



Women and Climate Change: A Gender-Based Analysis of Rural Climate Resilience

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Abstract

This paper presents a gender-based analysis of climate resilience in rural communities, focusing on the often-overlooked role of women in adapting to and mitigating the impacts of climate change. Drawing on field research from rural regions in Indonesia and complemented by a review of global gender-climate frameworks, the study examines how women's experiences, responsibilities, and knowledge systems shape their responses to environmental challenges. It argues that while rural women are disproportionately affected by climate-related stresses—such as water scarcity, agricultural decline, and natural disasters—they also possess unique adaptive capacities rooted in local knowledge, caregiving roles, and community networks. Through qualitative interviews, participatory observation, and policy analysis, the research identifies key structural barriers that limit women's access to resources, decision-making processes, and climate adaptation programs. These include gendered land tenure systems, limited financial and technical support, and socio-cultural norms that undervalue women's labor and leadership. At the same time, the paper documents instances where women have emerged as pivotal actors in grassroots climate initiatives, sustainable agriculture, and disaster risk management. The paper's primary contribution is its call for the integration of gender justice into climate resilience planning at both national and community levels. It challenges technocratic, gender-neutral adaptation models and highlights the importance of intersectional approaches that consider class, ethnicity, and local context. By centering women's voices and agency, the study advocates for inclusive climate strategies that recognize



women not merely as vulnerable populations, but as key agents of transformative change in the face of the climate crisis.

[Tulisan ini menyajikan analisis berbasis gender tentang ketahanan iklim di komunitas pedesaan, dengan fokus pada peran perempuan yang seringkali diabaikan dalam beradaptasi dan mengurangi dampak perubahan iklim. Berdasarkan penelitian lapangan dari daerah pedesaan di Indonesia dan dilengkapi dengan tinjauan kerangka kerja gender-iklim global, studi ini meneliti bagaimana pengalaman, tanggung jawab, dan sistem pengetahuan perempuan membentuk respons mereka terhadap tantangan lingkungan. Studi ini berpendapat bahwa meskipun perempuan pedesaan secara tidak proporsional terdampak oleh tekanan terkait iklim—seperti kelangkaan air, penurunan pertanian, dan bencana alam—mereka juga memiliki kapasitas adaptif unik yang berakar pada pengetahuan lokal, peran pengasuhan, dan jaringan komunitas. Melalui wawancara kualitatif, observasi partisipatif, dan analisis kebijakan, penelitian ini mengidentifikasi hambatan struktural utama yang membatasi akses perempuan terhadap sumber daya, proses pengambilan keputusan, dan program adaptasi iklim. Hambatan tersebut meliputi sistem kepemilikan tanah yang bias gender, dukungan finansial dan teknis yang terbatas, dan norma sosial budaya yang meremehkan tenaga kerja dan kepemimpinan perempuan. Pada saat yang sama, makalah ini mendokumentasikan contoh-contoh di mana perempuan telah muncul sebagai aktor penting dalam inisiatif iklim akar rumput, pertanian berkelanjutan, dan manajemen risiko bencana. Kontribusi utama makalah ini adalah seruannya untuk mengintegrasikan keadilan gender ke dalam perencanaan ketahanan iklim baik di tingkat nasional maupun komunitas. Makalah ini menantang model adaptasi teknokratis dan netral gender serta menyoroti pentingnya pendekatan interseksional yang mempertimbangkan kelas, etnis, dan konteks lokal. Dengan memusatkan suara dan peran perempuan, studi ini menganjurkan strategi iklim inklusif yang mengakui perempuan bukan hanya sebagai populasi rentan, tetapi sebagai agen kunci perubahan transformatif dalam menghadapi krisis iklim.]

