processes related to climate resilience planning and resource allocation is essential for creating inclusive, equitable, and impactful solutions. In conclusion, this article has elucidated the intricate interplay between gender, vulnerability, and resilience. It underscores a focus on addressing the structural inequalities that exacerbate women's vulnerabilities.

Recognizing and harnessing the resilience of women is not only a moral imperative but also a pragmatic strategy for building more sustainable and resilient societies. As the world grapples with the ongoing and escalating challenges of climate change, it is our hope that this research will serve as a valuable resource for policymakers, researchers, and practitioners (Balabantaray, 2022)<sup>[3]</sup>. By centering gender in climate discourse and action, we can forge a path toward more equitable and effective adaptation strategies that benefit not only women but entire communities. In the face of an uncertain climate future, acknowledging the strength and resilience of women becomes not just a matter of justice but a cornerstone of sustainable development. As we move forward, it is imperative that we recognize women as catalysts for positive change and embrace their agency in shaping a more resilient world for all.

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