PERSPECTIVE

Intersecting Inequities: Gender Inequality and Ethical Dimensions of Sustainability

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Abstract

This paper critically explores the urgent intersection between gender inequality and the ethical challenges surrounding sustainability, emphasizing the need for an inclusive approach to global sustainable development. While sustainability aims to meet the needs of the present without compromising future generations, ethical oversight often neglects the systemic and structural gender disparities embedded in socio-economic and environmental systems. The paper begins by examining the historical and structural roots of gender inequality, analyzing how patriarchal norms and socio-political exclusion have systematically marginalized women and gender-diverse individuals from decision-making, land ownership, education, and access to technology. These disparities have profound implications for sustainability, particularly in areas such as resource management, climate adaptation, food security, and energy justice, where women are disproportionately affected yet remain underrepresented in leadership. The second section elaborates on the ethical principles of sustainability—intergenerational justice, equity, environmental integrity, and participatory governance—through a gendered lens. It critiques the failure of many sustainability initiatives and policies to incorporate gender justice as a core ethical imperative. The paper argues that addressing gender inequality is not only a moral responsibility but also a practical necessity for achieving the United Nations Sustainable Development Goals (SDGs), particularly SDG 5 (Gender Equality) and SDG 13 (Climate Action). By ensuring that all voices are heard and all needs are met, gender-inclusive sustainability frameworks can lead to more effective and sustainable solutions. Drawing on case studies from different regions, the third section highlights both the challenges and transformative possibilities when gender perspectives are integrated into sustainability strategies. The final section offers a framework for ethical and inclusive sustainability that recognizes diverse knowledge systems, prioritizes gender-responsive governance, and ensures equitable participation in decision-making processes. It also emphasizes the crucial role that women and gender-diverse individuals play in sustainability transitions, underscoring the need for their inclusion in all aspects of sustainability planning and implementation. This paper calls for a paradigm shift toward an intersectional, ethical sustainability model—one that centers justice, inclusion, and dignity for all genders as foundational pillars for a resilient and equitable future, offering transformative potential.

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1 Introduction

1.1 Background and Rationale

The pursuit of sustainability has become a central focus of global development agendas, particularly in light of mounting environmental crises and growing social inequalities. Defined by the Brundtland Commission as development that "meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development [1], sustainability emphasizes ecological balance, social equity, and economic viability. However, mainstream sustainability discourse has often failed to address the deeply rooted gender inequalities that shape access to resources, decision-making, and benefits from sustainable development interventions [2, 3].

Gender inequality is not merely a social injustice—it is a structural barrier to achieving sustainability. Women and gender-diverse individuals are frequently excluded from policy-making, land ownership, education, and technology, despite playing critical roles in environmental stewardship, agriculture, and community resilience [4]. The ethical dimensions of sustainability—including equity, justice, and participation—are thus undermined when gender is marginalized or treated as a secondary concern [5].

Furthermore, climate change, biodiversity loss, and resource scarcity disproportionately impact women in vulnerable regions, compounding existing social and economic disadvantages [6]. However, the contributions and knowledge systems of women remain underrecognized in global sustainability frameworks. This paper argues that gender justice must be understood not only as a moral imperative but as a foundational pillar of ethical and effective sustainability [7–9]. By applying an intersectional lens, the paper aims to critically examine the nexus between gender inequality and sustainability ethics, offering pathways toward inclusive, transformative solutions.

1.2 Objectives and Scope of the Study

The primary objective of this paper is to critically analyze the intersection of gender inequality and the ethical dimensions of sustainability, emphasizing the importance of integrating gender justice into global sustainability frameworks. Although sustainability is widely regarded as a multidimensional concept encompassing environmental protection, economic viability, and social equity [1], gender remains insufficiently addressed within many sustainability strategies and policies [2, 3].

