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Women's Environmental Stewardship in a Matrilineal Society: The Role of Bundo Kanduang in Green Economy Development

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Abstract

Background

The transition toward a sustainable green economy requires inclusive community participation, particularly women's involvement in environmental and socio-economic governance. In the Minangkabau matrilineal society of West Sumatra, Indonesia, *Bundo Kanduang* represents women's cultural authority and social leadership within family and community structures. Despite increasing global attention to gender and sustainability, few studies have examined how indigenous matrilineal values contribute to environmental stewardship and the development of a green economy in local communities. This study explores the multidimensional role of *Bundo Kanduang* in supporting sustainable development practices within Minangkabau society.

Methods

This study employed a qualitative research design using narrative interviews with 98 married Minangkabau women aged 25–45 years residing in Lubuk Minturun Village, Koto Tangah District, Padang City, West Sumatra, Indonesia. Data were analyzed thematically to identify women's contributions across household economic activities, social participation, and environmental management practices within the context of green economy development.

Results

The findings reveal that *Bundo Kanduang* plays a significant role in promoting sustainable household economies through adaptive income-generating activities and resource management practices. Participants also demonstrated active engagement in community-based social initiatives and environmental stewardship, including waste management, coastal environmental preservation, and the transmission of ecological values within families and communities. The integration of matrilineal cultural values into women's environmental leadership strengthens community resilience and supports localized green-economy practices.

Study Limitations

This study has several limitations. First, it was conducted as a qualitative single-case study in Lubuk Minturun Village, Padang City; therefore, the findings are context-specific and should not be interpreted as statistically representative of all Minangkabau women or matrilineal communities in Indonesia. Second, the study relies substantially on participants' narratives and interpretations of their everyday economic, social, cultural, and environmental practices, which may be influenced by recall and social desirability. Third, although interviews, questionnaire-guided qualitative prompts, observations, community discussions, and documentary materials were used to strengthen triangulation, the study does not quantitatively measure the environmental or economic outcomes associated with the reported practices. Consequently, the findings demonstrate culturally embedded practices that are consistent with principles of environmental stewardship and green economy development rather than establishing a causal effect of Bundo Kanduang on green economy outcomes. The

single-site design and purposive qualitative focus also limit transferability beyond the study setting. Future research could employ comparative and mixed-method designs across multiple Minangkabau communities to examine the transferability of these findings and quantitatively assess their socio-economic and environmental implications.

Conclusion

This study highlights the potential contribution of indigenous women's leadership to sustainable development and locally grounded green economy practices. Within the study setting, the findings show how matrilineal cultural practices are associated with environmental stewardship and socio-economic resilience. The study contributes context-specific evidence to discussions on gender-inclusive sustainability and offers practical considerations for policymakers, development practitioners, and researchers seeking culturally grounded approaches to women's participation and sustainable community development. These findings should not be generalized beyond comparable contexts without further research.

Introduction

The transition toward a green economy has become one of the most important global development agendas in addressing climate change, environmental degradation, and social inequality. The green economy emphasizes sustainable production, environmental conservation, efficient resource utilization, and inclusive welfare improvement. In this context, women have increasingly been recognized as strategic actors in accelerating sustainable development (Dewi et al., 2023; Supriatna et al., 2023; Soeprobowati et al, 2023) because they play essential roles in household management, social resilience, and environmental stewardship. Recent studies in Indonesia demonstrate that women's participation significantly contributes to sustainability transformation, especially through community-based economic activities, environmental awareness, and local resource management (Alikhanova, 2020; Irjayanti & Lord, 2024).

In developing countries, women are often directly connected with natural resources through food provision, water management, agriculture, and household consumption practices. This condition positions women as key agents in promoting environmentally responsible behavior at the grassroots level. Research on ecofeminism in Indonesia explains that women possess strong ecological awareness and tend to prioritize environmental preservation because their daily lives are closely intertwined with nature and family welfare (Khoiruddin et al., 2024). Moreover, women's environmental participation has been associated with stronger community resilience and adaptive capacity in the face of ecological crises (Manoby et al., 2023; Yanuarta et al., 2022).

Within the Indonesian context, the Minangkabau society in West Sumatra presents a unique social structure, adopting a matrilineal kinship system in which women hold significant social and cultural authority. The concept of Bundo Kanduang symbolizes women as the central pillar of family and customary life. In Minangkabau culture, women are not merely domestic actors but also custodians of inheritance, moral education, social cohesion, and environmental continuity. This cultural structure creates a distinctive opportunity to examine how indigenous women contribute to green economic development through local wisdom and communal values. Recent research highlights that Minangkabau women play significant roles in

sustaining family businesses, preserving traditional knowledge, and supporting innovation within matrilineal systems (Games & Sari, 2023; Wowor, 2023).

The role of women in sustainable development has also gained broader academic attention due to its relationship with gender equality and the Sustainable Development Goals (SDGs). Women's leadership and participation are increasingly associated with organizational sustainability, ecological responsibility, and social inclusion. In Indonesia, studies reveal that women's leadership positively influences sustainability-oriented decision-making and strengthens environmentally responsible business practices (Dewi et al., 2023). Likewise, female entrepreneurship has become an important driver of green economic initiatives, as women tend to integrate social welfare and environmental considerations into their economic activities (Rahayu, 2024).

