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Original Article

Empowering Women in Farmer-Managed Natural Regeneration Practice: An Analysis of Socio-Cultural Determinants in Selected Counties of Kenya

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Keywords:

*Socio-cultural norms,
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Women's participation,
FMNRs.*

Women are crucial stakeholders in sustainable land restoration and Farmer-Managed Natural Regeneration (FMNR), yet their participation is often limited by socio-cultural factors. This study presents an analysis of five key determinants of women's participation in FMNR, namely (1) women's awareness of FMNR development sessions, (2) Women's Education and Training, (3) Faith-Based and Religious Institutions, (4) Socio-Cultural norms, and (5) community-level decision-making. A descriptive survey design employing a mixed methods approach was used, where data were collected concurrently. Quantitative data were collected via a household survey (N = 1,628) across four study areas (Kalawa, Kitise, Osiligi, Mara) and analysed using descriptive and inferential statistics. Qualitative insights from focus group discussions and key informant interviews provided contextual depth. Baseline findings reveal that while a majority (~88–91%) of respondents report women's involvement in farming and community activities, significant disparities were observed in the levels and nature of women's involvement across regions, Makeni (93.03%) exhibited the highest level of women's involvement, followed by Narok (88.16%), while Kajiado (79.46%) recorded the lowest. While women were frequently engaged in labour-intensive and routine tasks of caring for regenerated trees, their participation in decision-making roles, land ownership, and access to training remained limited. Awareness of women "lead farmers" or FMNR champion initiatives was uneven. That is only 13% in Kitise vs. ~49% in Mara ($p < .001$), and only 20% reported any prior gender-equity training. Socio-cultural norms pose clear barriers: over half (54%) of those who saw women as not engaged in community decisions cited cultural barriers, alongside discriminatory attitudes (46%) and other factors. Women's participation in community decision-making varied widely by locale (ranging from 79% affirming in Osiligi to 99% in Kalawa ($p < .001$)). Traditional household leadership structures also influence women's roles – for example, only 3.7% in the most patriarchal community perceived women as influential in local

groups, versus 44% in the least patriarchal. The baseline underscores that women's engagement in FMNR is constrained by limited training opportunities and persistent gender norms. Socio-cultural shifts and ongoing sensitisation to bring a measurable softening of rigid norms, promotion of inclusive decision-making focusing on quality of engagement and a reflection of women voices in community decision-making would be vital. Leveraging on cultural and faith-based institutions as allies can lead to a culturally rooted endorsement of women's involvement through public statements by elders and clergy to support women's enhanced participation. These findings provide a benchmark for tracking progress and inform gender-transformative strategies to enhance women's empowerment and FMNR adoption.

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INTRODUCTION

Globally, while women have historically been involved in environmental conservation activities, they remain underrepresented in natural resource management (NRM) and development initiatives (Webology, 2023). Instances of women's participation in Farmer-Managed Natural Regeneration (FMNR) related activities have been witnessed in various parts of the world. For instance, in the 1970s, women led the Chipko movement in India, embracing FMNR practices such as tree planting to prevent deforestation and protect their local environment (CWE, 2023). Their

roles encompass sustainable agriculture, water resource management, and biodiversity preservation. In many communities, women are the primary gatherers of water, fuel, and food, giving them intimate knowledge of local ecosystems and positioning them as key actors in biodiversity conservation and sustainable resource management. Their involvement in environmental decision-making has been linked to more effective and equitable resource governance (IUCN, 2023), underscoring the need to critically examine and strengthen their participation in FMNR initiatives.

Land restoration initiatives like FMNR are most effective when they actively involve women, who contribute a substantial share of agricultural labor and resource management worldwide (Global Ever Greening Alliance, 2024). However, despite their critical role, women's participation in FMNR projects has historically been limited. Prior studies indicate that FMNR adoption rates among women lag behind, undermining the potential success of such interventions. For instance, Mfitumukiza (2020) observed that even with significant investments in FMNR across continents, implementation has not been as successful as intended due to slow uptake and participation among women, highlighting the need to assess factors influencing their involvement. Key barriers include gendered labour burdens, limited access to information and education, and restrictive norms affecting women's decision-making power (Weston et al., 2020). At the same time, women's participation in FMNR contributes significantly to sustainable land management, particularly in enhancing resilience to climate change, improving soil moisture, and supporting sustainable land use. These benefits extend to improved food security and poverty reduction through increased agricultural productivity and diversified income sources (Reuters, 2024), reinforcing the importance of promoting inclusive participation.

In Africa, particularly in rural contexts, women face socio-cultural norms and religious beliefs that shape their roles in farming and community leadership (Agarwal, 2021). These norms often constrain women's agencies. For example, in Ethiopia, traditions designate men as primary landowners and community leaders, placing women in subordinate roles. Similarly, FAO (2023) documents that in Cameroon, patriarchal systems have historically limited women's influence in NRM, though engagement with traditional leaders has shown potential for expanding women's roles. Such structures can limit women's ability to adopt practices like FMNR or participate in resource governance. At the same time, cultural and religious

systems can act as both barriers and enablers; for instance, sacred traditions that protect certain tree species demonstrate opportunities for culturally grounded conservation (Ojuok & Ndayizigiye, 2021). This duality highlights the importance of examining socio-cultural and faith-based factors shaping women's participation in FMNR.

In Kenya, initiatives such as the Green Belt Movement—initiated by women—have played a significant role in land restoration through tree planting and environmental education aimed at combating desertification. FMNR initiatives similarly contribute to restoring degraded lands in arid and semi-arid regions (ASALs), reducing desert expansion (Ojuok & Ndayizigiye, 2020). Women constitute a significant proportion of Kenya's agricultural workforce and are key players in environmental conservation (Reuters, 2024). However, research on FMNR in Kenya has largely focused on technical and ecological aspects, with limited attention to gender dynamics (UN Women, 2021). Despite their contributions, women face socio-cultural and faith-based barriers linked to traditional gender roles that limit their involvement in environmental decision-making processes (Agarwal, 2021). This situation necessitates an in-depth analysis of the extent and determinants of women's participation in FMNR within specific local contexts.