Keywords: Climate Change, Climate Resilience, Gender Justice, Gender-based Analysis, Women's Access to Resources

Introduction

Climate change is not a gender-neutral phenomenon. Although climate hazards such as droughts, floods, sea-level rise, extreme temperatures, and changing rainfall patterns affect entire communities, their consequences are mediated by existing social, economic, and political inequalities. Gender is one of the most important factors shaping these differentiated experiences because women and men frequently have unequal access to land, income, financial resources, technology, information, mobility, and political decision-making. Consequently,

climate vulnerability cannot be understood exclusively through exposure to environmental hazards; it must also be examined through the social structures that determine people's capacity to anticipate, respond to, and recover from climate-related disruption (Carr and Thompson 2014; Eastin 2018).

The relationship between gender and climate change is particularly significant in rural areas. Rural livelihoods often depend directly on agriculture, fisheries, forests, livestock, and water resources, all of which are highly sensitive to climate variability. Women contribute substantially to these livelihood systems while also performing unpaid domestic and care work. When environmental conditions deteriorate, women may consequently experience a “double burden”: their productive activities become more difficult while their reproductive and care responsibilities increase. Research on gender and climate adaptation demonstrates that these burdens are not simply consequences of women's biological characteristics but are produced by social institutions and gendered divisions of labor (Arora-Jonsson 2011; MacGregor 2010).

Agricultural systems provide a particularly important example. Changes in rainfall, drought, soil conditions, temperature, and water availability can reduce agricultural productivity and increase the amount of labor required to maintain household food security. In many rural contexts, women are heavily involved in food processing, household nutrition, water collection, small-scale agriculture, and informal economic activities. When climate stress reduces the availability of natural resources, the additional labor required to secure food, water, and household income frequently falls disproportionately on women. Gender inequality therefore functions not only as an outcome of climate vulnerability but also as a mechanism through which climate impacts are reproduced within households and communities.

Indonesia provides an important context for examining these dynamics. The country's large rural population, extensive agricultural sector, geographic exposure to floods, droughts, coastal hazards, and other climate risks, and persistent gender inequalities create multiple points of interaction between climate change and gender. A study of Cirebon, for example, found that gender differences in adaptive capacity were associated with education, livelihoods, access to and control over resources, health, mobility, household structure, and participation in decision-making. It also found that gender-sensitive adaptation was more difficult to institutionalize in rural settings because of differences in community conditions and the capacity and awareness of policymakers (Pratiwi, Rahmawati, and Setiono 2017).

Nevertheless, describing rural women primarily as vulnerable populations presents a conceptual problem. Such an approach can obscure women's agency and reproduce the assumption that women are passive recipients of climate assistance. Feminist scholarship has demonstrated that women are not merely victims of environmental change; they are also knowledge producers, livelihood strategists, community organizers, environmental actors, and political agents

(Arora-Jonsson 2011; Resurrecciyn et al. 2019). Their adaptive practices may include diversification of livelihoods, collective savings, sustainable resource management, food preservation, agricultural innovation, community-based disaster preparedness, and participation in environmental movements.

This distinction is particularly important because resilience itself can be interpreted in two different ways. A narrow understanding treats resilience as the capacity of communities to absorb climate shocks without major disruption. A more transformative approach asks whether resilience-building can also address the structural inequalities that make particular groups more vulnerable in the first place. From this perspective, strengthening women's resilience should not mean simply teaching women to cope with greater burdens. It should involve changing the unequal distribution of resources, authority, labor, and political power that produces gendered vulnerability.

This paper therefore examines rural climate resilience through a gender-based and intersectional perspective. It argues that women's vulnerability to climate change is shaped by unequal access to resources and decision-making, while women's adaptive capacity is grounded in knowledge, social networks, livelihood diversification, and collective agency. The paper focuses on four dimensions: the gendered production of climate vulnerability; women's access to land, resources, and livelihood opportunities; women's knowledge and collective agency in climate adaptation; and the need to transform climate governance through gender-responsive and intersectional approaches. The analysis draws on scholarly literature and Indonesian evidence while recognizing that “women” do not constitute a homogeneous category. Class, ethnicity, age, household structure, occupation, geographic location, and other social identities influence how climate risks are experienced.