Despite the growing discussion regarding women and sustainability, existing studies still predominantly focus on formal institutions, corporate leadership, or urban entrepreneurship. Limited attention has been paid to indigenous women in rural communities, especially in matrilineal societies, where women possess greater cultural legitimacy in managing social and environmental resources. Previous studies on gender and environmental governance in Indonesia primarily discuss patriarchal communities, exclusionary forest management, or feminist ecological resistance movements (Koentjoro, 2022; Manoby et al., 2023). Consequently, there remains a significant empirical gap concerning how matrilineal indigenous women contribute to green economy development at the household and community levels.

This study, therefore, focuses on the role of Bundo Kanduang in Padang, particularly in Lubuk Minturun Village, Koto Tangah District, as an important social actor in accelerating green economy development. The study examines three interconnected dimensions of women's lives: household economic activities, social community participation, and environmental management practices. Through these dimensions, the research explores how women maintain sustainable livelihoods, strengthen communal solidarity, and preserve ecological resources through customary practices and local wisdom.

Theoretically, this study contributes to the intersection between green economy theory, ecofeminism, indigenous knowledge systems, and Weberian social action theory. Empirically, the research provides evidence regarding how matrilineal women negotiate economic resilience, social responsibility, and environmental stewardship within everyday life. The findings are expected to enrich discussions on gender-inclusive sustainability and demonstrate that local cultural institutions such as *Bundo Kanduang* possess significant potential to support sustainable development agendas in Indonesia and other indigenous societies worldwide.

Literature Review

Indigenous in Matrilineal Women

Indigenous women play an important role in maintaining environmental sustainability, preserving local knowledge, and strengthening community resilience within traditional societies. In many indigenous communities, women are closely connected with natural resource management because they are responsible for household food security, water management, traditional agriculture, and intergenerational knowledge transmission. Their involvement in environmental governance is often rooted in customary values, collective responsibility, and ecological ethics inherited across generations. Recent studies reveal that indigenous

women contribute significantly to sustainable development through local wisdom, social solidarity, and environmentally responsible economic practices (Manoby et al., 2023). Similarly, ecofeminist perspectives emphasize that women's experiences and cultural positions create stronger emotional and ethical relationships with nature, enabling them to become key actors in environmental stewardship and climate adaptation strategies (Khoiruddin et al., 2024).

Within the Indonesian context, the Minangkabau society of West Sumatra is one of the largest matrilineal societies in the world, where women hold significant social, cultural, and economic authority. The concept of Bundo Kanduang symbolizes women as custodians of family values, inheritance systems, and communal harmony. Unlike patriarchal societies, where women often have limited access to resources, Minangkabau women enjoy greater legitimacy in customary land ownership and household decision-making. This matrilineal structure offers unique opportunities for women to participate actively in sustainable economic activities and environmental management. Research by Games and Sari (2023) demonstrates that women in matrilineal Minangkabau communities play strategic roles in preserving local knowledge, sustaining family-based economic systems, and encouraging innovation across generations. Therefore, the study of Bundo Kanduang offers an important contribution to understanding how indigenous matrilineal women support green economy development through cultural values, social action, and environmental responsibility.

Ecofeminism and Environmental Stewardship

Ecofeminism emerged as a critical theoretical perspective that links environmental degradation with gender inequality and patriarchal domination. The theory argues that women and nature often experience similar forms of exploitation under systems that prioritize economic expansion and resource extraction over sustainability and social justice. Ecofeminist scholars emphasize that women have unique ecological experiences due to their close involvement in household management, food provision, caregiving, and the use of natural resources. Consequently, women often develop greater environmental awareness and a stronger sense of ethical responsibility toward ecological preservation. Recent studies indicate that women's participation in environmental governance contributes positively to biodiversity conservation, climate adaptation, and sustainable resource management, particularly within rural and indigenous communities (Khoiruddin et al., 2024). Ecofeminism, therefore, provides an important framework for understanding how women's social roles can support sustainable development and environmental resilience.

In developing countries, ecofeminist perspectives have increasingly been applied to analyze the relationship between women's local knowledge and sustainable livelihoods. Women are often viewed as agents of ecological transformation because they integrate environmental concerns into everyday economic and social practices. Research in Indonesia demonstrates that women's involvement in green economic activities strengthens household sustainability, promotes community environmental awareness, and encourages responsible consumption patterns (Wowor, 2023). Furthermore, female participation in renewable energy and community-based environmental programs has been associated with greater social inclusion and long-term ecological sustainability (Supriatna et al., 2023). Within the Minangkabau matrilineal context, ecofeminism becomes highly relevant because women not only manage household welfare but also maintain customary land, preserve local wisdom, and sustain communal environmental ethics. Thus, ecofeminism offers a valuable

lens for examining the role of Bundo Kanduang in accelerating green economy development through culturally embedded environmental stewardship.

