

## Empowering Women in Green Technology: A Pathway to Sustainable Development

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### ABSTRACT

*Gender equality is a pivotal factor in achieving sustainable development, intersecting economic, social, and environmental dimensions. Addressing barriers such as sexual violence, exploitation, unequal unpaid care work, and food insecurity can help create equitable growth. This paper discusses how promoting gender equality, particularly through initiatives like women's empowerment in green jobs, can foster sustainable development. It draws on case studies from India and globally to illustrate how empowering women leads to poverty reduction, economic resilience, and environmental sustainability. Additionally, United Nations Development Programme (UNDP) guidelines for gender-responsive program implementation and the emerging challenges of global food systems are highlighted.*

**Keywords:** Gender Equality, Sustainable Development, UNDP, Green Jobs.

### Introduction

The empowerment of women is recognized as a fundamental element in promoting sustainable development. In general, the empowerment of women yields numerous beneficial outcomes for both economic and social progress, while also contributing to environmental enhancement globally. The active involvement and leadership of women are vital for attaining a sustainable future, as they play a key role in tackling global issues such as poverty, economic advancement, and environmental conservation.

To achieve sustainable development goals for women and girls, concerted action across countries and communities is necessary. Dedicated resources should be provided to empower women of all ages and girls. Gender equality should be included in policy development, implementation, monitoring, and accountability. A gender-sensitive approach is crucial for global transformation and the achievement of Sustainable Development.

The idea of sustainability inherently rests on balance—balance between economic development, environmental protection, and social equity. Gender equality cuts across these domains, influencing outcomes at every level. From improving access to education and healthcare to addressing systemic inequalities in workplaces and communities, gender equality serves as both a catalyst and a driver of sustainable development. Its importance has been globally recognized through the United Nations' Sustainable Development Goals (SDGs), where Goal 5 explicitly focuses on achieving gender equality and empowering women and girls. However, the interconnected nature of gender equality ensures its relevance across nearly all SDGs, including those addressing poverty, education, health, and environmental resilience.

Organizations and governments alike play a crucial role in promoting gender equality as part of sustainable development. Initiatives such as gender-responsive budgeting, inclusive education programs, and support for women-led businesses are examples of how systems can be redesigned to foster equality. The interconnection between gender equality and sustainable development has gained significant academic and policy attention over the past few decades. Researchers and organizations

worldwide have recognized that gender equality is not only a fundamental human right but also a prerequisite for achieving sustainable economic, social, and environmental development.

Government initiatives and international frameworks, such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW), have provided legal and institutional support for gender equality. However, the success of such initiatives often depends on their implementation and cultural adaptability.

Despite its recognized importance, significant barriers hinder the achievement of gender equality. Cultural norms and societal attitudes remain pervasive obstacles. In many societies, traditional gender roles limit women's access to education, healthcare, and employment opportunities.

### Objectives

This research explores:

- UNDP guidelines for gender-responsive programs, emerging challenges like global food insecurity, and alternatives like green jobs for women.
- The relationship between gender equality and sustainable development by examining key barriers.
- Case studies from India and globally demonstrate the impact of gender equality on economic growth and environmental conservation.
- To identify the SDGs most impacted by gender equality.

### Literature Review

- The United Nations Development Programme (2008) asserted that a woman who possesses self-confidence is considered empowered. She enjoys the liberty to make her own choices and has access to a diverse range of resources and opportunities that provide her with various options. She holds authority over her life, both in her domestic sphere and beyond, and wields the influence necessary to drive societal change, thereby contributing to the establishment of a more just social and economic system on a global level.
- A study conducted by Verba, Scholzman, and Brady (1997) indicates that the political engagement of women can enhance the representation of their interests within the policy-making framework, as well as elevate the visibility and legitimacy of issues pertinent to women.
- A study conducted by Kabeer and Mahmud (2004) indicates that the economic empowerment of women can result in higher income levels, enhanced nutrition and health outcomes, and increased decision-making authority within the household. Furthermore, such empowerment can positively influence the wider community by fostering gender equality and diminishing gender-based discrimination.

### UNDP Guidelines for Gender-Responsive Program Implementation

The United Nations Development Programme (UNDP) provides guidelines for integrating gender equality into sustainable development programs. These guidelines focus on the following:

- **Gender-Responsive Budgeting:** Ensuring that sufficient resources are allocated to address gender disparities, particularly in healthcare, education, and employment.
- **Participation in Decision-Making:** Engaging women in policy-making and implementation processes to reflect their needs and experiences.
- **Capacity Building:** Providing women with the skills and resources needed to succeed in various sectors, including agriculture and technology.

