

Rooted Resistance: Women's Socio-Cultural Roles in Environmental Conservation in a Patriarchal Society in Northern Uganda.

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Abstract

Background

In Northern Uganda's patriarchal communities, women play vital yet underrecognized roles in environmental conservation. There is limited research examining the socio-cultural roles women play in society in northern Uganda. This study, conducted in Gulu District, examined the socio-cultural functions performed by women in safeguarding natural resources.

Methods

This study employed an analytical cross-sectional design involving 395 women aged 18–49 in Gulu District, selected for its patriarchal context. Data were collected using structured questionnaires and analyzed with SPSS, applying descriptive and inferential statistics. Key variables included women's roles in environmental conservation and barriers to participation. Ethical approval and informed consent were obtained to ensure research integrity.

Results

The study found that women in Gulu District play vital socio-cultural roles in environmental conservation, particularly as custodians of indigenous knowledge (Mean = 4.42), active participants in tree planting (Mean = 4.11), and conservers of ecosystems (Mean = 4.04). However, their involvement in advocacy (Mean = 3.46) and decision-making (Mean = 3.20) was perceived as limited, reflecting the constraints of a patriarchal society. Additionally, evolving gender roles have negatively impacted women's engagement, with 47.6% citing excessive domestic workload and 44.1% reporting reduced participation in conservation activities. These findings highlight both the significance of women's contributions and the structural barriers that hinder their full involvement in environmental governance.

Conclusion

Despite these challenges, women's contributions remain central to sustainable environmental stewardship. The study recommends targeted sensitization and training programs to promote gender equality and community acceptance of

women's leadership in environmental governance.

Introduction

Globally, women like their male counterparts are deeply engaged in the environmental sector, encompassing agriculture, fisheries, forestry, mining, and related domains [1]. In addition to their active participation, women exert considerable influence in the conservation and management of natural resources, including soil, water, forests, and energy [2]. Women across the globe play indispensable roles in environmental conservation, often rooted in their daily responsibilities and traditional ecological knowledge. Their intimate relationship with nature, through tasks such as water collection, fuel procurement, farming, and seed preservation, positions them as effective stewards of biodiversity and sustainable resource management [3, 4, 5]. They often possess rich reservoirs of both traditional and contemporary ecological knowledge [6]. However, their involvement in environmental conservation is significantly constrained by patriarchal norms and socially constructed gender roles [1]. As Regans asserts [7], patriarchy is predicated on the presumed natural superiority of men over women, fostering female dependence and subordination across all spheres of life. These patriarchal structures restrict women's mobility and autonomy over their bodies and property. Although the degree of male dominance varies across cultures, the underlying principle of male control remains a consistent feature [8]. Patriarchy thus serves as the foundational framework for gendered power imbalances, from which other forms of inequality emerge and persist [9, 10]. It institutionalizes normative values based on biological distinctions, shaping labor divisions, access to privilege, behavioral expectations, and the distribution of opportunities [9]. Consequently, women's contributions and expertise in environmental conservation and domestic resource management are frequently undervalued relative to those of men [11].

While global frameworks such as the Beijing Declaration emphasize gender equality in environmental governance [4], local realities often reflect persistent disparities in resource access, labor division, and leadership roles [8, 12, 13]. Women's informal knowledge, though vital for sustainable practices, is frequently excluded from formal discourse, despite its proven efficacy in grassroots movements like the Chipko Movement in India and the Green Belt Movement in Kenya [14, 15]. Moreover, women play a critical role in shaping environmental values among younger generations, particularly in Indigenous and rural communities, where they are responsible for water management and ecological education [16]. By investigating these dynamics, the study aimed to illuminate the barriers and opportunities surrounding women's participation in conservation, reaffirming their role as agents of ecological resilience and sustainable development.