This study specifically aims to: Investigate the structural, cultural, and institutional roots of gender inequality and its effects on sustainability outcomes; Evaluate core ethical principles of sustainability—including justice, equity, and intergenerational responsibility—through a gender lens [5, 10]. Explore real-world case studies that illustrate both barriers and breakthroughs in incorporating gender perspectives into sustainability efforts; Propose a normative, intersectional framework that emphasizes ethical, inclusive, and gender-responsive approaches to sustainable development.

The scope of this paper spans global and regional contexts, with particular attention to the Global South and Indigenous communities, where gender disparities are often most pronounced [6]. Drawing on empirical evidence and theoretical insights, the study bridges academic discourse and policy application, contributing to ongoing efforts to reframe sustainability as a justice-centered paradigm that uplifts all genders equitably.

1.3 Methodology and Theoretical Framework

This study adopts a qualitative, interdisciplinary approach rooted in feminist theory, sustainability ethics, and intersectionality. By synthesizing theoretical analysis and empirical insights, the paper seeks to explore how gender inequality intersects with the ethical imperatives of sustainability. The methodology is primarily based on a critical literature review and case study analysis, drawing from peer-reviewed academic sources, policy documents, and global development reports from institutions such as the United Nations, UN Women, and the Intergovernmental Panel on Climate Change (IPCC).

Feminist theory provides the foundation for examining how patriarchal structures and gendered power relations influence access to resources, participation in decision-making, and exposure to environmental risks [11]. It challenges dominant androcentric paradigms in sustainability discourse and highlights the importance of valuing women's knowledge, labor, and agency in sustainability transitions.

Intersectionality, originally developed by [12], serves as a critical lens to analyze how overlapping systems of oppression—such as gender, race, class, and geography—shape individuals' experiences of inequality. This framework is essential for understanding how sustainability challenges and solutions impact different social groups unequally, particularly in the Global South.

The ethical framework employed in this study draws from principles of environmental justice, equity, intergenerational responsibility, and participatory governance [10, 13]. By applying these theoretical lenses, the study critically assesses existing sustainability initiatives and policies, identifies gaps in gender responsiveness, and offers recommendations for inclusive and ethical sustainability strategies.

2 Gender Inequality in a Global Context

Gender inequality remains one of the most persistent and pervasive forms of injustice in the modern world. Despite global efforts to advance gender equality through frameworks such as the United Nations Sustainable Development Goals (particularly SDG 5), deep structural disparities continue to shape women's and gender-diverse individuals' access to resources, opportunities, and decision-making power across all regions [4]. These inequalities are not isolated incidents but are rooted in centuries of institutionalized patriarchy, cultural norms, and economic systems that have systemically privileged men over women in both public and private spheres [14].

While significant progress has been made in areas such as education, health, and political participation, the global gender gap remains stark. According to the World Economic Forum (2024), it will take over 130 years to close the overall gender gap at the current pace of change. This gap is even more pronounced when examined through an intersectional lens that considers race, class, ethnicity, geography, and sexuality [12]. Women in the Global South, Indigenous women, and gender-diverse individuals often face compounded layers of discrimination, further marginalizing them from the benefits of development and sustainability initiatives.

Understanding gender inequality in a global context is essential to recognizing how these systemic disparities undermine the ethical foundations of sustainability—namely, justice, equity, and inclusivity. This section explores the historical and structural roots of gender inequality, analyzes gendered access to education and resources, and examines the disproportionate impacts of environmental change on women and marginalized genders worldwide.

2.1 Historical Roots and Structural Barriers

The roots of gender inequality can be traced to early socio-economic transformations that shaped societal hierarchies. Scholars have argued that matriarchal and egalitarian structures existed during the early stages of human social organization, particularly in hunter-gatherer societies where survival and resource-sharing depended on cooperative roles irrespective of gender. However, with the emergence of agriculture, private property, and state formations, patriarchal systems increasingly took root. These systems devalued women's reproductive and caregiving roles, gradually marginalizing them from public life and formal power structures [14].