### Gender Equality and the Sustainable Development Goals (SDGs)

Achieving gender equality is central to the success of multiple SDGs. The promotion of gender equality has a ripple effect, accelerating progress in various areas of sustainable development.

- **SDG 1: No Poverty** – Gender equality in employment and access to financial services is key to reducing poverty. Women in India, for example, are often disadvantaged in terms of property rights and access to credit. Improving gender parity in economic participation can help lift entire households out of poverty.

- **SDG 4: Quality Education** – Ensuring equal access to education for girls is essential for achieving broader social and economic development goals.
- **SDG 13: Climate Action** – Women are disproportionately affected by climate [2]
- **Mainstreaming Gender in Climate Policies:** Ensuring that gender considerations are integrated into climate change mitigation and adaptation efforts. [3]

#### **The Impact of Gender Equality on Sustainable Development**

- **Economic Growth and Gender Equality**

Empowering women in the workforce leads to economic growth, poverty reduction, and increased productivity [1]. Studies show that gender equality could significantly increase global GDP. According to the McKinsey Global Institute (2015), advancing women's equality could add \$12 trillion to the global economy by 2025[1]. When women participate equally in the labor market, economic outcomes improve, benefiting households and national economies.

#### **Case Study: Women's Self-Help Groups in India**

In India, Self-Help Groups (SHGs) empower women economically through access to microcredit and entrepreneurial training. States like Kerala and Andhra Pradesh have seen success where women-led SHGs contribute to local economies and improve financial independence. These groups also support sustainable agricultural practice, contributing to community resilience and environmental protection [2].

- **Social Inclusion: Education and HealthCare.**

Women who are educated tend to have better health outcomes, smaller family sizes, and improved income-earning potential [2], thereby contributing to economic resilience [2]. Additionally, access to healthcare empowers women to make decisions about their health, leading to improved well-being and productivity [2].

#### **Case Study: Beti Bachao Beti Padhao (India)**

The Indian government's "Beti Bachao Beti Padhao" initiative focuses on ending gender-based discrimination and promoting girls' education. This campaign has led to improved school enrollment and retention rates for girls in regions where female literacy was historically low, contributing to social development and long-term economic growth. [5]

- **Environmental Sustainability**

Women play a crucial role in managing natural resources, especially in rural areas. When empowered, women contribute to sustainable resource management and climate adaptation strategies. Their participation in green jobs—such as renewable energy, waste management, and sustainable agriculture—leads to a reduction in environmental degradation. (Barefoot College, 2020)

#### **Case Study: Solar Mamas (India and Global)**

Barefoot College's "Solar Mamas" initiative empowers rural women from around the world, including India, to become solar engineers. These women bring solar electricity to their communities, reducing dependence on non-renewable energy sources. By training women in clean energy solutions, the program contributes to both gender equality and environmental sustainability.[3]

#### **Facts Demonstrating the Impact of Gender Equality on Sustainable Development**

Several statistics and facts illustrate the critical link between gender equality and sustainable development:

- **Economic Growth:** According to a World Economic Forum (2020) report, countries that rank high on gender equality metrics, such as the Nordic countries, also rank high on sustainability indexes and economic prosperity.
- **Climate Change Resilience:** A study by the United Nations Development Programme (UNDP) found that women's involvement in climate adaptation efforts in Africa increased community resilience and reduced vulnerability to climate impacts.
- **Educational Outcomes:** The World Bank found that in countries where girls have access to education at the same level as boys, there are substantial reductions in poverty and improvements in child health outcomes.

### **Barriers to Gender Equality in Sustainable Development**

- **Sexual Violence and Exploitation**

Sexual violence remains a critical barrier to gender equality and sustainable development. According to UN Women, one in three women globally experiences physical or sexual violence in her lifetime. This violence prevents women from participating fully in the workforce, education, and leadership roles, which hinders economic growth and social development [2].

- **Unequal Division of Unpaid Care and Domestic Work**

Globally, women shoulder a disproportionate burden of unpaid care and domestic work, limiting their ability to participate in formal employment. The International Labour Organization (ILO) reports that women do three times more unpaid care work than men, restricting their economic empowerment and perpetuating gender inequality. [7]

- **Discrimination in Employment and Pay**

Despite progress in gender equality, discrimination in hiring, unequal pay, and limited access to leadership roles continue to persist. Gender pay gaps are prevalent across industries, limiting women's economic independence and reducing their contributions to the formal economy[2].