Numerous economic and social activities undertaken by both women and men are intricately linked to environmental resources. However, many of these practices, such as bush burning, deforestation for timber and charcoal production, farming along riverbanks and wetlands, and improper waste disposal, contribute significantly to environmental degradation, thereby threatening the sustainability of natural ecosystems and the well-being of future generations [17]. These activities have led to the depletion of forest cover, topsoil erosion, and the drying of water bodies, resulting in widespread ecological consequences, including global warming, prolonged droughts, floods, landslides, and declining soil fertility, with Uganda being notably affected.

Women, whose livelihoods are closely tied to the environment through roles as farmers, water and firewood collectors, and custodians of traditional ecological knowledge, are disproportionately impacted by environmental degradation [18, 17]. Their direct and sustained interaction with both

natural and built environments has cultivated deep environmental awareness, often making them more protective and responsive to ecological changes [19]. Despite this, patriarchal norms continue to undermine women's tenure rights and exclude them from environmental decision-making processes, thereby heightening their vulnerability and limiting their influence in conservation efforts [20, 11].

Raimi observes that women's substantial contributions to environmental management are frequently undervalued due to entrenched patriarchal ideologies that shape societal norms and values [21]. These ideologies perpetuate disparities in roles, resource access, and ownership, resulting in unequal capacities between men and women to respond to environmental challenges [22, 23]. This situation is particularly acute in Northern Uganda, and notably in Gulu District, where patriarchal structures are deeply embedded [24]. Gulu was selected for this study due to its pronounced gender dynamics and severe environmental degradation. Between 2010 and 2021, the district lost approximately 38,700 hectares of forest, representing a 6.2% decline in forest cover [24]. In response, the Ugandan government imposed a ban on commercial tree cutting in the area, yet the region continues to experience erratic rainfall patterns and declining agricultural productivity, underscoring the urgent need for inclusive and sustainable environmental interventions [25].

In rural communities, women's expertise in identifying medicinal plants, managing landscapes, and ensuring household health contributes significantly to ecosystem preservation and waste reduction [6, 26]. Despite these contributions, patriarchal norms continue to marginalize women by restricting tenure rights and excluding them from decision-making processes, thereby limiting their influence in formal conservation efforts [20, 11]. This gendered exclusion is particularly evident in regions like Northern Uganda, where cultural norms reinforce male dominance in environmental governance [27]. In Gulu District, for instance, forest cover declined by 6.2% between 2010 and 2021, prompting government intervention to ban commercial tree cutting [24], yet women's roles in reversing degradation remain underrecognized.

Given the urgency of environmental degradation and its disproportionate impact on women, enhancing their engagement in conservation efforts is essential. This study critically examined the roles women play in fostering environmental sustainability within patriarchal contexts, with Gulu District serving as the focal point due to its entrenched gender norms and ecological challenges.

Methodology

Study Design

This study adopted an analytical cross-sectional design to examine the role of women in environmental conservation. A case study approach was employed to provide contextual depth, while a mixed-methods strategy was integrated to enhance the richness and quality of evidence, as supported by [28]. This combination allowed for both quantitative and qualitative data collection, offering a comprehensive understanding of the subject matter.

Study Area Justification

The research was conducted in Northern Uganda, a region known for its ecological diversity and strong community-based environmental practices. The choice of this location was informed by the significant role women play in natural resource management, particularly in post-conflict recovery settings. Northern Uganda presents a unique socio-cultural context where traditional knowledge systems are still actively practiced, making it an ideal setting for exploring women's contributions to environmental conservation.

Inclusion and Exclusion Criteria

The study included adult women and men aged 18 years and above who resided in the selected communities and were actively involved in environmental or household resource management. Individuals below the age of 18, non-residents, and those unwilling or unable to provide informed consent were excluded from participation.

Sampling Technique and Sample Size

Purposive sampling was initially used to identify key informants and communities relevant to the study objectives. To ensure representativeness, simple random sampling was later applied to select individual respondents. This method guarantees that each member of the population has an equal and independent chance of being included in the sample, thereby enhancing the validity of the findings [29].