Access to education and training is another critical determinant of women's participation. Lower literacy and educational attainment hinder the uptake of new agricultural knowledge. For example, a study in Marsabit County found that 90% of women in focus groups had only informal education, limiting their ability to learn FMNR techniques (Njuki et al., 2022). Women also have fewer opportunities to attend training due to household responsibilities and social constraints. This gap reinforces confidence barriers that limit their engagement in leadership roles such as "lead farmers" or community champions (Nyasimi et al., 2019). However, targeted training and gender-

transformative extension systems can empower women to actively participate and lead community initiatives. Expanding women's access to education and training in FMNR is therefore essential for enhancing their participation and addressing existing gender disparities (Tanui et al., 2025).

Socio-cultural norms further restrict women's mobility and participation in decision-making, limiting their engagement in conservation activities (UN Women, 2021). In Makueni County, for instance, cultural norms, mobility restrictions, workload, and poverty hinder women's active participation in FMNR. Similarly, in pastoral communities such as Kajiado and Narok, norms surrounding women's public roles and leadership reduce their opportunities for participation and leadership. These constraints reduce their ability to implement sustainable practices and contribute meaningfully to conservation efforts (Ojuok et al., 2020). Additionally, socio-cultural and religious systems often fail to adequately recognise women's roles in environmental conservation, resulting in

their underrepresentation in governance and decision-making structures (Duke University, 2021). These challenges highlight the need to examine context-specific barriers affecting women's participation in FMNR.

Enhancing women's participation in FMNR is expected to yield multiple benefits. Evidence shows that when women are empowered to make land-use decisions and benefit from restoration efforts, household welfare improves and projects achieve greater sustainability (Laidlaw, 2024). Integrating women into FMNR has been linked to increased economic empowerment and more equitable decision-making within communities (IUCN, 2023). Additionally, inclusive FMNR interventions can reduce women's labour burdens, such as time spent collecting firewood, and improve access to resources (Tanui et al., 2025). These outcomes emphasise the importance of strengthening women's participation not only as beneficiaries but also as active agents in land restoration initiatives.

Figure 1: A Farmer Pruning a Tree in her FMNR Farm in Kitise Area Program, Makueni County



Theory of Change

This study was guided by the Theory of Change (ToC), which emerged in 1995 through the work of Carol Weiss. According to Anderson (2005), the Theory of Change comprehensively describes and illustrates how and why a desired change is expected to happen in a particular context by mapping causal pathways from interventions to outcomes and long-term impacts. In this study, the ToC provides a structured framework for understanding how specific interventions within Farmer-Managed Natural Regeneration (FMNR) influence women's participation and ultimately lead to empowerment outcomes. Within the context of this study, FMNR interventions, such as training in land management, access to natural resource rights, and inclusion in decision-making structures—are conceptualised as key inputs. These inputs are expected to influence intermediate variables, particularly women's knowledge, skills, confidence, and access to productive resources. The ToC thus helps to explain how these interventions translate into increased participation of women in FMNR activities, which is a central outcome variable of the study.

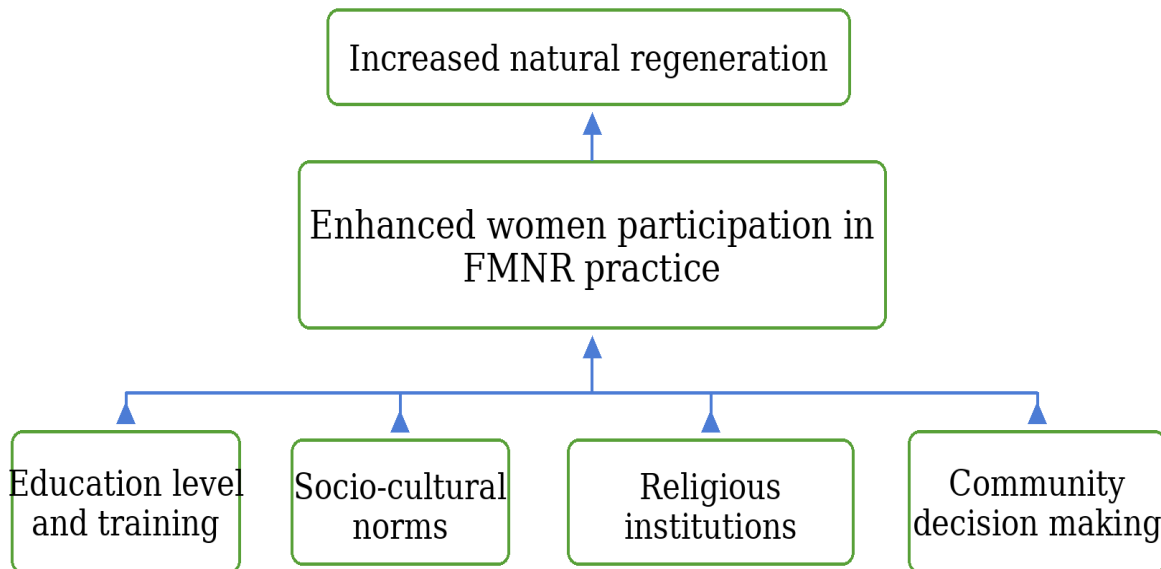
The theory further highlights the role of socio-cultural determinants as critical intervening variables. These include beliefs, customs, traditions, religion, and existing power relations that shape gender roles and influence women's ability to engage in environmental conservation. In this study, socio-cultural and faith-based factors are treated as both barriers and potential enablers that mediate the relationship between FMNR interventions and women's participation (Figure 2). For example, restrictive norms may limit women's mobility, decision-making power, and access to training, thereby weakening the effectiveness of FMNR

initiatives. Conversely, supportive cultural practices and inclusive community leadership can enhance women's engagement and amplify program outcomes.

Applying the Theory of Change enables the study to systematically examine how targeted interventions can transform these socio-cultural constraints over time. By promoting gender-inclusive approaches, such as deliberate inclusion of women in community governance structures, provision of gender-responsive training, and recognition of women's indigenous knowledge, the pathway from intervention to outcome becomes clearer. These intermediate changes are expected to lead to increased levels of women's participation in FMNR practices, which is the key dependent variable in the study. Ultimately, sustained participation is linked to broader empowerment outcomes, including economic independence, improved livelihoods, enhanced leadership roles, and increased self-efficacy among women. The ToC also emphasises feedback loops, where empowered women further influence community norms and contribute to more inclusive and sustainable natural resource management systems.

