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Advancing Gender-Inclusive Climate Change Adaptation: Overcoming Inequality through Sustainable Pathways

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Abstract: This study investigates how rural women in flood-prone areas are involved in adaptation actions. The study focuses on gender inequalities in climate-resilient adaptation and sustainable development pathways. The research evaluates the attainability of reducing gender inequality through a sustainable adaptation process. 53 women from Sirajganj Sadar Upazila who were involved in government or non-government adaptation and community awareness programmes were interviewed. Addressing the gender inequality within the climate change policy is deemed critical in the context of Bangladesh and around the globe. This study shows that if gender discrepancies persist, women will face more setbacks as the effects of climate change. To overcome this, plans must prioritise disadvantaged women's inclusion in adaptation programmes and secure their access to resources. Government and non-governmental efforts should provide inclusive support to encourage women's active participation.

Keyworks: Gender inequality, Climate change policies, Adaptation pathway, Sustainable development, and Vulnerability of women.

1. Introduction

Women often face higher risks and greater burdens from the impacts of climate change in situations of poverty and due to existing roles, responsibilities and cultural norms. The inclusion of women in climate discussions across various levels, from negotiations to community involvement, is pivotal, especially in areas affected most by climate change. Women and girls are becoming increasingly empowered to contribute to, and benefit from, climate action. While climate change is a worldwide concern, the impact varies greatly between communities, individuals, and ecosystems due to intrinsic sensitivity differences (Denton, 2002). Evidence highlights how climate change is having a disproportionate impact, especially in rural areas where women, who are frequently the most economically disadvantaged—are more vulnerable and traditional gender disparities are worsened (Sharmin, & Islam, 2013; UN Women & IUCN, 2022). Bangladesh ranks seventh on the 2021 World Climate Risk Index, highlighting its vulnerability to climate change. Due to its geographical location and flat, low-lying terrain, Bangladesh faces high risks of climate change-induced natural disasters. The effects of climate change disproportionately affect women, who face greater difficulties in adapting to its impacts. There is a growing interest in understanding the relationship between gender equality, climate change, and sustainable adaptation (Bessah et al., 2021). The level of inequality in Bangladesh presents unique challenges, with women having less access to resources and insufficient support from government initiatives (Wossen, Berger, Haile, & Troost, 2018). Addressing gender inequalities is crucial in areas highly vulnerable to climate change, where resource allocation plays a significant role in adaptation efforts.

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Bangladesh has made significant strides in enhancing adaptive capacity and resilience through various policies and strategies. The National Policy for Women's Advancement (NPWA), the National Adaptation Programme of Action (NAPA, 2005), and the Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009) integrate gender considerations to protect women from the adverse impacts of climate change (MoEF, 2022). In Bangladesh, efforts have been made to include gender in climate change plans, aiming to respond effectively to gender-related issues. Research indicates that women bear a disproportionate share of the consequences of climate change, especially in rural areas with limited adaptation options. Prioritizing gender-sensitive policies and programs is essential to strengthen sustainable livelihoods for women, particularly in the face of climate change-induced adversities such as floods, river erosion, droughts, and changing rainfall patterns.

A study found that more women than men are suffered during disasters, because of the discrimination they suffer due to their gender (Aguilar, Granat, & Owren, 2015). In the 1991 cyclone disaster that killed 140,000 in Bangladesh, 90 per cent of victims were women and girls (Gurung, 2021). Women's roles as primary caretakers and resource managers make them vulnerable to the impacts of climate change. However, women are also powerful agents of social change who are highly resilient and play critical family and community roles in all stages of climate adaptation and catastrophe risk reduction (Andrijevic, et. al., 2020; Jahan, 2023; Kabir, 2018; Lewis, 2016). Integrating gender considerations into climate change adaptation and disaster risk reduction efforts is essential for sustainable development and building climate-resilient communities in Bangladesh.