The sample size was determined using the Kish formula, a scientifically recognized technique for survey sampling. The Kish formula was selected for its resilience to outliers [30] and its ability to ensure fairness in participant selection [31]. Originally, the target sample size was 394 respondents; however, to improve statistical efficiency, the number increased to 395 through the use of structured questionnaires.

The selection of the Kish formula was informed by its resilience to outliers, as highlighted by [30]. More so, the formula ensured that each potential survey participant was afforded an equal probability of selection, thereby enhancing the fairness and validity of the sampling process [31].

The sample size is denoted by $n = \frac{Z^2 pq}{d^2}$

Where;

n = is the required sample size

Z = the normal standard deviate that represents the level of confidence (1.96)

d = the desired level of precision estimated at 95%, which is the same as 5% or 0.05 in terms of value

p = the estimated proportion of attributes that is present in a population (50%). An average of 50% is used or 0.5 is adopted.

q = proportion of the population without the desired prevalence which in this case is $1 - 0.5 = 0.5$

Therefore;

$$n = \frac{Z^2 pq}{d^2}$$

$$n = \frac{1.96 \times 1.96 \times 0.5 \times 0.5}{(0.05)^2}$$

$n = 394$ as a minimum number of respondents to be reached.

Sample Size Selection

The distribution of the 394-sample size for study respondents among the six (6) sub-counties in Gulu district was determined as below.

Proportion Sample: $n_1 = \frac{\text{size of entire sample} \times \text{sample size}}{\text{Target population}}$

Target population

Sample proportion for Awach Sub County

$$n1 = \frac{19,502}{125,815} \times 394 = 61$$

125,815

Sample proportion for Bungatira Sub County

$$n1 = \frac{32,948}{125,815} \times 394 = 103$$

125,815

Sample proportion for Paicho Sub County

$$n1 = \frac{24,306}{125,815} \times 394 = 76$$

125,815

Sample proportion for Palaro Sub County

$$n1 = \frac{13,510}{125,815} \times 394 = 42$$

125,815

Sample proportion for Patiko Sub County

$$n1 = \frac{18,540}{125,815} \times 394 = 58$$

125,815

Sample proportion for Unyama Sub-County

$$n1 = \frac{17,009}{125,815} \times 394 = 54$$

125,815

However, in the course of data collection, 55 respondents were reached in Unyama sub-county instead of 54 minimum proportions sampled. Since the greater the sample size, the more efficient the research findings, the researcher chose to consider the questionnaire. Therefore, the number of respondents increased from 394 to 395. The respondents were selected using a simple random sampling. It ensures that each element of the population has an equal and independent chance of being included in the sample, enhancing the representativeness of the sample [29].

Data Collection Methods

Data were collected using a researcher-administered questionnaire that contained survey questions translated into the local language spoken in Gulu.

Ethical Considerations

The study received ethical approval from Clarke International University Research Ethics Committee and clearance from the Uganda National Council for Science and Technology. Local leaders in the selected villages granted administrative permission. Written informed consent was obtained from all participants, with materials translated into Luo for clarity. Participation was voluntary, confidential, and included consent for future publication of findings.

Results

Socio-demographic characteristics of respondents

This section outlines the socio-demographic characteristics of study participants, including age, gender, marital status, education level, and occupation. These variables provide essential context for interpreting the study's findings. Table 1 summarizes the distribution: the largest age group was 26–30 years (32.2%), while the youngest (20–25 years) made up 11.6%. Male respondents comprised 53% of the

Table 1. Socio-demographic characteristics of respondents

	Frequency (N=395)	Percentage (%)
Age of respondent		
20-25 years	46	11.6
26-30 years	127	32.2
31-35 years	126	31.9
36 and above	96	24.3
Sex of respondent		
Male	210	53.2
Female	185	46.8
Marital status		
Single	54	13.7
Married	274	69.4
Separated	31	7.8
Divorced	16	4.1
Widowed	20	5.1
Education level		
No formal education	49	12.4
Primary	189	47.8
Secondary	118	29.9
Tertiary/University	39	9.9

Data source: Field data, 2024

sample. Marital status was predominantly married (69.4%), with singles representing 13.7%, suggesting marital status may influence women's participation in environmental conservation. In terms of education, 47.8% had primary education, and only 9.9% had tertiary qualifications.