Therefore, the application of the Theory of Change in this study provides a comprehensive lens for analysing the relationships between the independent variables (FMNR interventions and socio-cultural determinants), the mediating factors (access to resources, knowledge, and decision-making opportunities), and the dependent variable (women's participation in FMNR). This approach ensures a holistic understanding of how change occurs and supports the design of context-specific, gender-responsive strategies for enhancing women's participation and achieving sustainable land restoration outcomes.

Figure 2: Socio-cultural and Faith-Based Factors Served Both as Barriers and Potential Enablers that Mediate the Relationship between FMNR Interventions and Women’s Participation



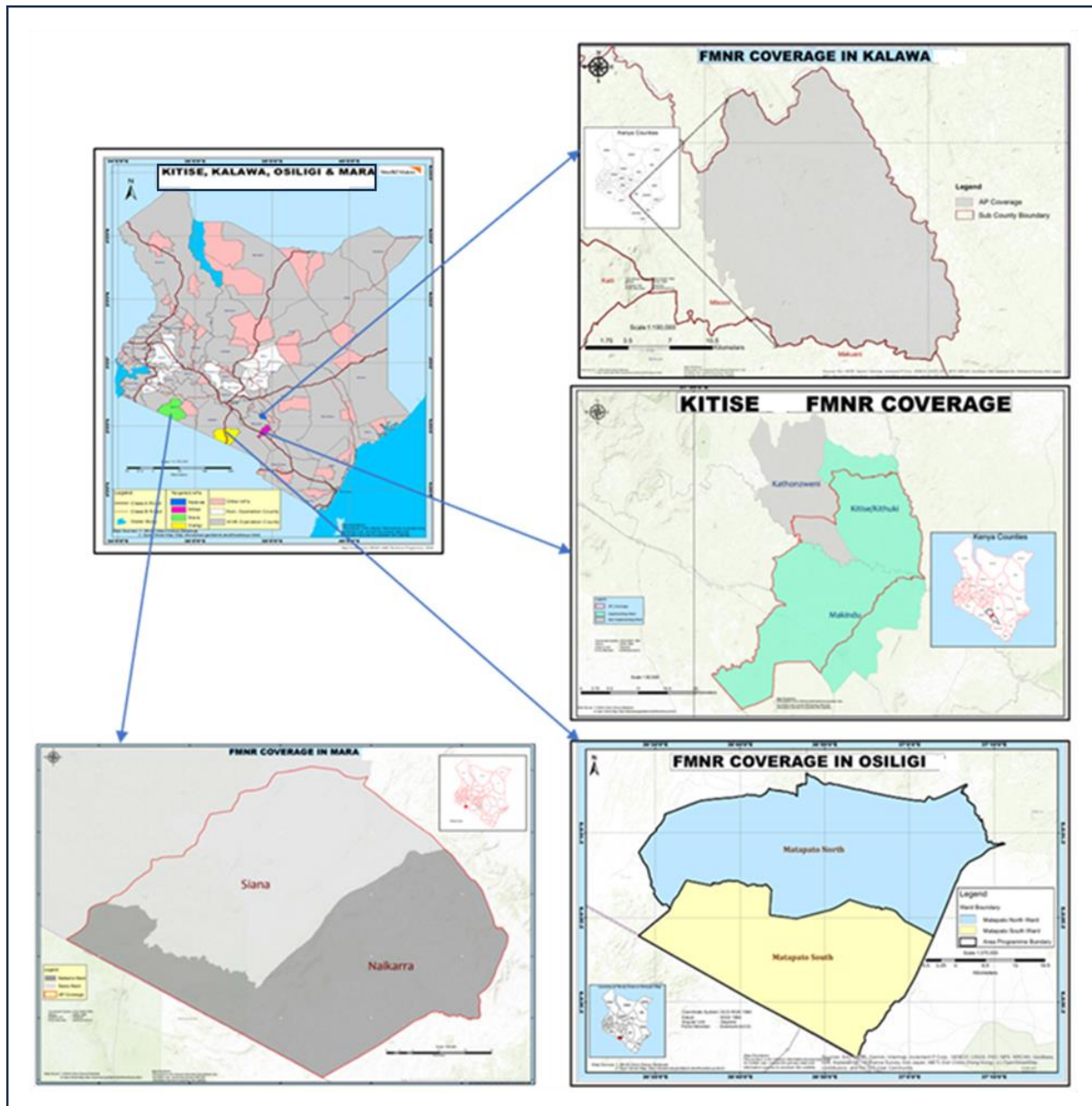
METHODOLOGY

Study Area

The study was conducted in four areas, namely, Kalawa and Kitise in Makueni County, Osiligi in Kajiado County and Mara in Narok County. These areas encompass semi-arid rangelands and smallholder farming communities targeted for

FMNR scale-up between 2023 and 2028. The socio-cultural contexts vary, for example, Osiligi and Mara include, predominantly pastoralist Maasai communities with strong traditional governance, whereas Kalawa and Kitise are Kamba communities with different norms regarding women’s roles. This variation provided a natural contrast to examine how cultural context affects women’s participation.

Figure 3: The Study Settings Map



Research Design

The study employed a descriptive survey design and utilised a mixed-methods approach wherein quantitative and qualitative data were collected concurrently during the baseline and later integrated for analysis. The quantitative component quantified the prevalence of key attitudes and practices and tested for differences across sub-groups (e.g. by region, gender). The qualitative component explored deeper perceptions and norms, helping to

explain the “why” behind the numbers. Together, this approach gives a comprehensive picture of the status of women’s engagement in FMNR.

Sampling and Participants

For the quantitative survey, a stratified random sampling strategy was used to select households from each of the four targeted areas. The target sample size was ~400 households per area (to ensure adequate power for sub-group analysis),

yielding a total sample of $N = 1,628$ completed questionnaires (Kalawa: 413, Kitise: 405, Osiligi: 413, Mara: 397). Within each household, the primary respondent was an adult farmer involved in land management decisions. Enumerators were trained to seek, when possible, the female head of household or female spouse as the respondent, in order to capture women's perspectives. As a result, the final sample was 51.4% female respondents ($n \approx 836$) and 48.0% male ($n \approx 781$), with a few respondents identifying as "other" gender. Respondents' ages ranged from 18 to over 70, with the majority (approximately 74%) in the 25–54-year age bracket (prime working age). About 53% of respondents were household heads (of whom roughly one-fifth were women heading their households), and 42% were spouses (predominantly wives of male heads). This ensured representation of both men and women in various household roles.