Gendered Climate Vulnerability in Rural Communities

Climate vulnerability is produced through the interaction of environmental exposure and social conditions. The same climate hazard can produce substantially different consequences for different people because individuals possess different levels of access to resources, social networks, infrastructure, information, and political power. A gender-based analysis therefore moves beyond asking whether women are more vulnerable than men and instead asks why particular social arrangements generate different capacities to cope with climate risks (Carr and Thompson 2014).

One important source of gendered vulnerability is the division of labor. Rural women frequently combine productive work with reproductive and care responsibilities. They may work in agriculture, livestock, fisheries, informal trade, or home-based enterprises while simultaneously being responsible for food preparation, childcare, eldercare, and household management. Climate-related disruption can intensify each of these responsibilities. For example, water scarcity may require greater time and physical effort to secure household water, while

declining agricultural production may increase women's responsibilities for food management and household budgeting.

This relationship between environmental degradation and women's labor is consistent with feminist political ecology. Rocheleau, Thomas-Slayter, and Wangari (1996) demonstrate that gender, environmental resources, and social power are interconnected. Environmental resources are not distributed neutrally; access to forests, land, water, and agricultural inputs is mediated by gender relations and institutions. Consequently, environmental change can alter gender relations by changing who controls resources and who performs the labor required to compensate for resource scarcity.

The relationship becomes particularly visible in water management. In many rural communities, women are closely involved in household water provision and management. When droughts, changing rainfall patterns, or declining water availability occur, the burden of securing water may increase without corresponding changes in household decision-making authority. Women can therefore become more responsible for managing climate impacts while remaining underrepresented in decisions concerning water infrastructure, resource allocation, and local adaptation planning.

Food security provides another important dimension. Rural women often play central roles in food production, processing, preparation, and distribution. Climate-related agricultural losses can therefore affect women through multiple pathways: declining household income, reduced food availability, increased food prices, and increased unpaid labor. The resulting vulnerability is not simply a consequence of being female; it is connected to gendered economic structures that determine who controls agricultural resources and household income.

The Indonesian case of Cirebon illustrates these dynamics. Pratiwi, Rahmawati, and Setiono (2017) examined gender differences in adaptive capacity through indicators including education, livelihoods, access to and control over resources, health, mobility, female-headed households, and decision-making. Their findings demonstrate that gender equality is directly connected to the ability of individuals and households to adapt to climate change.

Importantly, however, the argument that women are disproportionately vulnerable should not become an essentialist claim that women are naturally less resilient. Arora-Jonsson (2011) warns against framing gender simply through a binary vulnerability narrative because such representations can reinforce stereotypes and obscure the political structures that create vulnerability. Women may experience greater vulnerability in some contexts while demonstrating greater adaptive capacity in others. Their experiences depend on social class, household status, ethnicity, livelihood, age, education, land ownership, and access to institutions.

Intersectionality is therefore essential. Carr and Thompson (2014) argue that gender and climate adaptation should be analyzed through the intersection of multiple identities and social relations rather than through a simple male-versus-

female framework. A landless agricultural laborer, an Indigenous woman with customary land rights, a female-headed household, and a middle-income woman farmer may face the same drought but possess very different resources and adaptive options.

The implication is significant for climate policy. Gender-sensitive adaptation cannot be reduced to counting how many women participate in a program. It must identify the structural conditions that shape women's vulnerability and adaptive capacity. Policies that provide women with climate information while leaving unequal land tenure, financial exclusion, mobility restrictions, and decision-making structures unchanged may improve knowledge without substantially changing resilience.

Access to Land, Finance, Technology, and Climate Resources

Access to resources is one of the most important mechanisms connecting gender inequality to climate vulnerability. Adaptive capacity requires material resources: land, water, capital, technology, infrastructure, agricultural inputs, information, and access to markets. Yet these resources are not distributed equally between women and men.