Weberian Perspective on Women's Social Action

Max Weber's theory of social action provides a foundational sociological framework for analyzing how individuals construct meaning and respond to social realities within everyday life. Weber argued that social action is inherently meaningful because it is oriented toward others and shaped by subjective motivations and cultural interpretations. He classified social action into four ideal types: instrumental rational action (*Zweckrational*), value-rational action (*Wertrational*), traditional action, and affective action. Instrumental rational action refers to behavior guided by calculated goals and efficiency, whereas value-rational action is driven by ethical, religious, or cultural commitments independent of material outcomes. Traditional action emerges from deeply rooted customs and inherited social practices, while emotions, solidarity, and personal attachment influence affective action. This theoretical framework has been widely employed in sociological and sustainability studies to examine how cultural values and social norms shape collective behavior, community organization, and environmental governance (Kalberg, 2023).

Within the context of environmental sustainability and green economy development, Weberian social action theory offers a relevant analytical lens for understanding women's socio-environmental roles in indigenous and matrilineal communities. Women's environmental practices are frequently shaped not only by economic rationality but also by moral obligations, kinship structures, customary values, and spiritual beliefs. In Minangkabau society, the role of *Bundo Kanduang* reflects the multidimensional characteristics of Weberian social action. Women's involvement in cultivating customary land and sustaining household livelihoods illustrates instrumental rational action aimed at maintaining economic resilience. Simultaneously, their commitment to protecting communal resources and preserving ecological sustainability demonstrates value-rational action grounded in collective cultural ethics. Traditional agricultural practices, rotational land management, and participation in customary institutions further represent traditional action embedded within inherited matrilineal norms. Moreover, emotional solidarity, cooperation, and caregiving practices among women's groups exemplify affective action that reinforces social cohesion and community resilience. Accordingly, Weber's theory provides a comprehensive framework for examining how indigenous women negotiate economic sustainability, cultural continuity, and environmental stewardship within the broader green economy transformation agenda.

Methods

Research Design

This study employed an exploratory qualitative research design using a single-case study approach to examine the role and practices associated with Bundo Kanduang among Minangkabau women in relation to household economic resilience, social participation, cultural continuity, and environmental stewardship. A qualitative approach was selected because it enables an in-depth understanding of participants' meanings, lived experiences, social practices, and cultural perspectives within their natural social context. Rather than generating statistical generalizations, the study aimed to explore the social dynamics, cultural interpretations,

and everyday practices through which Bundo Kanduang values may support locally grounded green economy principles in contemporary Minangkabau society.

The overall research design and conceptual framework are presented in Fig. 1, illustrating the integration of the theoretical foundations, research context, data collection, thematic analysis, and interpretation of Bundo Kanduang's economic, social, cultural, and environmental roles within Minangkabau matrilineal society.

Data Collection

Data were collected through qualitative techniques, including in-depth narrative interviews, a questionnaire-based set of qualitative question domains, direct observation, community group discussions, and document review. The primary participants consisted of Minangkabau married women who actively practiced and interpreted Bundo Kanduang values within household, community, and socio-economic activities. The questionnaire component was used as a structured qualitative guide to document non-identifying participant background and to organize questions concerning household economic life, social and community participation, customary (ulayat) land, environmental stewardship, and Bundo Kanduang values; it was not used to generate a psychometric score or statistical survey measure. Narrative interviews allowed participants to elaborate on their experiences and practices. Observational data were used to identify patterns of social interaction, community participation, and culturally embedded environmental practices. Community group discussions provided additional context for collective concerns and practices, while supporting documents, including local cultural records and community-related materials, were reviewed to strengthen contextual understanding and data triangulation.

Data Analysis

The data analysis in this study employed qualitative thematic analysis combined with Weberian social action theory to examine the role of Bundo Kanduang in supporting locally embedded green economy practices within Minangkabau matrilineal society. Interview recordings and relevant community discussion materials were transcribed, while observation and documentary notes were organized for analysis. The researchers repeatedly reviewed the material to identify meaningful narratives related to household economic activities, social participation, cultural practices, and environmental management. Open coding was then conducted to generate initial categories from participants' experiences, which were further grouped into broader themes such as economic resilience, social solidarity, cultural stewardship, and ecological responsibility.

Furthermore, axial coding was applied to connect the identified themes with Weber's four dimensions of social action: instrumental rational action, value-rational action, traditional action, and affective action. Women's income-generating strategies and household resource management reflected instrumental rational action, while environmental preservation and communal land protection represented value-rational action. Traditional practices rooted in customary norms illustrated traditional action, whereas emotional solidarity and mutual support among women reflected affective action. To ensure the credibility of the findings, triangulation was conducted through interviews, observations, and community discussions, supported by member checking and reflexive notes. The findings were then synthesized into thematic narratives explaining how *Bundo Kanduang* contributes to sustainable economic, social, and environmental development within indigenous communities. Coding Structure: Empirical Units, Initial Codes, Sub-Themes, and Weberian Categories shown is Table 1.