The qualitative sample consisted of purposefully selected community members and leaders to capture diverse insights. A total of 8 focus group discussions (FGDs) were conducted – separate groups for women and men in two communities per county (e.g. one women's FGD in each county). Each FGD had 8–12 participants, including farmers of different ages and, where applicable, persons with disabilities, to incorporate an inclusion lens. Additionally, key informant interviews (KIIs) were carried out with 12 individuals: local administrators (village elders or chiefs), religious leaders (pastors or cultural elders), and World Vision field staff. These key informants were selected for their knowledge of community norms, leadership dynamics, and any prior initiatives around FMNR or gender. By triangulating household survey data with community and leader perspectives, the study obtained a robust understanding of the socio-cultural environment.

Data Collection

The baseline data collection took place in July 2024. The household survey was conducted by trained enumerators using a structured questionnaire

programmed in Open Data Kit (ODK) on mobile devices. Before data collection, the instrument was pilot tested in a neighbouring community to ensure clarity of questions and culturally appropriate wording.

Interview Guides

Interviews were conducted in the respondent's preferred language (primarily Swahili, Kikamba or Maa, depending on the location), with translation assistance as needed. Verbal informed consent was obtained from all participants after explaining the study purpose, the voluntary nature of participation, and confidentiality measures (as per the approved research ethics protocol). The survey took approximately 45–60 minutes to complete per household.

Survey Instrument

The questionnaire included sections on: demographic and household information; land ownership and current land use (including any practice of FMNR or other restoration activities); awareness and attitudes towards FMNR; participation of women, youth and people with disabilities in agricultural activities and decision-making; socio-cultural beliefs and norms (with both closed-ended and a few open-ended questions); and exposure to any relevant training or capacity building.

Data Analysis

Quantitative Analysis

Descriptive statistics (frequencies, percentages) were first generated for all relevant variables, stratified by area and gender, to observe patterns. Next, inferential analyses were performed to test differences: Chi-square tests of independence were used to examine associations between categorical variables. The perception of women's engagement in decision-making was tested, which differed significantly by area (a proxy for cultural context), and whether awareness of training programs

differed by the gender of the respondent. A chi-square test was also used to assess whether those communities with prior women exposure to involvement in community decision making in FMNR trainings showed different responses in women’s participation (as an initial exploration). Results were considered statistically significant at $p < .05$. Specific chi-square values and p -values are reported where applicable to highlight significant differences.

Qualitative Analysis

FGD and KII transcripts were analysed thematically using a manual coding approach. A coding framework aligned with the five key themes plus emergent sub-themes was developed. Relevant segments were coded under categories like “Norms – women’s roles,” “Norms – decision-making barriers,” “Religion – influence on gender,” and

“Positive deviants (women leaders’ examples).” Summary memos were written for each community, highlighting prevalent views and any notable differences. During interpretation, triangulation of insights with quantitative findings was done. Qualitative quotes are used in the discussion to illustrate or contrast numerical trends where appropriate.

RESULTS

Most respondents (86%) fall within the 25–64 years age group, indicating that most participants are within the economically active population. A smaller proportion (9%) are youth under 24 years, while 10% are above 65 years, representing the elderly segment. The percentages across men, women, and PLWD show a balanced distribution, though females and PLWDs slightly dominate the older age bracket (Table 1)

Table 1: Age Distribution of Respondents by Gender and PLWD Status in Kalawa, Kitise, Osilingi and Mara

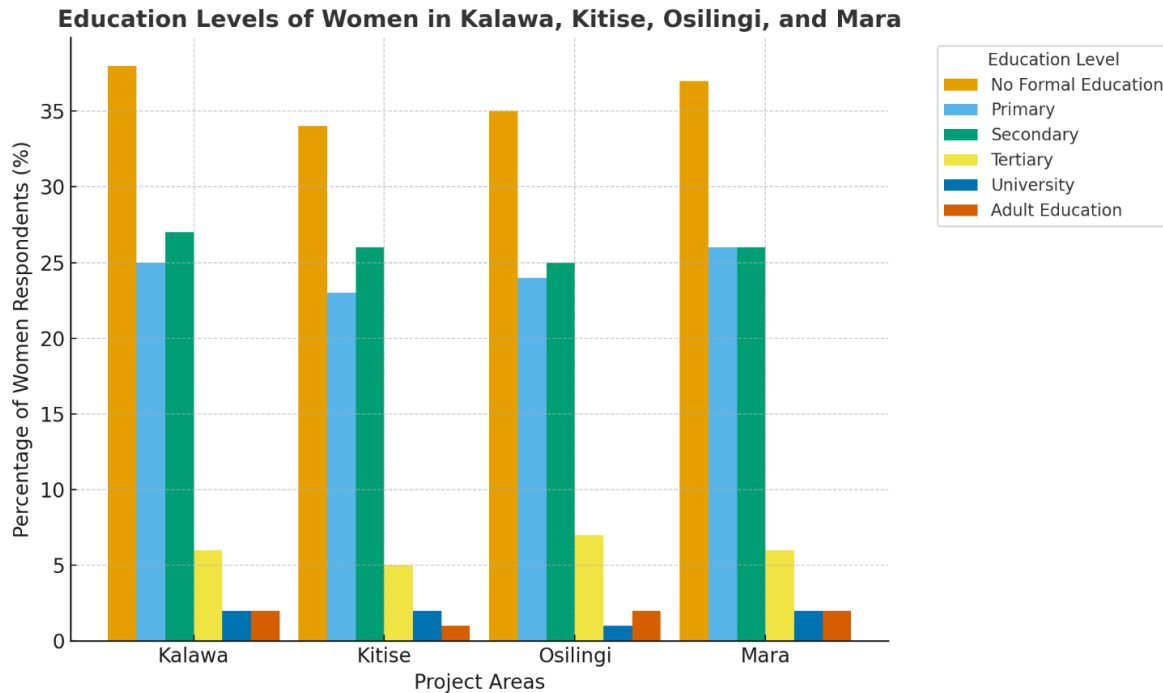
Age Category (Years)	PLWDs%	Men%	Women%
Less than 24 years	10	8	10
25–64 years	88	84	86
Above 65 years	12	8	11

Women’s Education and Training

The survey collected data on respondents’ education levels, though the results were captured in broad categories. Overall, the study revealed that 33% of the interviewed respondents had no formal education Female 36%), with 28% of the study participants who answered the question being persons with disability. The percentage of respondents who completed their primary education

was Female 24%), with 26% of the respondents representing the persons with disability community. It was also noted that 31%, female 26%) of respondents reached by the survey completed their secondary education, and 24% of the respondents were living with a disability. The study further disclosed that, 6%, and 2% of the interviewed respondents have completed their tertiary education, university education and adult education respectively (Figure 4).