Gender discrimination, as sociologists contend, is a socially constructed phenomenon rather than a biological inevitability. Institutions, cultural practices, religious codes, and legal systems have historically functioned to reinforce male dominance and female subordination [15]. Sylvia [16] argues that during the transition to capitalism, women were systematically excluded from wage labor and confined to unpaid domestic roles. This transformation laid the groundwork for modern gender hierarchies. Under feudal and capitalist modes of production, women's labor was either invisibilized or commodified, contributing to their long-term structural marginalization.

These historical developments institutionalized gender inequality across legal, economic, and political domains. Even in contemporary societies, the legacies of these structures continue to influence gender roles, norms, and access to opportunities. Understanding these deep-rooted foundations is essential to dismantling systemic gender inequalities and building more inclusive and ethical sustainability frameworks.

2.2 Gendered Access to Resources, Education, and Decision-Making

Access to essential resources—including land, education, financial services, and political representation—remains highly gendered globally. Despite progress in gender-sensitive policies, women and gender-diverse individuals continue to face

significant barriers in exercising equal rights and accessing socio-economic opportunities.

In many regions, customary and legal frameworks prevent women from owning or inheriting land. According to the [25], while women comprise over 40% of the global agricultural labor force, they own less than 15% of the land. This disparity restricts women's ability to secure loans, invest in agricultural technology, or make autonomous decisions about land use—factors that directly impact food security and environmental sustainability [17].

Education is another critical domain where gender disparities persist. While global enrollment gaps have narrowed, girls in many developing countries face challenges such as poverty, early marriage, menstruation stigma, and domestic labor burdens that prevent them from continuing their education [18, 19]. In STEM fields, for instance, entrenched stereotypes and gendered expectations discourage female participation, resulting in underrepresentation in scientific and technological leadership [20].

Decision-making power—whether in households, communities, or national governance—also reflects gender asymmetries. Women are often excluded from political and institutional leadership positions. As of 2023, women hold only about 26.5% of parliamentary seats globally [21]. This underrepresentation means that policies, particularly those related to climate change, resource management, and technological innovation, are frequently designed without the inclusion of women's perspectives and priorities.

Addressing these disparities is critical for sustainability. Without equitable access to education, resources, and power, women and gender-diverse individuals cannot meaningfully participate in or benefit from sustainability initiatives, thereby weakening the overall impact of development interventions.

2.3 Gender and Vulnerability in the Face of Environmental Change

Environmental change—particularly climate change, deforestation, water scarcity, and biodiversity loss—has profound and unequal impacts across gender lines. Women, especially those in rural and low-income communities, are disproportionately vulnerable to environmental stressors due to their socio-economic status, gendered division of labor, and limited access to resources, information, and decision-making power [6, 22]. Despite their central roles in managing natural resources and sustaining household livelihoods, women often bear the brunt of environmental degradation while remaining underrepresented in climate adaptation planning and governance structures [4].

In many developing countries, women are primarily responsible for securing food, water, and fuel for their families—tasks that become increasingly arduous with the degradation of ecosystems and shifting climate patterns [56]. For example, longer distances to collect water or firewood due to deforestation or drought directly increase women's workload and reduce time available for education, income generation, or political engagement [23]. Additionally, women's limited land rights, insecure tenure, and unequal access to climate finance and agricultural extension services further inhibit their ability to adapt to environmental change [24, 25].

Climate-induced disasters such as floods, cyclones, and droughts often have higher mortality and morbidity rates among women, particularly in regions where mobility, information access, and social norms constrain their ability to respond [26]. Pregnant women, elderly women, and those with caregiving responsibilities are particularly at risk, highlighting the need for gender-responsive disaster risk reduction strategies.

At the same time, women are not passive victims but active agents of resilience. Their traditional ecological knowledge, adaptive practices, and community leadership are crucial for sustainable environmental governance. However, these capacities are frequently overlooked in policy and development planning [7–9]. Addressing gender-specific vulnerabilities and promoting inclusive adaptation strategies are essential not only for equity but also for the effectiveness of sustainability and climate resilience efforts.