Table 1
Coding Structure: Empirical Units, Initial Codes, Sub-Themes, and Weberian Categories

No	Empirical Unit (Field Data)	Original Language	Data Source	Initial Codes	Sub-Themes	Weberian Categories
1	Women work to support household income when husband's earnings are insufficient	"Kalau penghasilan suami indak cukup, awak bantu mancari tambahan untuak anak jo dapua."	Interview – Informant NN01 (Career Woman)	Women supplement household income	Economic resilience of women	Instrumental Rational Action (*Zweckrational*)
2	Income from women's work is saved for children's education and emergencies	"Penghasilan awak disimpan untuak biaya sakolah anak jo keadaan darurat."	Interview – Informant NN03	Household financial planning	Long-term family investment	Value Rational Action (*Wertrational*)
3	Mothers bring lunch from home to reduce household expenditure	"Kami biaso mambaok nasi dari rumah bia hemat pitih."	Interview – Informant NN05	Consumption efficiency practices	Household consumption efficiency	Instrumental Rational Action (*Zweckrational*)
4	Food ingredients are obtained from customary land	"Sayua, lado, jo buah banyak diambiak dari tanah pusako."	Observation & Interview – NN07	Utilization of customary land	Sustainable livelihood strategy	Traditional Action
5	Women participate in informal economic activities such as sewing and trading	"Sambiak di rumah, awak manjua kue jo manjait pakaian."	Interview – Informant NN10	Informal sector participation	Informal green economy participation	Instrumental Rational Action (*Zweckrational*)
6	Women actively join *yasinan* and women's organizations	"Setiap minggu awak ikut yasinan jo arisan kampuang."	Interview – Informant NN12	Participation in women's community groups	Community social cohesion	Social Action
7	Community groups discuss waste and drainage problems	"Kami sering bahas masalah sampah jo saluran aia."	FGD – Women Community Group	Collective environmental discussion	Community environmental awareness	Social Action

No	Empirical Unit (Field Data)	Original Language	Data Source	Initial Codes	Sub-Themes	Weberian Categories
8	Women help neighbors during sickness or funerals	“Kalau ado warga sakik atau meningga, kami bantu basamo.”	Observation – Community Activity	Mutual assistance and empathy	Social solidarity	Affective Action
9	Religious activities strengthen moral responsibility	“Pengajian mambuek awak labiah sadar jo tangguang jawab.”	Interview – Informant NN14	Religious participation	Religious and moral engagement	Value Rational Action (*Wertrational*)
10	Women educate children about adat and religion	“Anak harus diaja adat jo agama dari ketek.”	Interview – Informant NN16	Cultural and moral education	Cultural transmission and leadership	Value Rational Action (*Wertrational*)
11	Women manage communal land rotationally among sisters	“Tanah pusako dikelola baganti jo saudari perempuan.”	Interview – Informant NN18	Rotational land management	Customary ecological governance	Traditional Action
12	Agricultural products are shared among family members	“Hasil panen dibagi rato ka saudari.”	Observation – Farming Activity	Harvest-sharing system	Collective economic solidarity	Traditional Action
13	Women maintain irrigation and environmental cleanliness	“Saluran aia harus dijago supayo sawah indak rusak.”	Field Observation – NN20	Irrigation and sanitation maintenance	Environmental stewardship	Value Rational Action (*Wertrational*)
14	Women avoid converting customary land into buildings	“Tanah pusako jan sampai dijua atau dibangun rumah gadang baru.”	Interview – Informant NN22	Protection of customary land	Preservation of ecological heritage	Value Rational Action (*Wertrational*)
15	Women cultivate vegetables and livestock on customary land	“Kami tanam sayua jo piaro ayam di tanah pusako.”	Observation – Agricultural Site	Sustainable agricultural activities	Sustainable resource management	Instrumental Rational Action (*Zweckrational*)

No	Empirical Unit (Field Data)	Original Language	Data Source	Initial Codes	Sub-Themes	Weberian Categories
16	Women receive disaster preparedness education from village institutions	“Kami diajari cara siaga bencana dek pihak kelurahan.”	FGD – Women Organization	Disaster preparedness participation	Adaptive community resilience	Instrumental Rational Action (*Zweckrational*)
17	Women willingly share harvest surplus with relatives	“Kalau ado labiah hasil panen, dibagi ka saudara.”	Interview – Informant NN24	Sharing of harvest surplus	Environmental ethics and solidarity	Affective Action
18	Kinship values encourage concern for hometown environmental issues	“Walau marantau, kampuang tetap jadi tangguang jawab.”	Interview – Informant NN25	Kinship-based environmental concern	Community ecological attachment	Traditional Action
19	Women are viewed as moral guardians in Minangkabau society	“Bundo kanduang itu tiang rumah tanggo jo nagari.”	Interview – Traditional Leader NN27	Symbolic role of women	Cultural authority and leadership	Value Rational Action (*Wertrational*)
20	Participation in health and nutrition outreach programs	“Posyandu penting untuak kesehatan anak jo lansia.”	Observation – Posyandu Activity	Community health participation	Social welfare and empowerment	Social Action

RESEARCH LOCATION

This study was conducted in Lubuk Minturun Village, Koto Tangah District, Padang City, West Sumatra, Indonesia. The research location was purposively selected because Lubuk Minturun represents a Minangkabau community that continues to maintain a strong matrilineal social structure, where the institution of Bundo Kanduan**g** remains actively involved in household decision-making, customary practices, community organizations, and environmental stewardship.

Lubuk Minturun also provides an appropriate setting for examining the interaction between indigenous cultural values and contemporary sustainable development practices. Women in this community actively participate in household economic activities, community-based organizations, the management of customary (*ulayat*) land, environmental conservation, and the transmission of cultural values across generations. These characteristics make the village an ideal case for exploring how indigenous women's leadership contributes to green economy development within a matrilineal society.