Figure 4: Women’s Education Levels and Training



Prior Training Exposure

Beyond formal schooling, access to non-formal education, specifically training or sensitisations related to FMNR, agriculture, or gender, was examined. The findings indicated that very few women had received such training. Overall, 4 out of 5 community members had not seen any gender equality training prior to the project’s start. Again, area differences were notable (Tables 3 and 4):

Kalawa stood out with about one-third (32.9%) aware of past gender training and had integrated some gender discussions in its development activities. Mara and Osiligi had around 21% awareness each, and Kitise was lowest at only 2.0%. The chi-square test for area vs. gender-training awareness was significant ($\chi^2 = 128.6, p < .001$), driven largely by the very low result in Kitise (where essentially no such training had occurred yet) and the higher result in Kalawa.

Table 3: Awareness of World Vision-Facilitated Gender Equality Training by Area

Area	Aware of Gender Training (%)	Not Aware (%)
Kalawa	32.9	67.1
Mara	21.2	78.8
Osiligi	21.5	78.5
Kitise	2.0	98.0
Total	19.5	80.5

Note: “Yes” indicates recall of at least one such session in recent years. ($\chi^2 = 128.6, p < .001$ across the four areas.)

Table 4: Awareness of FMNR Champion Development Sessions by Area (baseline survey, N = 1,628)

Area/County	Aware of Champion Sessions %	Not Aware %
Mara (Narok)	48.9	51.1
Osiligi (Kajiado)	37.8	62.2
Kalawa (Makueni)	38.0	62.0
Kitise (Makueni)	12.6	87.4
Total Sample	34.2	65.8

“Yes” indicates the respondent is aware of any sessions/forums to develop FMNR champions or lead farmers in their community. Differences by area were statistically significant ($\chi^2 = 126.7, p < .001$).

These findings indicate that systematic training and capacity building around gender and FMNR had barely commenced in most areas as of the baseline. Most women had not been trained in improved land management practices, leadership skills, or their rights in community resource governance. This lack of exposure can leave women ill-equipped to participate effectively. For example, without training, women may be less aware of FMNR techniques or less confident to speak up in community forums. It can also perpetuate misconceptions (as one male respondent in Kitise remarked, “*women have not been taught these things, so they would not know how to manage trees*”). The subset of respondents who believed women are not engaged in community decision-making were asked why, 20.7% of them selected “limited access to education and training for women”. Thus, one in five of those who see women excluded attribute it partly to women’s lower education or skill levels. While this is a smaller fraction compared to those citing cultural barriers, it

nonetheless shows that lack of education and training is recognised by community members as an impediment to women’s involvement.

It is important to note that women’s education/training and socio-cultural norms are interlinked. Qualitative data indicate that historical norms have restricted women’s access to education (e.g., prioritising boys’ schooling), which in turn affects women’s readiness to take on a leadership role. Similarly, because few women have served as lead farmers or received agricultural training, there are fewer role models to inspire others. Significant gaps exist in women’s knowledge and empowerment going into FMNR practice. This highlights a need to ramp up training, both FMNR-specific (technical training in pruning, natural regeneration, etc.) and soft skills (leadership, group facilitation, confidence-building) targeted at women. Also, incorporating functional literacy or basic education components for adult women could be beneficial in communities with very low female literacy, as suggested by local leaders. In summary, Women’s Education and Training can be summarised as insufficient but with room to improve. With only 20% exposure to prior training, most women have not had the opportunity to build capacity in land restoration or leadership.

Figure 5: A Group of Women Taking Part in a Discussion During Gender Transformative Approach Training in Machakos

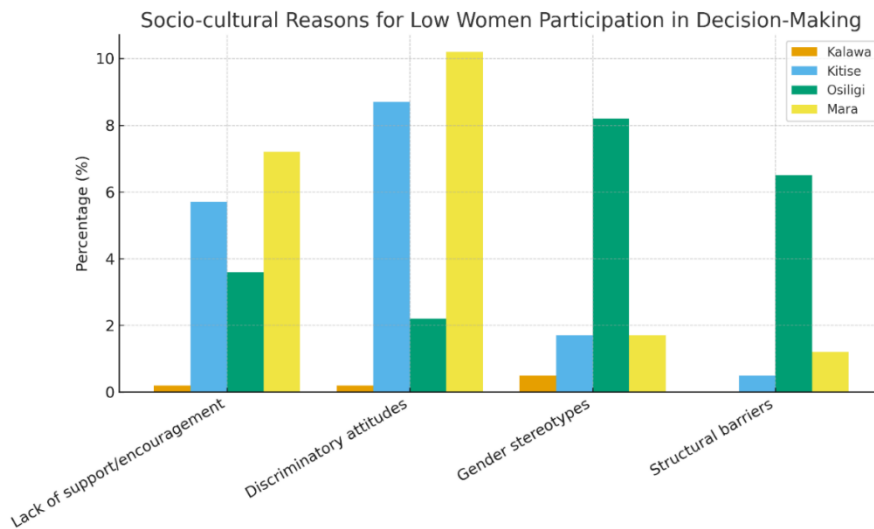


Socio-Cultural Norms

The study sought to examine socio-cultural reasons limiting women’s participation in community-level decision-making processes across the four study areas: Kalawa, Kitise, Osiligi, and Mara. It was

evident that socio-cultural norms play a significant role in shaping women’s participation and leadership in community-based initiatives such as FMNR (Figure 6). Most of the participants (about 88%) felt that women were engaged in important community decisions.