3 Ethical Foundations of Sustainability

Sustainability is not merely a technical or environmental concern—it is deeply rooted in ethical principles that guide how we relate to the planet, each other, and future generations. The ethical dimensions of sustainability are foundational in fostering just and equitable societies. Addressing sustainability through an ethical lens enables a broader vision that accounts for systemic injustice, power asymmetries, and the need for long-term human and ecological flourishing.

3.1 Core Ethical Principles: Justice, Equity, and Responsibility

Justice, equity, and responsibility are central ethical pillars of sustainability. Environmental justice demands fair treatment of all people regardless of race, class, gender, or geography in environmental decision-making and access to a clean and safe environment [13]. Equity, particularly distributive equity, addresses the fair allocation of environmental benefits and burdens, acknowledging that marginalized communities often face the harshest consequences of environmental degradation while contributing least to its causes.

Responsibility, both individual and collective, emphasizes the moral duty to care for the planet and its inhabitants. This includes the principle of "do no harm" and the obligation to mitigate environmental harm, particularly where one's actions disproportionately impact vulnerable populations or ecosystems [27]. Ethical sustainability requires not only policy and behavioral change but a shift in moral consciousness towards empathy, care, and accountability for the commons.

3.2 Intragenerational and Intergenerational Equity

The concept of intragenerational equity refers to justice among individuals and communities of the present generation, while intergenerational equity extends ethical responsibility to future generations. Both principles are foundational in the Brundtland Report [1], which framed sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Intragenerational equity demands attention to global inequalities, particularly between the Global North and South. The ethical imperative is to reduce ecological and economic disparities so that all people—regardless of geography—have access to resources, opportunities, and healthy environments [28]. Intergenerational equity challenges current generations to consider the long-term consequences of their actions, particularly in relation to resource depletion, climate change, and biodiversity loss.

Ignoring either form of equity results in unsustainable practices that can perpetuate environmental injustice and violate human rights. The responsibility toward future generations is not merely hypothetical but is rooted in the idea of moral obligation, stewardship, and the intrinsic value of life beyond the present.

3.3 Critiquing Sustainability Ethics Through a Gender Lens

A gendered critique of sustainability ethics reveals how mainstream environmental discourses often ignore or marginalize women's experiences, contributions, and vulnerabilities. Feminist ethics challenges the gender-blind nature of sustainability policies by highlighting the intersection of gender, power, and ecological degradation [29, 30]. Women, particularly in the Global South, are often at the frontlines of environmental change, yet their knowledge, agency, and rights remain undervalued.

The ethics of care, a feminist framework, emphasizes relationality, empathy, and responsibility in moral reasoning—values often absent in dominant, utilitarian, or technocratic approaches to sustainability [31]. Feminist critiques argue that sustainability must go beyond distributive justice to include recognition justice—acknowledging the diverse identities and knowledge systems of women and other marginalized groups [32].

Gender equity in sustainability thus requires structural transformation, not just inclusion. It calls for redefining what counts as knowledge, who gets to participate in decision-making, and how ethical frameworks can shift to accommodate lived realities and historical injustices [33]. Ethical sustainability must therefore be intersectional—recognizing how race, class, gender, and geography shape environmental vulnerability and resilience.

4 The Nexus of Gender Inequality and Sustainability

4.1 Impacts of Gender Disparity on Sustainable Development Goals (SDGs)

Gender inequality is deeply interwoven with the achievement of the Sustainable Development Goals (SDGs), particularly SDG 5 (Gender Equality), SDG 4 (Quality Education), and SDG 3 (Good Health and Well-being). Although women constitute nearly half of the world's population, their access to and control over resources, opportunities, and decision-making power remain significantly limited compared to men [4]. Gender disparities manifest in various forms—especially within the realms of unpaid care work, education, and labor participation—thus impeding broader development outcomes.