The village is located in the northern part of Padang City, West Sumatra Province, Indonesia, and combines semi-rural agricultural landscapes with growing urban development. This setting allows the study to capture how traditional institutions and local wisdom continue to shape women's economic, social, and environmental roles amid ongoing socio-economic transformation. Figure 2 presents the geographical location of the study area.

Result

Analysis on Household Economic Life

Based on interviews with informants who work as career women at the research location, it is clear that women, in this case, bundo kanduang, help earn a living for the family. A man cannot replace the head of the family. This applies to women who are intact in the family, namely, married women with a husband and children. In productive activities, the authority of the husband or man determines whether the woman uses the family income. In this research, men account for the largest share of household expenditure and consumption, such as buying cigarettes or just having fun in coffee shops. The remainder of the husband's income is used to meet the family's food needs, including children's education.

Women in this study, as career women, contribute to meeting family food needs and supporting children's education when the husband's income is insufficient. If the husband's income is sufficient for all family needs, the wife's income from working outside the home is used as an emergency reserve for unexpected needs, such as the husband's death or illness, helping parents or relatives, or improving children's education.

Women who work at home in the informal sector, such as tradespeople, laundry workers, tailors, and housemaids, earn a little extra income, which they use as a reserve fund for urgent needs. But often, men or husbands who do not receive a share of the income women earn tend to take and use the money secretly. In some households, this was sometimes accompanied by coercion, which then resulted in physical and psychological violence. The position of women is very weak because men are still seen as the head of the family. So, from a productive perspective, women take food from the customary land they own, at least to meet the family's daily food needs.

This study even finds that women are considered wealthy. Men believe that they have the authority to control women as their subordinates. Women are persecuted for their incompetence and refusal to do extra work to supplement the family income.

Women as housewives (*Uniang* who became informants in this study) were found a result:

“To only expect a living from their husbands. When the husband brings income, he must be able to pay for the kitchen, food, and education needs of the children. Because women are given inheritance, this inheritance land is planted with food ingredients such as rice, crops, vegetables, fruits, and livestock. When harvested, the produce from this inherited land is brought home for consumption in the household, if there is excess, it is brought to the shop or to the market to be sold in order to add to the financing of the children's education”.

All informants brought lunch from home for themselves and their children to save on daily consumption expenses. This lunch is prepared and cooked by the mother at her home. Food supplies such as chilies, onions,

vegetables, and fruit are obtained from the land on customary land. However, salt, sugar, oil, and other complementary goods not produced on customary land will be bought at the market or in a shop. Usually, the customary land they own is not far from where they live. For career women who don't have time to cultivate their ulayat land, they ask for a share of the proceeds from crop sales, which becomes their allotment from their sister, who also helps manage the ulayat land. Sometimes, informants who work as career women give up the results of their customary land to their sisters who are still lacking.

For side dishes and other nutritious foods such as seafood, meat, and chicken, informants usually buy them at the market in the afternoon because prices are lower for working women, working mothers, and homemakers. All respondents obtained chicken eggs or duck eggs from their customary land. Pond fish or freshwater fish are sometimes sent by female relatives who manage communal land.

Analysis of Social Life

Based on interviews with informants, it was found that all informants were active in the social community known as bundo kanduang. They joined this group because it was close to where they lived. This community group has activities such as gathering to discuss daily problems around their homes, for example, garbage, sewerage, sick, deceased residents, cooperation for traditional weddings, outreach from health and education experts, religious preaching, and so on. Their aim in participating in this activity is to increase their knowledge, stay in touch with one another, and be concerned about residents' problems.

Career women, mothers who work at home, and homemakers take the time to attend because the time set for gathering together in the community is handled after the As prayer, which is at four in the afternoon. Where career women have returned from the office, mothers who work at home have taken a break from their jobs, and homemakers are waiting for their husbands to come home from work.

Those who are active in this community usually have broad insight into the future. They are ready to educate their children, guide their families to worship at the mosque, care for the people around them, and be nimble in their actions. This can be seen in the children's achievements: they are agile, their speech is polite and orderly, and their clothes are clean and tidy. If she is a career woman, she occupies a position in her job. They feel the many benefits of joining this group. They feel they are not alone; they can make friends and plan for the future of their family.

When asked what things impressed them if they were part of this group. Almost all of their answers (*Upiak* who became informants in this study), said;

“We were very happy to be invited to participate in religious preaching events, doctors and midwives came to check their health, health center staff provided guidance on health, immunization, nutrition for toddlers and the elderly, social services provided outreach about disaster response because the city of Padang is prone to natural disasters, as well as the village providing guidance on the importance of live kitchens and live pharmacies”.

Interview results showed that the informants (Upiak) responded positively to their participation in the Bundo Kanduang community, particularly through the various activities that provided direct benefits to their social and family lives. The informants stated that they enjoyed participating in religious activities, health education,

doctor and midwife examinations, and education from health workers on immunization, child nutrition, and elderly health. In addition, they gained knowledge of disaster preparedness, given Padang City's high risk of natural disasters, as well as guidance from the village government on the concepts of "living kitchens" and "living pharmacies" as forms of family resilience. Overall, participation in this community was found to be very beneficial, as it increased knowledge, health awareness, and social preparedness in daily life.