Figure 6: Socio-Cultural Reasons for Less Women Engagement in Decision-Making Across the Selected Areas



The results show that social norms, gendered expectations, and discriminatory perceptions continue to shape women’s engagement in leadership spaces, albeit with varying intensity across sites. Overall, the most commonly cited barriers were discriminatory attitudes toward women in leadership roles and gender stereotypes linked to traditional gender roles. These reflect persistent patriarchal values where leadership is socially coded as male, and women are expected to remain in domestic spheres. For example, Mara and Kitise recorded the highest proportions citing discriminatory attitudes (10.2% and 8.7%, respectively), suggesting entrenched gender bias in these communities. Similarly, Osiligi reported the highest incidence of gender stereotypes (8.2%), consistent with pastoral cultural systems where women’s roles are culturally defined and protected, limiting their public participation. A lack of support or encouragement for women’s involvement was most prominent in Mara (7.2%) and Kitise (5.7%). This demonstrates that, in addition to overt discrimination, women often face passive barriers, where they are neither invited nor motivated to take part in decision-making processes.

Qualitative data indicated that the socio-cultural norms, such as the traditional gender norms, remain a primary barrier to women’s full participation. Notably, Kalawa consistently recorded the lowest prevalence across all barriers, indicating a more enabling environment for women’s leadership participation. This may be attributed to more exposure to civic education, stronger community

development programming or gradual attitudinal shifts that broaden space for women’s involvement in public affairs. The findings highlight that while progress exists in some communities, socio-cultural norms remain a significant impediment to women’s leadership participation. One male participant in a focus group discussion stated, “*According to our customs, men make the big decisions; women’s domain is the home.*” This illustrates how cultural values and structural gender expectations shape leadership spaces, often sidelining women.

The results highlight that faith-based and religious institutions are major influences in women’s participation in FMNR practices, shaping community perceptions of gender roles and decision-making power. Religious teachings can play a dual role — reinforcing traditional gender norms or empowering women through stewardship messages. Key standout findings indicate religious leadership dominates decision influence across most study areas, with 52.7% overall recognising religious leaders as key influencers, compared to 27.8% for women. Mara shows the strongest influence of religious leaders (85.6%), reflecting the significant authority of faith institutions in local governance and development spaces (Table 5). Osiligi reveals the most unequal perception — almost half (48.5%) recognise religious leaders, vs only 3.7% recognizing women. Kitise is the exception, where women (37.0%) are seen as slightly more influential than religious leaders (31.9%), suggesting stronger women’s agency or weaker centralised religious authority.

Table 5: Perceived Influence of Religious Leaders Versus Women in FMNR Participation

Area	% Citing Religious Leaders as Influential	% Citing Women as Influential
Kalawa	45.9%	27.2%
Mara	85.6%	44.3%
Osiligi	48.5%	3.7%
Kitise	31.9%	37.0
Average Total	53.0	28.1

Data from key informants revealed that positive faith-based involvement exists: Religious institutions can either reinforce gender hierarchies or become powerful catalysts for women's empowerment in FMNR programs, highlighting the importance of engaging faith-based actors strategically in conservation and gender mainstreaming initiatives. In contexts like Mara, where church leaders are highly respected, their support or opposition can greatly affect women's participation. For instance, if a pastor encourages women to take part in FMNR activities or even preaches about stewardship involving men and women, it could boost acceptance of women's roles. Conversely, if religious teachings (or interpretations thereof) promote male headship and female submissiveness, they could reinforce women's exclusion. These beliefs aid FMNR in that community, because people protect those tree species naturally. Women's involvement in protecting such trees is accepted, since it aligns with cultural beliefs. In Kajiado (Osiligi), a few men hinted at a belief that "if women take over men's roles, it brings disharmony." This kind of belief – that tradition dictates separate spheres – can hinder women from stepping into what's seen as male territory (like community leadership on land issues). Religious beliefs also provide motivation: for example, Christian women in Makueni said they join environmental efforts because they believe "*we are stewards of God's creation,*" a belief encouraged by their church. In Kalawa, a pastor's wife championing FMNR demonstrates how religious platforms can empower women and support environmental stewardship. On the flip side, no major negative religious doctrine specifically against FMNR or women's involvement was noted. The barriers are more cultural and interpretative (misuse of religion to keep women "in their place").

Community Level Decision-Making

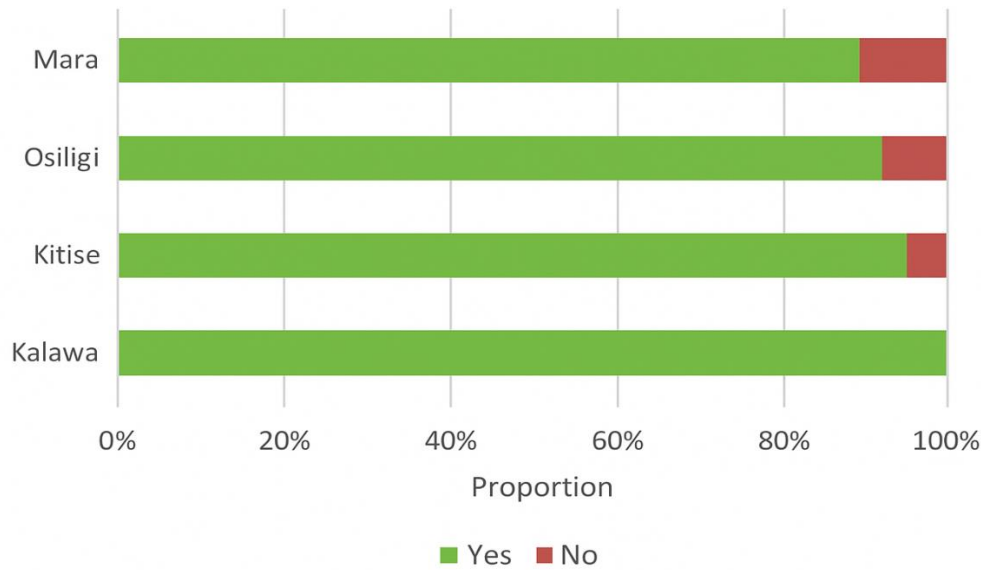
The study sought to establish socio-cultural reasons limiting women's participation in community

decision-making processes across the four study locations: Kalawa, Kitise, Osiligi, and Mara. The results show that social norms, gendered expectations, and discriminatory perceptions continue to shape women's engagement in leadership spaces, albeit with varying intensity across sites. Overall, the most cited barriers were discriminatory attitudes toward women in leadership roles and gender stereotypes linked to traditional gender roles. These reflect persistent patriarchal values where leadership is socially coded as male, and women are expected to remain in domestic spheres. For example, Mara and Kitise recorded the highest proportions citing discriminatory attitudes (10.2% and 8.7%, respectively), suggesting entrenched gender bias in these communities. Similarly, Osiligi reported the highest incidence of gender stereotypes (8.2%), consistent with pastoral cultural systems where women's roles are culturally defined and protected, limiting their public participation. A lack of support or encouragement for women's involvement was most prominent in Mara (7.2%) and Kitise (5.7%). This demonstrates that, in addition to overt discrimination, women often face passive barriers, where they are neither invited nor motivated to take part in decision-making processes.