For instance, the disproportionate burden of domestic labor on women significantly limits their participation in income-generating activities, educational pursuits,

and public life. This imbalance reinforces economic dependency and perpetuates cycles of poverty. Gender inequality in education, particularly in developing countries, is often rooted in cultural and structural barriers. Stereotypes that deem girls less capable in STEM fields, combined with societal expectations regarding marriage and reproduction, lead to higher dropout rates among adolescent girls [18]. Sekine and Hodgkin [34] found that early marriage remains the most common reason for school dropout among girls aged 15–17 in Nepal, thereby narrowing their future opportunities and undermining progress toward SDG 4.

Health disparities further exacerbate gender inequality. In many low-income and patriarchal societies, women's health needs—especially in terms of reproductive healthcare—are neglected due to cultural taboos, gender norms, and systemic underinvestment in female-focused healthcare services [35]. The dowry system and preference for male children in South Asia often lead to discriminatory attitudes that diminish the perceived value of women, compounding their vulnerability and marginalization [36].

4.2 Gender and Climate Change: Unequal Burdens and Opportunities

Climate change disproportionately affects women and gender-diverse individuals, particularly in agrarian and low-income communities. Women's livelihoods, especially in rural settings, are intricately tied to natural resources—such as land, forests, and water—that are increasingly threatened by environmental degradation, droughts, and erratic weather patterns. Because women often lack secure land rights and access to adaptive technologies, their capacity to respond to these crises is severely constrained [2]. For example, the degradation of agricultural and grazing lands disrupts crop production, fodder collection, and forest resource gathering—all traditionally female responsibilities in many societies. Additionally, women's roles in unpaid household labor—including water collection, food preparation, and caregiving—intensify during climate-induced disasters, exacerbating their vulnerability [37]. Limited access to timely information, mobility constraints, and inadequate representation in decision-making further limit women's ability to respond effectively to environmental risks. In community-based flood early warning systems, for instance, women in female-majority communities have often faced difficulties responding swiftly to warnings due to these layered constraints. Addressing such vulnerabilities requires meaningful inclusion of women and gender-diverse voices in climate adaptation and mitigation strategies to ensure equitable and effective responses.

4.3 The Role of Women and Gender-Diverse Individuals in Sustainability Transitions

Despite these challenges, women and gender-diverse individuals have emerged as key actors in promoting sustainability transitions. Yet their potential remains underutilized due to structural biases in policy and technology design. Energy policies, for instance, often adopt technocratic approaches that overlook social dimensions, particularly gender. The dominance of men in science, technology, engineering, and mathematics (STEM) fields leads to "gender-blind" energy policies that fail to account for the lived realities of women. However, in many rural and agricultural economies, women are the primary stakeholders in sustainable energy transitions—both as users and as change agents. Initiatives aimed at increasing household access to modern electricity and clean cooking technologies have demonstrated positive impacts on gender equality, reducing time poverty and health risks. Nevertheless, Johnson et al. [38] caution that such energy transitions may redistribute inequalities rather than eliminate them if systemic gender norms remain unchallenged. Therefore, integrating gender perspectives and ensuring the active participation of women and gender-diverse individuals in sustainability planning is essential for truly transformative and just transitions.

5 Case Studies and Evidence-Based Practices

5.1 Community-Led Initiatives and Gender Empowerment

Community-led initiatives have demonstrated significant potential in advancing gender empowerment within sustainability frameworks. These grassroots efforts often emerge from the lived experiences of women and gender-diverse individuals, who mobilize local knowledge and social networks to address environmental challenges and socio-economic inequalities [39]. For example, women-led forest management groups in Nepal have successfully combined conservation efforts with empowerment, enhancing women's decision-making roles and control over forest resources [2]. Such initiatives promote gender equity by shifting

power dynamics and providing women with skills, confidence, and leadership opportunities. Similarly, in sub-Saharan Africa, community-based water management programs have integrated gender-sensitive approaches, recognizing women's central role in water collection and use. These programs have improved access to clean water, reduced time burdens on women, and increased their participation in local governance [40]. The success of these initiatives highlights the importance of bottom-up approaches that validate women's expertise and foster collective action in sustainability transitions.