Analysis of Natural Life and the Environment

The field findings showed that women given the right to manage ulayat lands achieved satisfactory results when they cultivated them. If the bundo kanduang does not participate in managing it, but his sister does, he will also enjoy it, although not as much as the one who manages the ulayat land. A rotation period is allocated for the management of this communal land. Usually, this opportunity occurs twice during the harvest period. When this opportunity period expires, it will move to another sister. The distribution of proceeds is based on the agreement of each family from the customary land. When the opportunity period was not as a manager, only yielding a little result, there was sincerity from the other sisters in accepting it gracefully. Concern for the fate of female siblings is a priority at this research location. This career woman still has a plot of customary land, but it is managed by her sister, who is not as lucky as she is.

The customary land in question is the shared land of the members of the customary law community concerned. Tenure rights over the land of indigenous peoples are known as ulayat rights. Ulayat rights are a set of authorities and obligations under customary law governing land within their territory. Customary rights are recognized "as long as in reality they still exist in reality". Thus, customary land cannot be transferred to become private land if the customary land actually still exists, for example, as evidenced by the support of the customary law community concerned or the highest customary leader in an area where the customary government center is located.

Customary land managed by the mother's biological family, whether her husband or her children, during the two growing seasons must be attended to for waste, irrigation, and cleanliness. In this customary land, rice, corn, cooking spices (ginger, turmeric, galangal, basil, lemon grass, bay leaves, etc.) are planted. fruits (bananas, watermelon, pumpkin, sugar cane, etc.), vegetables (spinach, kale, lettuce, cucumber, eggplant, chilies, onions, etc.). Some raise chickens, ducks, and other poultry. Some raise catfish and tilapia in freshwater ponds.

The harvest from the land will be enjoyed by the woman's family, who receives the management share. The remaining excess proceeds from the customary land are sold, and the money will be given equally to the sister. But some did not provide information, as long as their sister had expressed her willingness to accept the results.

When asked what things impressed them if they were part in this study like *Piai* who who became informants in this study, said;

“The harvest from the land holds a special significance, not just as a source of sustenance but also as a means of reinforcing familial bonds and community cohesion. The system of land management and distribution is deeply rooted in customs and traditions that have been passed down through generations”.

Central to this system is the role of the woman entrusted with managing the share of the land. She plays a pivotal role in overseeing cultivation and harvest, ensuring that the land is used efficiently and that the crops are tended with care. Her responsibility is not only to ensure a bountiful harvest but also to ensure the equitable distribution of the produce among her family members.

The family of the woman who holds the management share is the primary beneficiary of the land's yield. This arrangement honors her commitment and dedication to the family unit's well-being. It also acknowledges the critical role women often play in agricultural activities, making them key figures in the community's economic and social fabric.

However, this community also recognizes the importance of fairness and inclusivity. When there is an excess of proceeds from the land's produce beyond what the family can consume or store, the surplus is sold. The proceeds from these sales are distributed equally among the sisters in the family. This practice not only ensures that wealth is shared among siblings but also reinforces the idea of collective responsibility and solidarity among family members.

I t's worth noting that not all sisters are required to participate in land management actively. Some may choose not to provide information or involve themselves in the agricultural activities. However, as long as a sister expresses her willingness to accept the results obtained from the land, she is entitled to an equal share of the proceeds. This approach reflects a sense of unity and support within the family, where each member's needs and contributions are respected.

Discussion

Women’s Socio-Economic Roles and Green Economy Resilience

The findings of this study suggest that practices associated with Bundo Kanduang contribute to household economic resilience and are consistent with locally grounded green economy principles within the Minangkabau matrilineal context. Women contribute through both formal employment and informal livelihood activities, while also managing household consumption and utilizing customary (ulayat) land as a food resource. These practices reflect instrumental rational action (Zweckrational), as women strategically allocate income, diversify livelihood sources, and use local resources to support household welfare. However, the findings also reveal gendered power asymmetries, where men may retain substantial authority over financial decision-making and, in some cases, exercise control over women’s income. Women’s adaptive strategies, including food production on customary land, inter-family resource sharing, and consumption-saving practices, illustrate their contribution to household food security and socio-economic stability.

Therefore, within this case, women are not merely supplementary economic actors; their practices contribute to household resilience and illustrate locally embedded pathways that are compatible with green economy objectives.

Cultural Ecology, Social Solidarity, and Environmental Stewardship

The study further reveals that environmental stewardship among Bundo Kanduang is deeply rooted in cultural values, customary norms, and collective ecological ethics embedded within Minangkabau matrilineal traditions. Women actively participate in the preservation and productive management of ulayat land through rotational cultivation systems, agro-biodiversity practices, and equitable resource distribution among family members. These practices represent a combination of value rational action (wertrational), traditional action, and affective action in Weberian terms, as environmental behavior is driven not only by economic logic but also by moral responsibility, inherited customs, and emotional solidarity. The integration of these social action types reflects how indigenous women sustain ecological balance while maintaining intergenerational resource security.