Gender inequality is made worse by resource allocation during the adverse effects of climate change in many areas (Cutter, 1996). Additionally, the traditional property inheritance system, significantly contributes to the gender wealth gap, denying women access to earned or produced wealth (Cutter, 1996). This disparity, which begins from birth, perpetuates restricted access to financial resources for women within the community. Gender-sensitive risk and vulnerability assessments are crucial, emphasizing the empowerment of women in disaster response. Integrating climate change adaptation with disaster risk reduction will bolster the overarching framework for sustainable development.

Bangladesh needs strategies to lessen the potentially catastrophic effects of the extreme climate events it has been experiencing. Women in the rural Sirajganj Sadar area are primarily dependent on agriculture, home farming, and handloom activities. The area is prone to flooding. Due to its great reliance on the climate, this industry is particularly vulnerable to the consequences of global warming. Food insecurity, social insecurity, displacement, migration, and productivity are all negatively impacted by climate change for women.

Despite Bangladesh's significant efforts to address climate change adaptation and disaster risk reduction through sustainable pathways, there remains a noticeable gap in research regarding the effective integration of gender considerations into these initiatives. While policies such as the National Adaptation Programme of Action (NAPA), the Bangladesh Climate Change Strategy and Action Plan (BCCSAP), and the National Environment

Policy acknowledge the importance of gender in climate resilience, there is limited evidence on whether these efforts adequately address gender concerns.

There is a need to investigate the extent to which gender-sensitive policies and programs are being implemented and their impact on strengthening sustainable livelihoods for women. The problem is that there isn't enough proof of how well programs and policies that consider gender help women deal with problems caused by climate change in Bangladesh. We need this evidence to make smart decisions about policies and actions that can make things better for women and help communities become stronger against climate change. This study critically examines the attainability of reducing gender inequality under sustainable development and its potential impact on overcoming gender disparities.

2. Aim and Objectives

This study examines the climate vulnerability of women in the rural Sirajganj Sadar area and proposes strategies to include gender in adaptation measures. It also looks into whether reducing gender disparity within the context of sustainable development is feasible, with a particular emphasis on strategies for climate-resilient adaptation. It investigates the possible sustainable pathways for reducing gender disparities.

3. Research Area

The primary data collection for this study focuses on flood-prone areas in the Sirajganj Sadar Upazila which experience the adverse effects of river erosion and prolonged flooding, attributed to climate change. The choice of this location is purposive, aiming to capture firsthand experiences of environmental risks and gender dynamics in the context of climate-induced challenges.

4. Methodology

The research adopts qualitative approach and in-depth interviews with vulnerable women involved in the climate change adaptation process in Bangladesh. The primary data collection involves in-depth interviews conducted between September to November 2022 with 53 vulnerable women actively engaged in both government and non-government adaptation projects. These interviews asked questions to assess the environmental risks of marginalized women working under adaptation and relocation programs. The purposeful selection of participants for this study came from those who worked in government and non-government adaptation processes or who volunteered for community awareness initiatives. Both primary and secondary data sources, including literature reviews and reports from the gender, climate, and development sectors have been reviewed. Primary data were gathered using questionnaire interviews with 53 women beneficiaries from government and non-government adaptation programmes were done using questionnaires. These women were specifically chosen from communities of farmers, fishermen, and weavers in the flood prone Sirajgonj Sadar area.

Table 1: Socio-economic and Demographic characteristics of the respondents

Characteristics	Women (%), n = 53	%
Age	Below 30	28(52.4)
	30-45	19(36.6%)
	45+	6(11.0%)
Marital status	Unmarried	2(3.9%)
	Married	40(74.7%)
	Divorced/Single	7(14.5%)
	Widowed	4(6.9%)
Education	No formal education	13(24.1%)
	Primary	14(26.4%)
	Secondar	17(32.80%)
	Higher Secondary and above	9(16.7%)
Occupation	Farming	15(27.9)
	Student	5(8.6)
	Services	11(20.1%
	Small business	7(13.7%)
	Weaving/Handloom	4 (7.1%)
	Housewives	11 (22.6%)

Table 1 shows a variety of demographic and occupational traits of women who are involved in the adaptation programme. A large percentage of the recipients are in the age range of thirty to forty-five. Married women who are taking part in the income-generating and training programmes make up 74.7% of the participants. 14.5% of women who are unmarried or divorced also participate in the programme. Women who work in agriculture or at-home farming show a great deal of interest in the adaptation programme; among those who profit from the adaptation initiatives are women who are housewives (22.6%), farmers (27.9%), and weavers (7.1%).