5.2 Gender-Responsive Policy and Program Implementation

Policy frameworks and programs that explicitly incorporate gender considerations are essential to bridging the gap between theory and practice in sustainable development. Gender-responsive budgeting, for instance, ensures that public resources are allocated in ways that address gender disparities and support women's empowerment [49]. Countries like Rwanda and Costa Rica have made strides in integrating gender into national climate action plans and energy policies, resulting in improved access to renewable energy for women and enhanced representation in decision-making bodies [41]. Moreover, gender mainstreaming in environmental governance calls for the institutionalization of gender analysis and inclusive participation across all levels of policy-making [42]. The success of such approaches depends on capacity-building, adequate funding, and political will to challenge entrenched patriarchal norms. Evidence from the Philippines demonstrates that gender-responsive disaster risk reduction programs reduce women's vulnerabilities while amplifying their leadership in crisis contexts [43].

5.3 Lessons from Global South and Indigenous Perspectives

Sustainability efforts benefit immensely from incorporating Global South and Indigenous perspectives, which often emphasize holistic relationships between people and nature. Indigenous women, in particular, play critical roles as custodians of traditional knowledge and biodiversity, contributing to sustainable resource management and climate resilience [44]. Case studies from the Amazon and the Arctic illustrate how Indigenous women's stewardship practices have preserved ecosystems and promoted community well-being despite external pressures and marginalization [45]. However, these contributions are frequently marginalized in dominant sustainability discourses that privilege Western scientific paradigms. Integrating Indigenous epistemologies requires respecting cultural diversity, ensuring free, prior, and informed consent, and recognizing Indigenous sovereignty [46]. Furthermore, gender justice within Indigenous communities must be addressed with sensitivity to local contexts, avoiding homogenizing approaches that overlook intra-community differences. The lessons from the Global South and Indigenous experiences emphasize that inclusive sustainability is inseparable from social justice. Recognizing and empowering marginalized voices enriches sustainability paradigms and fosters more equitable and effective environmental governance.

6 Toward Ethical and Inclusive Sustainability

6.1 Reframing Sustainability Through Intersectionality

The concept of intersectionality, originally coined by [12], provides a critical framework for understanding how multiple social identities—such as gender, race, class, ethnicity, and sexuality—interact to produce unique experiences of oppression and privilege. Applying intersectionality to sustainability shifts the discourse from a one-dimensional focus on environmental issues to a more nuanced analysis that centers social justice and inclusivity. Intersectional approaches reveal that environmental vulnerabilities and capacities to adapt are unevenly distributed along intersecting axes of identity, power, and structural inequalities [47]. By reframing sustainability through this lens, policy and practice can better address the complex realities faced by marginalized groups, especially women and gender-diverse individuals who are often multiply disadvantaged. For instance, Indigenous women in rural contexts may face simultaneous challenges related to colonial histories, gender discrimination, and ecological degradation, requiring solutions that acknowledge these overlapping oppressions [44]. Intersectionality thus broadens sustainability ethics beyond universalist or homogenizing approaches, advocating for tailored, context-sensitive strategies that respect diversity and promote equity [48].

6.2 Policy Recommendations for Gender-Inclusive Sustainability

Gender-inclusive sustainability policies must prioritize equity not only in access to resources but also in decision-making power and representation. Key recommendations include instituting gender-responsive budgeting at all levels of government to ensure that funds are allocated to programs benefiting women and gender-diverse populations [49]. Policies should also promote secure land and resource rights for women, given their vital role in natural resource management and agriculture [25]. Incorporating gender analysis into climate and environmental policies is crucial to uncovering differential impacts and opportunities. For example, Nationally Determined Contributions (NDCs) under the Paris Agreement should integrate gender action plans that empower women in climate adaptation and mitigation [50]. Additionally, enhancing education and training opportunities in STEM and sustainable technologies for women can help dismantle the gender biases that currently limit their participation in sustainability transitions [20]. Furthermore, intersectional policy frameworks must recognize the diverse experiences of marginalized groups, ensuring that Indigenous women, rural women, LGBTQ+ communities, and other vulnerable populations have equitable access to resources, technology, and platforms for voice and leadership [51]. This includes strengthening legal protections against discrimination and violence that inhibit women's full participation in sustainability efforts.