These findings align with feminist political ecology perspectives, which emphasize that environmental governance is shaped by gendered power relations, local knowledge systems, and cultural embeddedness (Elmhirst, 2022; Harcourt & Nelson, 2023). Moreover, women's ecological practices in this study, such as maintaining agricultural land, preserving food diversity, and ensuring the sustainable distribution of harvests, support broader sustainability frameworks in developing regions (Fauzi & Oxtavianus, 2022). The role of social institutions such as Bundo Kanduang community groups further strengthens collective environmental awareness and disaster preparedness, consistent with evidence that indigenous women are key actors in climate resilience and environmental governance (Iskandar & Permana, 2024). In addition, emotional solidarity and mutual support among women reinforce social cohesion and collective responsibility, which are essential components of sustainable community development.

Thus, the findings indicate that women in this Minangkabau community contribute to culturally grounded, socially embedded, and environmentally responsible practices that may support local green economy objectives.

Conclusion

This study finds that the economic, social, cultural, and environmental practices associated with Bundo Kanduang contribute to household and community resilience and are consistent with locally grounded green economy principles within the Minangkabau matrilineal setting. Women contribute to household sustainability through formal and informal economic activities, consumption management, and the use of customary land to support family welfare. Their participation in women's organizations, religious gatherings, health activities, and mutual-support practices also strengthens social cohesion and community preparedness. Environmental practices related to ulayat land, agriculture, resource sharing, and intergenerational cultural transmission illustrate how environmental stewardship is embedded in the local matrilineal social structure. Interpreted through Weberian social action theory, these practices reflect instrumental rationality, value-oriented action, traditional action, and affective solidarity. Rather than establishing a causal or universally generalizable relationship, the study provides context-specific evidence that matrilineal cultural institutions can offer socially embedded pathways for environmental stewardship and locally oriented green economy initiatives.

The study further reveals that environmental management practices among Bundo Kanduang are deeply embedded within cultural traditions, moral values, and indigenous ecological ethics. The preservation of ulayat land, sustainable agricultural activities, and collective resource-sharing systems demonstrate that environmental stewardship is strongly integrated into the matrilineal social structure of Minangkabau society.

Using Weberian social action theory, the findings show that women's actions reflect instrumental rationality, value-oriented behavior, traditional practices, and affective solidarity simultaneously. Therefore, this research contributes to the growing discussion on ecofeminism, indigenous sustainability, and green economy development by emphasizing that matrilineal women possess significant capacities as agents of environmental governance and sustainable community transformation.

Declarations

Acknowledgements Not aplicable.

Author contributions Maryanti Maryanti was responsible for the conceptualization, data collection, and preparation of the study. Sosmiarti and Leli Sumarni were responsible for writing and supervising the manuscript. Andi Harmoko Arifin and Dedi Saputra served as translators and contributed to the development of the ideas. All authors have read and approved the final version of the manuscript.

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Data Availability The materials supporting the findings of this qualitative study, including the anonymised data underlying the thematic analysis, research instrument, coding framework, and documentation of the analytical procedures, are provided as Supplementary Information for editorial and peer-review purposes. Raw interview recordings and unredacted transcripts are not publicly available because they may contain information that could permit the identification of participants. Additional de-identified supporting materials may be made available by the corresponding author upon reasonable request, subject to applicable ethical and confidentiality requirements.

Human Ethics and Consent to Participate Declarations: This study underwent internal ethical review at the Faculty of Economics and Business, Andalas University, Padang, West Sumatra, Indonesia, as documented in Ethical Clarification Letter No. 421/UN16.05.WD1/PT.01/2024, dated 8 June 2024. The institutional review covered a qualitative approach involving non-invasive observation, questionnaires, and interviews without collection of personally identifiable information. The institutional clarification determined that written informed consent was not required because participation was entirely voluntary, the study involved no physical or psychological risks to participants, and participant anonymity and data confidentiality were strictly maintained. Participant identities were anonymised during analysis and reporting, and research data were handled confidentially by the research team.

Consent for Publication: The manuscript does not disclose participants' direct identifying information. Quotations and qualitative materials reported in the manuscript are presented using anonymised informant codes, consistent with the confidentiality and anonymity conditions documented in the institutional ethical clarification.

Competing Interest: The authors declare no competing interests.