5. Gender mainstreaming in climate adaption policy

Gender mainstreaming involves integrating a gender perspective into all actions, policies, legislation, and activities to guarantee that everyone's needs and concerns are addressed, as well as to prevent gender inequities from being perpetuated through institutional mechanisms (Alston, 2014). According to Gurung (2021), gender mainstreaming is an internationally recognised technique for promoting gender equality. The United Nations Economic and Social Council defines gender mainstreaming as the process of analysing the implications for both men and women of any proposed action, including legislation, policies, or programmes, at all levels and in all domains (Watch, 1997). Gender mainstreaming, according to UN Women (2016), is bringing both men's and women's experiences, expertise, and interests into the development agenda, rather than merely adding a "woman's component" or a "gender equality component" to already-existing activities. There is a need for tools and techniques to encourage gender mainstreaming in climate finance, which will eventually lead to women's empowerment. Gender mainstreaming in climate change adaptation plans has received a lot of attention since 2012, with the gender factor being a common issue at UNFCCC Conference of Parties

(COP) meetings. According to research, women can play an important role in climate adaption. Gender mainstreaming in climate change adaptation plans involves including gender considerations to improve adaptive skills and meet the needs of the most vulnerable, hence contributing to the overarching objective of gender equality (Gurung, 2021). This strategy advocates for taking into account three characteristics of gender mainstreaming—gender-responsive content, gender representation, and an enabling environment—at all phases of policymaking (Gurung, 2021). National policymakers, gender machineries, development partners, and stakeholders should prioritise tackling gender mainstreaming concerns. Women must have specific abilities that can help with mitigation, disaster response, and adaptation activities at all levels and sectors. The study looks at how international and national policy frameworks, such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), the United Nations Framework Convention on Climate Change (UNFCCC), and National Adaptation Plans (NAPs), incorporate gender into their policies and respond through various activities.

Climate adaptation is essential for making well-informed decisions on the execution of interventions. Access to resources and information also plays a major role in one's ability to adapt to climate change. Adaptation deficits are increasingly prevalent worldwide (IPCC, 2014). The presence of an adaptation deficit is evident due to insufficient technological, financial, social, and institutional capacities to effectively adapt to climate change (Asfaw et al., 2018; Fankhauser and McDermott, 2014; Milman and Arsano, 2014). Gender-sensitive policies and programmes can support women's sustainable livelihoods. Gender considerations into climate change emphasize the urgency of fostering climate-resilient development. Gender-responsive adaptation proves to be more effective in addressing climate challenges. By considering gender dynamics in adaptation approaches, UNDP recognizes climate impacts aren't gender-neutral, these strategies acknowledge varied coping capacities and resource access for men and women. Gender-responsive adaptation not only tackles existing disparities but also fosters better adaptation outcomes, reinforcing gender equality (UNDP, 2023).

Climate change adaptation and catastrophe risk response literature is increasingly recognising the socially stratified consequences of hazards and climate change (Ray-Bennett, 2009). Adaptation, in this context, refers to the process by which humans adjust to and coexist with increased exposure to climate-related risks and stressors affecting their livelihoods. Climate change adaptation strategies have gained traction in a variety of discourses and policy arenas (Acheampong, et.al., 2023). The idea of pathways focuses on the processes of decision-making rather than the outcome. The notion of adaption pathways can help you make resilient judgements in the face of uncertainty. The idea of pathways, according to Wise et al. (2014), focuses on the processes of decision-making rather than the outcome, highlighting the adaptive character of the choice process itself in the face of high uncertainty. Many pathways models assume the presence of a clearly defined decision-maker and supported governance mechanisms (Wise et. al., 2014). Climatic change adaptation has received substantial attention in recent years. The need to guarantee that impacted people are fairly able to deal with and appropriately live with varying degrees (Onta & Resurreccion, 2011). Recent research has provided a new understanding of the elements that people's ability to adapt climate change.