6.3 Strategies for Mainstreaming Gender Ethics in Sustainability Science

Mainstreaming gender ethics within sustainability science involves integrating gender considerations into research design, data collection, analysis, and dissemination. This requires adopting participatory methodologies that engage women and marginalized groups as active knowledge producers rather than passive subjects [52]. It also means moving beyond binary gender categories to include gender-diverse identities, thus enriching the understanding of socio-ecological dynamics. Capacity-building for researchers and practitioners is essential to sensitize them to gender issues and to foster ethical reflexivity in their work. Interdisciplinary collaborations between natural and social sciences can help embed feminist and decolonial epistemologies within sustainability research, challenging dominant paradigms that often marginalize gender concerns [53]. Moreover, sustainability science must prioritize the ethics of care, relationality, and responsibility, emphasizing justice not only across generations but within communities and ecosystems [54]. Publishing gender-disaggregated data and fostering open-access knowledge platforms can democratize information and facilitate inclusive policymaking [55]. Ultimately, mainstreaming gender ethics will enhance the legitimacy, relevance, and transformative potential of sustainability science.

7 Toward Ethical and Inclusive Sustainability

7.1 Reframing Sustainability Through Intersectionality

Reframing sustainability through the lens of intersectionality offers a vital approach to understanding how multiple social identities—such as gender, race, class, and ethnicity—interact to shape individuals' experiences of vulnerability and resilience within environmental contexts. Crenshaw [12] introduced intersectionality to highlight how overlapping systems of oppression compound marginalization. Applying this framework to sustainability challenges, dominant paradigms often treat communities as homogenous groups, overlooking how intersecting identities affect access to resources, exposure to environmental risks, and participation in decision-making processes [47]. For example, Indigenous women frequently experience compounded disadvantages related to gender discrimination, colonial histories, and environmental degradation, which necessitate tailored strategies that recognize the complexity of their lived realities [44]. Intersectional approaches encourage the dismantling of power imbalances embedded within social and environmental systems, advocating for justice that is attentive to diversity rather than one-size-fits-all solutions [48]. By centering intersectionality, sustainability efforts can more effectively address inequities, ensuring that marginalized voices are not only heard but are integral to shaping sustainable futures.

7.2 Policy Recommendations for Gender-Inclusive Sustainability

Gender-inclusive sustainability policies require explicit recognition of gendered power relations and systemic inequalities that influence access to resources and decision-making. One essential recommendation is the adoption of gender-responsive budgeting, which involves allocating financial resources in

ways that actively promote gender equity [49]. This mechanism ensures that sustainability initiatives address the specific needs and priorities of women and gender-diverse groups, rather than reinforcing existing disparities. Secure land tenure and property rights for women are critical for promoting sustainable livelihoods, particularly in agrarian economies where women's roles in food production are central [25]. Furthermore, gender integration within climate policies, such as incorporating gender action plans into Nationally Determined Contributions under the Paris Agreement, enhances women's participation in climate mitigation and adaptation strategies [50]. Investing in education and training programs focused on science, technology, engineering, and mathematics (STEM) for women and girls is another important step to break gender barriers in sustainability-related fields [20]. Finally, intersectional policies must safeguard the rights and inclusion of diverse groups, including Indigenous women and LGBTQ+ communities, by promoting legal protections against discrimination and facilitating their meaningful involvement in governance [51].