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Figures

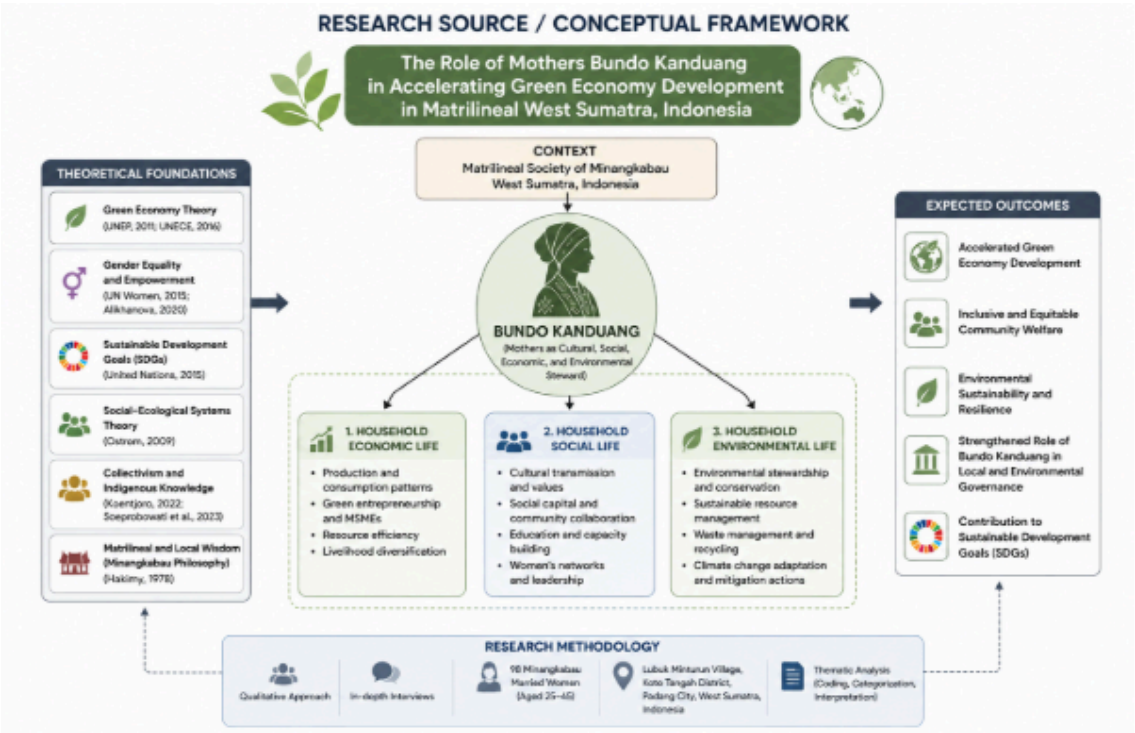


Figure 1

Research Design

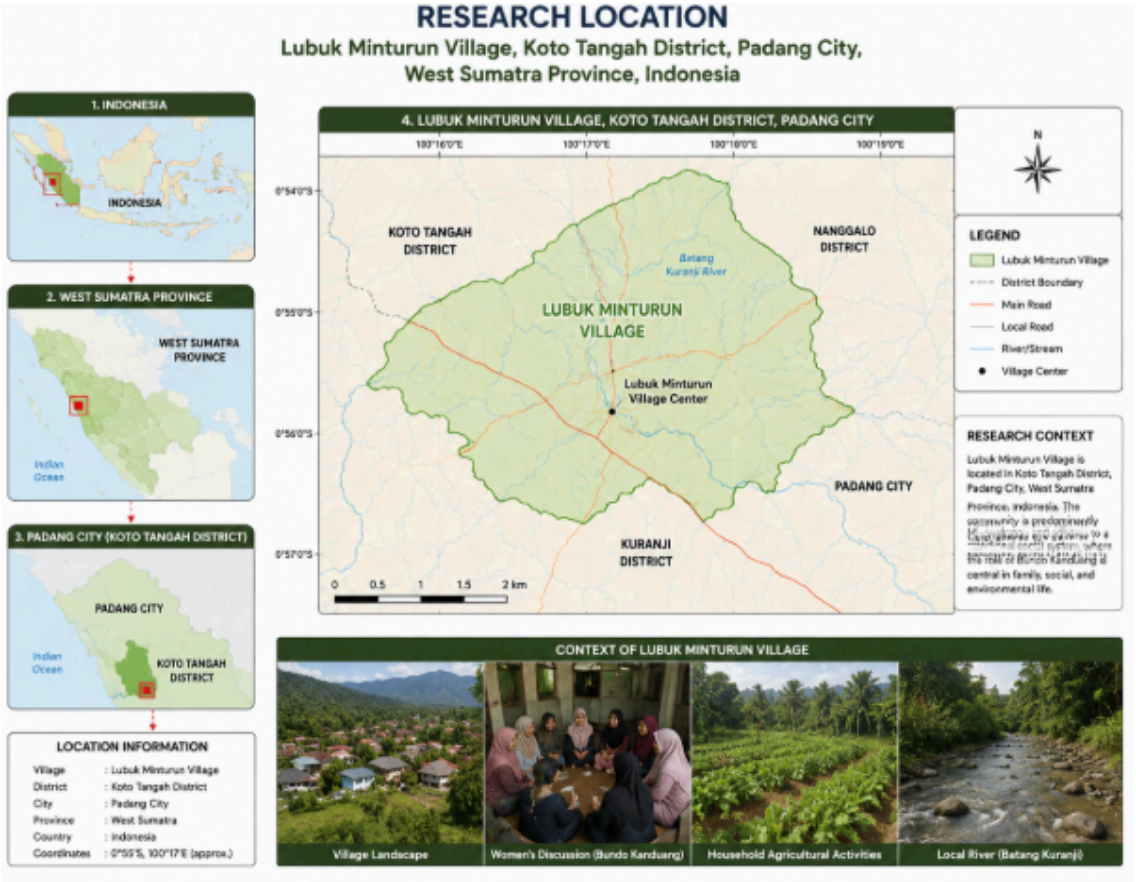


Figure 2

Research Location

Supplementary Files

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