Land is particularly important because it functions as both a productive resource and a form of economic security. Women who lack secure land rights may have limited ability to invest in climate-resilient agricultural practices, access formal credit, participate in agricultural organizations, or receive compensation when land is affected by climate hazards. Land tenure therefore influences not only livelihood security but also the range of adaptation strategies available to women.

The same applies to financial capital. Climate adaptation frequently requires upfront investment. Farmers may need to purchase drought-resistant seeds, irrigation equipment, livestock, crop-protection technologies, storage facilities, or alternative livelihood inputs. Women with limited control over household income or restricted access to formal financial institutions may be unable to make these investments even when they possess substantial knowledge about climate risks.

This creates an important distinction between knowledge and capacity. A woman may understand that rainfall is becoming less predictable and recognize the need to change cultivation practices, yet still lack the financial resources necessary to implement those changes. Adaptation policy that focuses exclusively on training therefore risks shifting responsibility from institutions to individuals.

Technology access presents a similar problem. Climate-smart agriculture, weather information systems, irrigation technologies, mobile financial services, and early-warning systems can improve resilience, but access to these technologies is mediated by income, education, digital literacy, mobility, and social norms. Women who have less access to technology may be excluded from adaptation programs even when they are directly responsible for agricultural and household decisions.

The relationship between resource access and adaptation is evident in the Indonesian experience. Pratiwi, Rahmawati, and Setiono (2017) identify access to and control over resources as one of the central dimensions through which gender differences in adaptive capacity emerge. Their study demonstrates why climate adaptation should be linked to broader development policies rather than treated as a technically isolated environmental intervention.

The problem also concerns climate finance. Climate adaptation programs frequently rely on project-based funding, which can be difficult for local women's organizations to access. Requirements concerning legal status, financial reporting, technical expertise, proposal development, and monitoring can unintentionally favor larger organizations and institutions. Women-led grassroots groups may possess substantial local knowledge and community legitimacy while lacking the administrative resources required to access formal climate finance.

A gender-just approach should consequently recognize different forms of capital. Financial capital is important, but social capital, knowledge, institutional relationships, and collective organization can be equally significant. Women frequently rely on community networks, informal savings groups, kinship structures, farmer groups, and local associations to manage shocks. These networks can provide access to information, credit, labor exchange, childcare, food, and emergency support.

Social capital can also become a mechanism for political empowerment. Collective organization allows women to negotiate with local authorities, participate in development planning, advocate for infrastructure, and influence resource allocation. Thus, climate resilience is strengthened not merely when women receive individual resources but when they gain collective capacity to shape the institutions governing those resources.

However, resource access should not be interpreted simply as a matter of “empowering women” within existing structures. A transformative approach asks why resources are distributed unequally in the first place. Gender-responsive climate policy must therefore address land governance, financial inclusion, agricultural extension services, social protection, labor rights, and representation in local institutions. Without such structural reforms, adaptation programs may inadvertently reproduce inequality. Women may be invited to training programs, encouraged to establish small enterprises, or taught new agricultural techniques while remaining excluded from land ownership, high-value markets, agricultural decision-making, and climate-finance institutions. In such circumstances, adaptation becomes an additional responsibility rather than a pathway toward greater equality.

Women as Knowledge Holders, Environmental Actors, and Agents of Resilience

A gender-based analysis should not focus exclusively on vulnerability. Rural women possess forms of knowledge and experience that can make important contributions to climate adaptation. Their daily engagement with food systems,

water management, household consumption, agriculture, health, and natural resources gives them situated knowledge of environmental change. This knowledge may include observations of rainfall patterns, crop behavior, soil conditions, water availability, pests, biodiversity, and seasonal variation.