Socio-cultural roles performed by women in environmental conservation within the patriarchal structure in Gulu district.

This section addresses the first objective of the study, which examined the socio-cultural roles performed by women in environmental conservation within the patriarchal structure of Gulu District. Socio-cultural factors were assessed using a questionnaire that included Likert scale items (using a 5-point scale, 1 = Strongly Disagree to 5 = Strongly Agree) was employed to evaluate the attitudes, opinions, and perceptions of respondents on various socio-cultural roles performed by women in promoting environmental conservation. The mean (M) and standard deviation (SD) were calculated for each item to summarize the central tendency and the variability in responses. The findings are presented in Table 2 below.

The study findings indicate a strong consensus among respondents regarding the role of women as custodians of indigenous knowledge (Mean = 4.42, SD = 0.99), highlighting their importance in

Table 2. Socio-cultural roles performed by women in environmental conservation

	SD n (%)	D n (%)	NS n (%)	A n (%)	SA n (%)	Mean	SD
Custodian of indigenous knowledge	14(3.5)	20(5.1)	1(0.3)	113(28.6)	247(62.5)	4.42	0.990
Changing attitude and impacting environmentally friendly values	10(2.5)	55(13.9)	11(2.8)	198(50.1)	121(30.6)	3.92	1.056
Participation in decision-making	60(15.2)	106(26.8)	2(0.5)	148(37.5)	79(20.0)	3.20	1.419
Activists and leaders in the environmental movement	24(6.1)	109(27.6)	4(1.0)	176(44.6)	82(20.8)	3.46	1.259
Conservers of the ecosystem	9(2.3)	50(12.7)	3(0.8)	187(47.3)	146(37.0)	4.04	1.044
Adoption of environmentally friendly technologies	28(7.1)	125(31.6)	4(1.0)	154(39.0)	84(21.3)	3.36	1.311
Tree planting	14(3.5)	36(9.1)	2(0.5)	185(46.8)	158(40.0)	4.11	1.039

Data source: Field data, 2024

Table 3. Chi-Square Test Results for Associations Between Demographic Variables and Socio-cultural roles performed by women in environmental conservation.

Demographic variables	X ²	Df	p-value	Cramer's V
Age group	13.83	12	0.312	0.108
Sex	4.66	4	0.324	0.109
Marital status	28.39	16	0.028	0.134
Education level	9.493	12	0.660	0.090
Occupation	10.988	12	0.530	0.096

Data source: Field data, 2024

preserving traditional ecological practices. Women were also widely recognized as key contributors to tree planting initiatives (Mean = 4.11, SD = 1.04) and as active conservers of ecosystems (Mean = 4.04, SD = 1.04).

In contrast, roles involving advocacy or leadership in environmental movements received moderate ratings (Mean = 3.46, SD = 1.26), suggesting more varied perceptions. Similarly, women's participation in decision-making processes (Mean = 3.20, SD = 1.42) and their adoption of environmentally friendly technologies (Mean = 3.36, SD = 1.31) were also rated moderately.

However, respondents rated women's influence in changing attitudes and promoting environmentally friendly values relatively high (Mean = 3.92, SD = 1.06), indicating recognition of their role in shaping sustainable behaviors within communities.

Test Results for Associations Between Demographic Variables and Socio-cultural Roles Performed by Women in Environmental Conservation

A chi-square test was conducted to assess the relationship between each demographic factor and the socio-cultural roles of women in environmental conservation. The results revealed a significant

association, $\chi^2(4) = 28.39$, $p = 0.028$, with a medium effect size (Cramér's $V = 0.134$). This suggests that respondents from different categories of marital status exhibited distinct responses. However, age group, sex, education level, and occupation were not significantly related to the socio-cultural roles of women in environmental conservation ($p > .05$).