- **Food Insecurity and Malnutrition**

Women, particularly in rural areas, are more vulnerable to food insecurity. As primary caregivers, they are often responsible for household food security, yet they face structural barriers in accessing resources like land, credit, and agricultural inputs. According to the World Food Programme (WFP), women and children are disproportionately affected by hunger and malnutrition. [10]

### **Emerging Challenges in Gender Equality and Sustainable Development**

- **Global Food Systems**

The world faces an ongoing challenge in securing food systems, which are threatened by climate change, land degradation, and unequal access to resources. Women, especially those in rural areas, face greater obstacles in food production and resource access, impacting their ability to feed their families.

- **National Efforts to Secure the Right to Food**

India's National Food Security Act (2013) aims to provide subsidized food to two-thirds of the population. However, the effectiveness of such programs often depends on addressing gender disparities in access to resources. Women in marginalized communities may not benefit equally due to a lack of awareness or bureaucratic hurdles.

- **Policy Implications**

Policymakers must adopt gender-responsive policies that ensure equitable access to resources, particularly in agriculture and food security. Governments must also engage women in decision-making processes related to climate change, food security, and sustainable agriculture. [8]

### **Search for Alternatives: Green Economy and Gender Equality**

- **Green Economy and Women's Empowerment**

The transition to a green economy offers unique opportunities for gender equality. By promoting green jobs, particularly in renewable energy and sustainable agriculture, women can gain access to employment opportunities that also address environmental challenges.

### **Case Study: India's National Solar Mission**

India's National Solar Mission has created opportunities for women to work in the renewable energy sector as solar engineers and technicians. Training women in these green jobs not only empowers them economically but also contributes to India's clean energy goals, showing how gender equality can drive sustainable development. [3]

- **Women and Green Jobs**

Green jobs provide a pathway for women's economic empowerment while contributing to environmental sustainability. Promoting women's participation in green industries, such as renewable energy and waste management, ensures that both gender equality and environmental goals are achieved simultaneously.

### Case Study: India's Forestry Industry

Agriculture and forestry are crucial economic sectors in developing countries, with women playing a significant role in rural communities. Women are concerned with biodiversity conservation and sustainable forest management, providing essential resources like firewood and fodder. However, due to traditional patriarchy, women face gender-biased treatment and socio-economic stresses. In 1990, the Indian government initiated the Joint Forest Management Regime, requiring 50% of the oversight board and one-third of community committees to be women. This mandate has led to women becoming active participants in co-management of forests and programs, reducing vulnerability to urbanization and climate change. [11]

### Suggestions for Promoting Gender Equality for a Sustainable Future

Promoting gender equality can drive sustainable development by implementing policy reforms, fostering education and awareness, and ensuring equal opportunities for women in leadership roles. Below are some suggestions on how to accelerate progress toward gender equality:

- **Policy Reforms and Legal Protections**

Governments must ensure the implementation of gender-sensitive policies that promote women's rights, particularly in employment, education, and healthcare. In India, legal reforms aimed at improving women's access to property rights and financial services can significantly contribute to economic equality and poverty reduction. [8]

- **Education and Skill Development**

Investing in education and skill development for girls and women is crucial. Expanding initiatives such as India's "Beti Bachao Beti Padhao" campaign to reach more rural areas can further enhance female literacy rates and economic participation. Skill development programs, like the Barefoot College's Solar Mamas initiative, provide women with opportunities to contribute to environmental sustainability. [5]

- **Promoting Women in Leadership**

Women's representation in leadership roles should be increased in both the public and private sectors. India's quota system, which mandates a certain percentage of seats for women in local government, has successfully improved gender representation at the grass roots level. Expanding such initiatives can enhance women's participation in decision-making processes at higher levels. [2]

- **Gender Equality in Corporate Policies**

Corporates should promote gender-inclusive policies, such as flexible work environments and equal pay initiatives. Gender-sensitive advertising, like Ariel's "Share the Load" [4] campaign, can influence consumer behavior and corporate culture, leading to more equitable workplaces and communities. [5]

### Conclusion

Gender equality is an essential element of sustainable development, impacting economic growth, social inclusion, and environmental sustainability. Through global and Indian case studies, this paper has demonstrated the wide-ranging effects of gender equality on achieving the SDGs. Initiatives such as women's SHGs in India, global efforts like the Solar Mamas, and advertisements that promote gender equality all contribute to creating more equitable and sustainable societies. Addressing barriers such as sexual violence, unpaid domestic work, workplace discrimination, and food insecurity is critical to enabling women to contribute to sustainable economic, social, and environmental outcomes. Emerging challenges in global food systems and the green economy require gender-sensitive solutions that empower women, particularly in sectors like agriculture and renewable energy. To realize the full potential of gender equality, governments, organizations, and individuals must collaborate so that policies can be promoted and practices that enhance women's access.

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