Flooding is a natural disaster that causes widespread destruction, disrupts normal living, and increases social, economic, and ecological vulnerability (Lloyd, 2008). Flooding impacts millions of people around the globe every year, many of whom are women and children (Cutter, 1996). Bangladesh is recognized as one of the most flood-prone and disaster-prone nations globally. Because of its geographical position, floods are a regular and serious danger in Bangladesh, with Sirajganj designated as a district prone to flooding (Aktar, Shohani, Hasan, & Hasan, 2021). In flood-prone rural areas women play a critical role in sustaining their communities in the aftermath of lengthy floods and river erosion that cause livelihood and livestock losses. In Bangladesh, climate change poses significant threats, particularly impacting vulnerable communities due to their reliance on local natural resources for livelihoods (Sharmin, & Islam, 2013). Each year, roughly 21% of the land experiences flooding during the monsoon season in Bangladesh (Dewan, Makoto, Komatsu, 2003). However, in severe situations, this figure escalates to over 60% of the total land area (Dewan, Makoto, Komatsu, 2003). According to comparative vulnerability analysis, women are extremely susceptible due to significant limitations in adaptation, coping capability, and resilience.

6. Findings of research: Impact of climate change adaptation pathways for women

The research findings show the climate adaptation pathways for women in flood-prone areas, particularly focusing on Sirajganj. Climate adaptation strategies have gained momentum globally, contributing to increased awareness of climate change-related issues. The concept of adaptation pathways emphasises decision-making processes in the face of uncertainty, highlighting the adaptive nature of choices amidst changing circumstances. National and international policies advocate for the inclusion of women in various adaptation programs. In Sirajganj, women participated in awareness-raising campaigns and knowledge-sharing sessions organised by government and non-government organizations. Though financial support for adaptation interventions was limited, only a fraction of women received assistance for livelihood programs. As pathways for women's adaptation to climate change, national and international policies advocate for increased inclusion of women in various programs. Bangladesh's National Adaptation Programme of Action (NAPA) and Climate Change and Gender Action Plan underscore the importance of gender-inclusive adaptation strategies. Yet, challenges persist in effectively addressing gender disparities and ensuring women's meaningful participation in adaptation efforts. Adaptation pathways for women in Sirajganj involve leveraging flood-resistant crops, poultry and fish farming, and vegetable cultivation to enhance resilience. The study was conducted in two areas of the district, where various government and non-government organisations implemented planned adaptation interventions. This study reveals that women in the flood-prone Sirajganj area participated in awareness-raising campaigns and knowledge-sharing sessions. Many women continue to face vulnerabilities, including displacement, water crises, and property loss during floods. Addressing these challenges requires additional resources, gender-inclusive policies, and improvements in physical infrastructure and institutional linkages. Women in Sirajganj heavily rely on natural resources for livelihoods, facing challenges exacerbated by climate change-induced hazards such as floods and erosion. Limited access to resources and property ownership issues further exacerbates women's vulnerabilities, hindering their ability to access

financial assistance for adaptation. Women also face security risks during floods, impacting their involvement in adaptation efforts.

The government is emphasising including women in adaptation in the health sector, livestock sector, climate-resilient cropping system, water and sanitation programme, and livelihood protection in fragile areas. The national Climate Change and Gender Action Plan for Bangladesh (CCGAP) has been taken to ensure gender equality in climate change-related policies, strategies, and interventions (MoEF, 2013). To facilitate adaptation efforts, inclusive and adaptive local institutions, adequate financial aid, and climate information services are required. Furthermore, gender-inclusive and adaptable governance and procedures would aid in the implementation of suitable adaptation actions in riverine lowlands.