Discussion

The current study found women's roles in environmental conservation to range from custodians of indigenous knowledge, engaging in tree planting initiatives, conservers of ecosystems, activists and leaders in environmental movements, participants in Decision-Making, and adopters of environmentally friendly technologies. The study findings align with the study conducted by [3], in which it was indicated that traditionally, women have been the primary stewards of biodiversity, although their contributions are often overlooked. Even today, women continue to perform critical tasks such as seed selection and conservation. Besides, in many contexts, women are more actively engaged in the household economy than men, and they carry the primary responsibility of providing their families with food, fuel, medicines, fibres, fodder, and other products. To meet these daily needs, women often select, improve, and adapt a diverse range of plant varieties, based on nutritional, medicinal, or culinary benefits, such as growing a variety of traditional species in home gardens [32].

The study found that the preservation of seeds for planting was predominantly carried out by women; however, with the advent of modern technology and new seed varieties, some men have also become involved in this process. Seeds, such as millet, sesame, and pigeon peas, were expected to be handled with great care starting from the harvest stage. Once harvested, the seeds were properly dried under the sun, sorted, and stored in clean pots, granaries, or in the kitchen area near the fireplace. The choice of storage method depended on the nature of the seeds. The use of kavera (polythene bags) for storing seeds and foodstuffs is a recent development in the Acholi community. Additionally, forests were traditionally protected, and certain tree species were revered due to their medicinal properties or spiritual significance. These plants were not to be cut down indiscriminately because of the beliefs attached to them. It was primarily women who took responsibility for caring for these plants, ensuring their preservation. Although participants acknowledged that many practices have changed over time, these traditions are still observed to some extent.

Findings indicate that women are key players in tree planting. This reflects global trends where women are increasingly recognized as central figures in reforestation efforts. Numerous case studies from Asia, Africa, and Latin America have demonstrated the positive impact of women's involvement in forest governance [33]. The findings further support the study results by Duguma, in which it was revealed that women are recognized for their essential role in forest management and in the utilization of forest products [33]. They possess traditional knowledge crucial to forest rehabilitation, managing forest products, and improving forest governance, including the implementation of management plans. As such, any approach to forest management that marginalizes women undermines the achievement of forest management goals, as their knowledge is indispensable (ibid).

Furthermore, the study revealed that women play a significant role as conservers of ecosystems. The study results affirmed the vital contributions of women in sustaining biodiversity. These findings underscore the often-overlooked roles women perform in environmental stewardship within their communities. Hence, there is a need to recognize the unique position of rural women, as the primary users of their communities' diverse resources, to serve as stewards of environmental renewal and sustainability [34].

Women generally exhibit a high degree of care and attentiveness in their daily activities. In agricultural practices, for instance, women participate alongside men in land preparation for crop planting. During this process, they often trim tree branches to reduce shading effects on crops but intentionally preserve tree stumps, allowing the trees to regenerate. While clearing land or weeding, women rarely resort to burning vegetation. Instead, they collect plant residues and heap them on anthills or at the edges of gardens to decompose and later enrich the soil as manure, thereby enhancing soil fertility. This is in agreement with the study conducted by Binelli, in which it was observed that women in Liberia and Sierra Leone enrich the soil through their daily activities [35], such as cooking and cleaning, by adding organic matter such as ash, potash, and leftover food and stalks to form African Dark Earth. This practice is based solely on traditional knowledge and is believed to improve soil quality.

The findings also highlight the continued influence of patriarchal norms that may constrain women's participation and leadership in environmental activism. Consequently, it may exacerbate environmental degradation. The study results are consistent with [36], in which it was revealed that reduced female involvement in conservation efforts may hasten environmental degradation. This implies that women are the majority in environmental activism in the communities. Green Belt Movement, initiated by women in Kenya on Earth Day in 1977, stands as a notable example of a conservation and forestry movement driven by female leadership [14].