The value of such knowledge should not be understood through an essentialist assumption that women are naturally closer to nature. Such assumptions have historically romanticized women while reinforcing gender stereotypes. Instead, women's environmental knowledge should be understood as socially produced through their particular roles, responsibilities, livelihoods, and relationships with natural resources (Rocheleau, Thomas-Slayter, and Wangari 1996).

This distinction matters because the same social structures that create additional burdens can also generate valuable knowledge. A woman responsible for household food provisioning may possess detailed knowledge about crop varieties, food storage, seasonal changes, and household nutrition. A woman involved in water collection and management may possess extensive knowledge about changes in local water sources. Women involved in informal markets may have detailed information about price fluctuations and livelihood risks.

Such knowledge can complement scientific climate information. Climate projections provide important information about regional trends and future risks, but local communities possess knowledge about how those changes interact with specific landscapes and livelihoods. Participatory adaptation planning can therefore become more effective when scientific information and community knowledge are brought together.

Research from the broader Asia-Pacific context illustrates the importance of women's knowledge and leadership in adaptation. Women leaders involved in climate and conservation initiatives have emphasized the importance of traditional knowledge, support for local women's organizations, women's land rights, and improved access to climate-finance mechanisms (Women's Environment and Development Organization 2018). The lesson is relevant to Indonesia: climate resilience should be constructed through partnerships with women rather than through policies designed for women without their meaningful participation.

The Indonesian context provides examples of this potential. The Cirebon research emphasizes women's participation in decision-making as a significant component of adaptive capacity (Pratiwi, Rahmawati, and Setiono 2017). Similarly, the development of gender-responsive climate adaptation frameworks in Indonesia has increasingly recognized that climate impacts interact with gendered socioeconomic conditions. The challenge is translating this recognition into substantive local participation.

Women can also become important actors in sustainable agriculture and community-based adaptation. Their involvement in food production and household economies provides opportunities for developing diversified livelihoods, improving food security, managing household resources, and promoting environmentally

sustainable practices. Such initiatives can strengthen resilience when women possess sufficient control over the resources required to implement them.

Collective action is particularly important. Individual women may have limited political influence, but women's groups can create collective bargaining power. Through farmer organizations, cooperatives, savings groups, environmental organizations, and community associations, women can negotiate access to markets, training, finance, infrastructure, and government programs.

This shifts the meaning of resilience from individual coping to collective transformation. A woman who adapts to drought by working longer hours may demonstrate individual resilience, but the situation is not necessarily just. A community that changes water-management institutions, diversifies livelihoods, expands women's land rights, and redistributes decision-making power demonstrates a more transformative form of resilience. The distinction between coping and transformation is therefore central. Climate adaptation should not simply increase women's ability to endure unequal conditions. It should create opportunities to alter the structures that produce vulnerability. In this sense, women's agency is not an additional benefit of climate adaptation; it is one of its central conditions.

From Gender-Responsive to Gender-Transformative Climate Governance

The recognition of gender in climate policy has expanded internationally, but recognition does not necessarily produce gender justice. Policies can mention women extensively while continuing to treat them primarily as vulnerable beneficiaries. This creates what feminist scholars identify as a central problem of gender mainstreaming: gender may become a technical category or checklist rather than a framework for examining power.

MacGregor (2010) argues that climate policy has frequently constructed women through a discourse of vulnerability and responsibility. Women are represented as particularly vulnerable to climate change while simultaneously being positioned as responsible for adapting households and communities. This combination can reinforce rather than challenge gender inequality. Women become both the “victims” of climate change and the people expected to solve its consequences through unpaid or underpaid labor.

Arora-Jonsson (2011) similarly cautions against the use of universalized narratives in which women are automatically represented as vulnerable and men as capable. Such representations fail to recognize differences among women and men and can obscure the institutional conditions that produce unequal outcomes. A gender-transformative approach responds to this problem by focusing on power relations. Rather than asking only whether women are included in adaptation programs, it asks whether those programs change women's access to resources, decision-making authority, leadership opportunities, and institutional recognition. This distinction separates gender-responsive adaptation from gender-transformative adaptation.