The qualitative findings support this, noting that women may not always encounter direct opposition, but often lack the social push, recognition, or confidence to participate actively. Structural barriers within leadership systems—such as community representation rules and customary leadership pathways—were most evident in Osiligi (6.5%). This suggests that institutional and cultural structures reinforce exclusion by limiting pathways for women to lead or contribute meaningfully to decision-making. Notably, Kalawa consistently recorded the lowest prevalence across all barriers, indicating a more enabling environment for women's leadership participation. This may be attributed to more exposure to civic education, stronger community development programming, or

gradual attitudinal shifts that broaden space for women’s involvement in public affairs.

Figure 7: Women’s Engagement in Community Decision-Making by Area



The chart shows the percentage of respondents in each area who answered “Yes” to women being engaged in community decision-making. Kalawa stands out with near-universal agreement, while Osiligi has the lowest proportion. The responses were as follows: Yes – women are engaged: 88.1%. About half of the respondents also indicated that women are engaged by “*serving on committees or boards related to community affairs*” (50.1%) and by “*taking leadership roles in community development projects*” (47.7%). This suggests that around half of the communities have women who actually hold positions on committees (e.g. water committee, school committee, natural resource

committee) or lead specific projects (perhaps as group leaders or treasurers in a project). This is a substantial finding: it shows that women’s leadership, while not dominant, is not unheard of at the community level (Table 6). Many communities have at least a few women in these roles. These roles might still often be considered “auxiliary” compared to male leadership, but they provide entry points for influence. Somewhat fewer respondents (about 53.9%) noted “*engaging in discussions and decision-making processes openly*”, which implies women actively speak up and deliberate in community meetings, not just attend silently.

Table 6: Chi-Square for Women's Engagement in Decision Making

Area	No (%)	Yes (%)	Total
Makueni (Kalawa & Kitise)	6.97	93.03	100
Mara	11.84	88.16	100
Kajiado (Osiligi)	20.54	79.46	100
Total	11.58	88.42	100

Pearson Chi2 = 49.08 Prob = 0.0000

The chi-square analysis revealed significant differences across the three counties (Pearson Chi2 = 49.08, p = 0.0000). Makueni County has the highest proportion of women engaged in decision-

making at 93.03%, indicating strong inclusivity and participatory practices in community decision-making processes. Narok County follows with 88.16%, showing substantial involvement, though slightly lower than Makueni. Kajiado County has the lowest engagement rate at 79.46%, suggesting the presence of cultural or structural challenges that may hinder women's participation. Overall, the data highlights that while the majority of women across all counties are engaged in decision-making (88.42%), there are notable regional disparities that require targeted interventions to address barriers in counties like Kajiado. Although women commonly attend community meetings, there are significant gaps in leadership positions and perceived influence, particularly in more patriarchal communities. The differences by region underscore that context matters: interventions can leverage the more progressive norms or peer learning sites for these places.

DISCUSSIONS

The findings reveal a community landscape where women are actively involved in agricultural and community activities, yet still constrained by traditional norms in reaching positions of leadership and influence.

Education and Training

Education and training, though limited so far, are crucial. Only 20% exposure to gender/leadership training is a baseline challenge, but also an opportunity – increasing that percentage is low-hanging fruit within project control. Given evidence from other regions that training and knowledge can empower women (e.g. improved decision-making and livelihood diversification when women received agricultural training (Tanui et al, 2025). Addressing this gap is likely to have a positive effect on women's participation and broader household outcomes. WWF (2021) argues for gender-transformative extension approaches so that women gain skills and confidence to take leadership in FMNR practices. This resonates with the fact that

communities with relatively more prior training (Kalawa) showed higher women's engagement. Similarly, Kandel *et al.* (2022) in Ghana found that when extension services engaged both men and women farmers and considered their perspectives, FMNR adoption was more successful. Therefore, scaling up capacity-building for women (from basic FMNR techniques to leadership and advocacy skills) is likely to increase women's effective participation (Tanui *et al.*, 2025). The study revealed that only ~1 in 5 women had seen any such training, meaning there is vast room for improvement.

Another enabler is the existence of women's groups and networks. It was found that 75% acknowledged that women participate through women's associations. These groups can serve as support systems and a collective voice for women. In other contexts, women's self-help groups have successfully advocated for resources and policy changes when empowered. For instance, in some Indian communities, women's forest committees significantly improved women's access to forest produce and have a say in management (Webology,2023). In our case, building on these existing women's groups – perhaps federating them or linking them to the FMNR agenda – could be powerful. Weston *et al* (2020) describe how savings groups and transformation groups in the Central Rift project enabled women and people with disabilities to diversify roles and engage in income activities like beekeeping. This indicates that economic empowerment via group activities can complement environmental initiatives, giving women more agency.

Socio-Cultural Norms

Recorded top socio-cultural barriers include cultural norms, discriminatory attitudes, lack of support and land ownership issues, which are nearly identical to those documented in qualitative studies on women and FMNR. In the Marsabit study, *excessive workload on women* was the number one barrier, along with women's lack of decision-making power over resources and male-dominated traditional

institutions (Ojuok and Ndayizigiye, 2021). Tanui et al. (2025) also noted women's lack of landownership and their need for security in decision-making over resources. Kinyili et al (2021) reflected in 29% of the respondents cited limited land ownership as a reason for women not being involved in leadership. Furthermore, "gender stereotypes and traditional roles" (cited by 26% in the survey) align with the notion of women's subordinate societal position and deeply ingrained expectations (e.g. that women should defer to men (Laidlaw,2024).