Climate adaptation pathways for women in the flood-prone Sirajgong Sadar area involve leveraging flood-resistant crops, poultry and fish farming practices, and vegetable cultivation to enhance resilience and livelihood support. Approximately one-third of women, out of 53 participants, have demonstrated the ability to reduce and recover from flood-induced food crises by cultivating flood-resistant crops and vegetables. They have received training and financial support from NGOs and local offices to diversify crops, process them, and market them both online and locally. This training has given them significant skills in food processing and marketing, allowing them to increase profits and better endure disasters. 17–18 individuals, constituting around 33.33% of the total, lack land ownership, rendering them ineligible for any short-term or long-term loans. Additionally, an estimated 15% do not have access to financial support from any adaptation programs. The remaining 36 women have solely undergone awareness training, indicating a gap in providing financial assistance and resources for a significant portion of the surveyed women.

NGOs have helped floodplain homes build plinths and yards above flood levels, allowing them to use low-lying, waterlogged land for seasonal fish and vegetable production. Women have also learned a variety of talents, including fish farming, which has proven critical in the recovery from crop losses and flood-related disasters. For households in floodplains, NGOs have provided support to raise plinths and yards above flood levels, allowing for the utilisation of low-lying waterlogged land for seasonal fish and vegetable farming. Additionally, women have developed mixed abilities, including fish farming skills, which have proven crucial in recovering from crop losses and flood-related aftershocks.

Women in flood-prone Sirajganj areas rely on natural resources, agriculture, fishing, handloom weaving, and farming for their livelihoods. The area has endured the effects of climate change in the form of persistent flooding, river erosion, cyclones, and severe rainfall, all of which have produced significant issues. These difficulties are perceived negatively by both men and women as they go about their daily activities in quest of a living for their families. Because their socioeconomic activities are divided along gender lines according to cultural norms, their obstacles are also divided along gender lines. A significant number of families depend on women to do important domestic duties, especially when a woman becomes the primary carer following a divorce or separation.

While women shoulder equal duties in caring for the family and children, they encounter limited access to family property and resources. This inequality in property ownership creates difficulties, particularly when attempting to apportion funding for flood protection, such as house raising. As a result, women face challenges in gaining financial assistance from various adaptation programmes designed to assist with land or house loss, as these programmes frequently prioritise property ownership, which women normally have less of in this setting.

7. Recommendations and Conclusion

Climate adaptation is essential for making well-informed decisions on the execution of interventions. Access to resources and information also plays a major role in one's ability to adapt to climate change. Gender-sensitive policies and programmes can support women's sustainable livelihoods. Gender considerations into climate change emphasizes the urgency of fostering climate-resilient development. The integration of climate change adaptation is crucial for achieving sustainable development and reducing gender inequality. Climate change adaptation has emerged as a critical aspect of discussions and policy formulation, with a growing recognition of the need to integrate women into the adaptation process. Adaptation pathways provide valuable insights into navigating decision-making amid uncertainty, underscoring the adaptive nature of the decision-making process itself. Gender plays a role in both development and climate change adaptation, enhancing our responses to climate change. Climate change impacts compound the urgent need for effective disaster risk reduction and climate change adaptation. Enhanced communication with local institutions and communities is essential for the successful implementation of adaptation pathways. Women are particularly susceptible as a result of this gap, which is made worse by the unequal distribution of resources and obstacles to the adoption of sustainable development routes that address the threat. Efforts to achieve convergence must prioritise realistic community participation, integrate technological and participatory capacity-building approaches, and improve government coordination at all levels. Improving physical infrastructure in flood-affected areas and addressing social insecurities due to poor law and order situations are essential steps to bolster resilience among women in these regions. Addressing irregular and flood-based government adaptation support programmes, ensuring adequate financial allocation, and strengthening institutional linkages are critical for reducing food risks and vulnerability. Designing gender-inclusive adaptation pathways and allocating more resources to promote women's participation in these programmes is imperative for promoting transformation in flood-prone areas.

If the government focuses on gender-inclusive climate change adaptation policies, there's hope for reducing inequalities, especially given the limitations women face in accessing property and resources in our traditional social system. Our findings highlight the need to incorporate gender considerations into the distribution of climate resources to reduce gender gaps and enhance climate-resilient development.

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