Gender-responsive adaptation identifies differences between women and men and adjusts policies accordingly. For example, it may ensure that women receive climate information, that training schedules accommodate care responsibilities, or that women have access to agricultural extension services. These measures are important, but they may not challenge the underlying gender relations that determine who controls land or household income.

Gender-transformative adaptation goes further. It seeks to change the structures and norms that generate inequality. This could involve strengthening women's land rights, institutionalizing women's participation in local climate planning, increasing women's representation in water and agricultural governance, expanding access to finance, recognizing unpaid care work, and supporting women-led organizations.

Intersectionality should be integrated into this framework. "Women" should not be treated as a single policy category. Climate risks intersect with poverty, ethnicity, age, disability, marital status, geographic location, occupation, and other forms of inequality. Carr and Thompson (2014) emphasize that gender and climate adaptation need to account for these overlapping identities rather than relying on a binary gender framework.

For Indonesia, this is particularly important because rural communities vary significantly across regions and social groups. The adaptive capacity of a woman farmer in Java may differ substantially from that of an Indigenous woman in Papua, a fisherwoman in a coastal community, or a female agricultural laborer in Sumatra. Policies that apply standardized gender interventions without local analysis may therefore produce limited results.

Climate governance should also recognize women's political agency. Participation should not mean merely attending meetings or being consulted after major decisions have already been made. Meaningful participation requires influence over agenda-setting, resource allocation, implementation, monitoring, and evaluation. Women should be represented in institutions responsible for managing water, agriculture, disaster risk, forests, coastal resources, and climate finance.

Local knowledge should likewise be institutionalized. Participatory vulnerability assessments can complement technical climate assessments by incorporating community observations, livelihood information, and gendered experiences. This does not mean replacing scientific knowledge with local knowledge; rather, it means recognizing that different forms of knowledge can contribute to more contextually appropriate adaptation.

Finally, gender-responsive climate governance requires adequate financing. Gender considerations should be integrated into climate budgets rather than treated as separate projects with limited resources. Monitoring systems should measure not only the number of women reached by programs but also whether women gain actual control over resources and decision-making. The ultimate objective should

be to transform the relationship between gender and resilience. Women should not be viewed as an additional “vulnerable group” to be protected after climate risks are identified. They should be recognized as political actors whose rights, knowledge, leadership, and collective capacities are central to building resilient rural communities.

Conclusion

Climate change interacts with gender inequality through unequal access to resources, differentiated livelihood responsibilities, social norms, and political power. Rural women can experience disproportionate burdens from water scarcity, agricultural disruption, food insecurity, and climate-related disasters because they frequently occupy critical positions in household provisioning and care while possessing less control over land, finance, technology, and decision-making. Evidence from Indonesia, including the Cirebon case, demonstrates that adaptive capacity is closely connected to these socioeconomic and gendered conditions.

At the same time, women should not be conceptualized merely as vulnerable victims. Their knowledge of agriculture, water, food systems, natural resources, and community livelihoods can contribute significantly to climate resilience. Women's organizations and collective networks can also create pathways for adaptation, livelihood diversification, and political participation. A just approach therefore requires moving from a vulnerability-centered model toward one that recognizes women's agency and leadership.

The central implication is that climate resilience must become gender-transformative rather than simply gender-sensitive. Policies should address unequal land tenure, access to finance and technology, unpaid care work, political representation, and institutional decision-making. Adaptation programs should incorporate women's knowledge and provide meaningful opportunities for women to shape climate policies and resource allocation. Most importantly, climate governance should recognize the intersection of gender with class, ethnicity, age, occupation, and geographic context. Rural women should not merely be beneficiaries of climate resilience programs; they should be recognized as co-producers and political agents of climate adaptation. Such an approach can transform climate resilience from a strategy of coping with environmental change into a broader project of social and gender justice.

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