7.3 Strategies for Mainstreaming Gender Ethics in Sustainability Science

Mainstreaming gender ethics into sustainability science requires embedding gender considerations throughout the research lifecycle, from conceptualization to dissemination. Participatory research methods that actively involve women and marginalized communities empower them as knowledge producers, fostering inclusive and contextually relevant sustainability solutions [52]. This approach challenges traditional, male-dominated scientific paradigms by valuing diverse epistemologies, including Indigenous and local knowledge systems. Capacity building for researchers and practitioners is essential to cultivate gender sensitivity and ethical reflexivity, enabling them to recognize and address biases in data collection and analysis [53]. Interdisciplinary collaboration, particularly between social and natural sciences, can promote integration of feminist and decolonial theories that question dominant sustainability narratives [54]. Moreover, transparency through the publication of sex- and gender-disaggregated data supports evidence-based policymaking and facilitates accountability [55]. Embedding ethics of care and justice within sustainability science emphasizes relationality, responsibility, and interdependence among humans and ecosystems, aligning scientific inquiry with broader social values [54]. These strategies collectively contribute to a more equitable and transformative sustainability science.

8 Conclusion and Future Directions

8.1 Summary of Key Findings

This paper has elucidated the critical intersection between gender inequality and sustainability, highlighting how persistent structural and social inequities undermine the achievement of sustainable development goals (SDGs). Gender disparities in education, resource access, health, and decision-making power systematically marginalize women and gender-diverse individuals, impeding their participation in sustainability initiatives and leadership roles [4, 35]. The analysis demonstrates that environmental challenges such as climate change disproportionately burden women, especially in rural and Indigenous communities, due to unequal access to resources and adaptive capacities [2]. The ethical foundation of sustainability demands justice, equity, and responsibility, yet sustainability ethics often overlook gendered dimensions, leading to policies and practices that fail to be fully inclusive or effective [48]. The integration of intersectionality into sustainability reframes these issues by revealing how overlapping identities affect vulnerability and agency [12, 47]. Case studies further illustrate that community-led initiatives, gender-responsive policies, and Indigenous knowledge systems offer promising pathways to redress inequities and foster resilience [2, 45, 49].

8.2 The Ethical Imperative of Gender Equality in Sustainability

From an ethical standpoint, gender equality is not only a human rights imperative but an indispensable element of sustainable development itself [55]. Sustainability necessitates inclusive governance models that uphold dignity, participation, and fairness for all genders [54]. The marginalization of women and gender-diverse populations represents a failure to honor the interconnectedness of social and ecological systems. As philosopher contends, justice requires recognizing and rectifying structural inequalities, thus ensuring that sustainability efforts are both equitable and effective. Author's view: Society must fundamentally transform how it values gender equity—not as a peripheral concern but as central to environmental stewardship and economic development. Education systems, policy frameworks, and cultural narratives must be reshaped to challenge

patriarchal norms, dismantle discriminatory practices, and foster empowerment at all levels. This requires collaboration across governments, civil society, academia, and local communities, nurturing solidarity and shared responsibility.

8.3 Call for Transformative Action and Continued Research

Achieving ethical and inclusive sustainability demands bold, transformative action. Governments should institutionalize gender-responsive budgeting and enforce legal protections for women's land rights and political participation [25, 49]. The private sector and educational institutions must advance gender equity in STEM and green jobs to bridge existing gaps [20]. Grassroots movements and Indigenous organizations need increased support to amplify their leadership and integrate traditional knowledge in climate adaptation strategies [45]. Future research must prioritize longitudinal and intersectional studies that explore how gender dynamics evolve within sustainability transitions [47]. Methodologies should be participatory and decolonial, empowering marginalized voices and valuing diverse epistemologies [52]. Moreover, the integration of gender-disaggregated data into environmental monitoring systems will enhance transparency and accountability [55]. Finally, cultivating global solidarity is paramount: sustainability is a shared responsibility that transcends borders, requiring concerted efforts to dismantle systemic inequalities while fostering resilience for future generations. As the United Nations emphasizes, "No sustainable development without gender equality" [50]. By centering gender justice as a core principle, humanity can forge a more just, resilient, and flourishing planet.

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Conflicts of Interest

Uma Sharma is an employee of Department of Immigration, Ministry of Home Affairs, Kathmandu, Nepal, and Medani Bhandari is an employee of Atlantic States Legal Foundation Inc, United States. The authors declare no conflicts of interest.

Ethical Approval and Consent to Participate

Not applicable.

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