According to a study conducted by [37], women are pivotal in transmitting cultural knowledge related to environmental conservation to future generations. Their role in environmental conservation is largely recognized, particularly in the education of children on simple environmental conservation (EC) practices and the development of skills in environmental management. The study findings also validate the research study conducted by [3], in which it was revealed that women, being primary caregivers and educators of the next generation, normally place significant emphasis on communication and education in addressing environmental challenges. They play a pivotal role in shaping attitudes, promoting the adoption of sustainable lifestyles, and instilling environmentally friendly values in their children. However, not all community members view women's role in shaping environmental behavior as significant.

Furthermore, the findings revealed that women possess awareness and fundamental knowledge of how to care for both the homestead and the surrounding environment. This knowledge and these skills are passed on to the children within the community. They play a crucial role in safeguarding the health of their families, striving to create healthy and safe environments for them [38]. For example, within the homestead, it is primarily women who plant trees in the compound areas and tend to them to ensure healthy growth. They maintain a clean surrounding environment by ensuring that waste is not disposed of recklessly. This is achieved by digging rubbish pits, where waste is disposed of and periodically burned, depending on need.

The findings revealed a moderate level of women's participation in decision-making. These findings are in line with [35], in which it was revealed that the conventional gender roles that assign men to commercial spheres and women to domestic spheres have placed women at a disadvantage, limiting their ability to participate in environmental decision-making processes. In addition, according to the Ministry of Water and Environment report on environment and natural resource gender strategy [34], it was revealed that women and girls in Uganda, as in other sub-Saharan African countries, are the major users and managers of the environment in homes; they therefore bear the impact of environmental degradation. However, men still dominate the arena of planning and decision-making regarding the use,

access, and management of the environment, and women's views are often under-represented, implying that women's practical and strategic needs are sometimes not addressed.

Important to note, the relatively higher standard deviations for items such as participation in decision making and adoption of environmentally friendly technologies indicate greater variability in perceptions, which is perhaps due to differing educational levels, economic status, social norms, and values among participants. Nonetheless, to foster women's engagement in conservation activities, it is perhaps crucial to enhance their level of participation in decision-making. More so, basic education and training in environmental conservation are essential. The results underscore the multifaceted roles women play in environmental conservation, while also highlighting areas where their contributions may be less recognized or more contested.

Limitations of the Study

Several limitations were encountered during the study. These included potential recall bias in self-reported data, limited generalizability beyond the selected communities, and logistical challenges in accessing remote areas due to poor infrastructure. Despite these constraints, the study maintained methodological rigor and produced valuable insights.

Dissemination of Findings

The preliminary findings of this study were disseminated through community feedback sessions, academic publications will be ensured, and presentations at relevant conferences. Additionally, policy briefs will be shared with local government authorities and environmental organizations to inform future interventions and decision-making processes.

Conclusion and Recommendation

Though women play significant roles in environmental conservation, it is not without challenges. And many of the activities they perform are interconnected with their socio-culturally assigned roles. This is a deeper manifestation of the underlying existence of a strong social structure that confines women's engagement in environmental conservation within the private sphere and creates barriers to their penetration into the public domain. And this social structure is delineated as patriarchy. Therefore, this calls for a change in the cultural norms and values of the society for the challenges that women encounter in their engagement in conservation activities to be remedied. This will enable women to stretch beyond the private domain in their engagement in environmental conservation for a more sustainable outcome.

This study recommends a comprehensive sensitization and training program on the significance of equality and empowerment to both men and women before launching any development programme targeting environmental conservation. This will help to transform the patriarchal mindset or perception of the people in the community. Much consideration should be given to understanding the context of the region. This would make them embrace the development initiative and be more receptive to equal participation.

Author Contributions

All authors were actively involved in the study. CRP developed the study concept and contributed to manuscript drafting, writing, and editing. AB and AA provided overall supervision throughout the research process.

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Conflict of Interest

The authors declare no conflicts of interest.

Data Availability

Study data can be accessed upon request.

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