One barrier that literature emphasises, which quantitative data indirectly touch, is women's time poverty. The Marsabit chapter reported that women's workload (domestic and reproductive duties) detracts from their ability to focus on FMNR and attend meetings (Ojuok and Ndayizigiye, 2021). Participants in the study similarly mentioned that many women are too busy fetching water, firewood, and caring for children to attend every meeting or training. An outcome of the Central Rift FMNR project was a reduction in firewood collection time to 30 minutes (from presumably hours) due to FMNR and fuel-saving stoves (Kristjanson et al 2021). This demonstrates that when FMNR succeeds, it can alleviate a significant barrier (time spent gathering resources), thereby freeing women to engage more in community life. Webology (2023) highlights that such factors often stem from norms as well, especially if community leaders never explicitly seek women's input, women internalise that these spaces are not for them. Likewise, if a woman has never seen another woman on a committee, she may not be aware that it's possible or permissible.

Faith-Based and Religious Institutions

Analysis highlights the outsized role of faith-based and religious leaders, which is well recognised in community development literature. In many African contexts, gaining the approval of the local chief, elders, or pastor, community behaviour change becomes much easier (Chomba et al, 2020).

Conversely, if they are not on board, projects can fail. The study findings show that religious leaders are seen as influential by over half the community (and up to 85% in one area). Additionally, linking environmental restoration to faith has been shown to increase women's participation by framing it in familiar values. For instance, in a Christian context, messages about caring for creation and the role of women as "virtuous stewards" can validate women's involvement with pastors publicly advocating for women to join FMNR committees (World Vision Australia, 2020).

Similarly, working with traditional cultural institutions is imperative, especially in places like Osiligi. Results revealed that only 3–4% perceived women as influencers, which reflects FAO (2023) documentation about the Cameroon case that, in strongly patriarchal cultures, women's direct influence in NRM was minimal, but when traditional leaders were engaged to support women, women's roles gradually expanded. One encouraging sign: the fact that 78.7% in Osiligi said women are engaged (even if at low influence) hints that the community is not opposed to women participating per se. It provides a foundation on which the elders' support could build more acceptance.

The influence of religious institutions was evident from the qualitative data. For instance, a female participant from Kitise stated, "*When our pastor encouraged us, many women felt it was right to join the FMNR group. If he had not spoken, maybe we would have hesitated.*" Similarly, a male participant from Kalawa indicated, "*Here, if the church leaders support a project, the whole village joins. We trust them.*" This concurs with Mfitumukiza (2020), who noted that religious leaders shape community decision-making and can legitimise women's participation in environmental initiatives. The authority of traditional religious elders as traditional leaders was seen to hold gate-keeping power, whereby women's influence increases when elders endorse their involvement. For example, a woman

from Osiligi stated, *“In this place, elders decide. When they tell us women should help with trees, we follow.”* A male elder from Mara made a declaration that *“Women do not lead here, but they are allowed to help when elders approve.”*

Qualitative data indicated that women work on the land even if they are not the ones speaking in meetings. *“We see women planting trees and caring for seedlings; they are active but rarely seen as leaders.”* Youth participant, Kalawa, reinstated. This means that women’s participation in FMNR exists but often lacks formal recognition and leadership authority. This resonates with Njuki *et al* (2022), who noted that environmental practices align with spiritual and cultural values, creating natural motivation for community engagement. In Mara, some participants mentioned that certain trees are spiritually significant (used in weddings or rituals). *“Some trees are blessed and used in weddings. Planting them keeps our tradition alive.”* (elder from Mara), while a female church member at Kitise said, *“God gave us this land; protecting it is like protecting our faith.”*

Community Level Decision-Making and Women’s Participation

Study findings indicate that most respondents perceive women as engaged in community decision-making processes, with 88.1% reporting that women participate in decision forums. This aligns with the growing narrative in sub-Saharan Africa that women are increasingly taking part in local governance and development structures (UN Women, 2022). However, the nature of this participation appears varied and, in some settings, limited. As noted by survey respondents, women’s roles often include serving on committees (50.1%) and leading community development projects (47.7%), suggesting that women have begun to occupy visible positions within grassroots institutions. Nevertheless, these leadership roles may remain auxiliary or symbolic, consistent with findings by Tanui *et al* (2025) who argue that women’s presence in local committees often does

not automatically translate into decision-making power unless social norms actively support their authority.

The quantitative results also reveal significant regional differences in women’s engagement ($\chi^2 = 49.08, p < 0.001$). Makueni (93.03%) exhibited the highest level of women’s involvement, followed by Narok (88.16%), while Kajiado (79.46%) recorded the lowest. These variations likely reflect differing cultural and socio-institutional contexts. For instance, Kajiado, predominantly influenced by traditional Maasai norms, has historically restricted women’s public roles (FAO, 2023). In contrast, Makueni has benefited from stronger community development structures and gender-responsive civic programs, which may explain higher female participation. These patterns support the argument by Laidlaw (2024) that context-specific socio-cultural norms shape women’s agency in collective decision-making. Furthermore, the finding that 53.9% of respondents observed women actively speaking and engaging in discussions highlights a gradual shift from passive presence to vocal participation — a shift supported by studies showing increased gender inclusion in climate resilience and natural resource programs (Farnworth *et al*, 2023). Yet, the 12% who believed women were not engaged underscores persistent gender gaps and resistance in some areas. This mirrors FAO (2023) evidence from Cameroon showing women’s limited influence in strongly patriarchal communities, although participation can rise when traditional authorities endorse women’s involvement.

Qualitative insights further strengthen this interpretation. Respondents noted that women attend community barazas and contribute to FMNR activities, though their influence can be constrained by patriarchal expectations. For example, one participant acknowledged, *“Women do a lot of tree work, but we rarely see women chairing meetings.”* This echoes Njuki *et al* (2022) findings that women’s participation in natural resource

governance often remains informal or task-oriented, rather than strategic or leadership-focused. Another respondent noted that leadership acceptance increases when endorsed by respected social institutions: “*When the pastor encouraged us, many women felt it was right to join the FMNR group.*” This reinforces literature emphasising the role of religious and traditional leaders in shaping gender norms and legitimising women’s roles in environmental governance (World Vision Australia, 2020; Chomba *et al.*, 2020).

Overall, the results suggest incremental but meaningful progress in women’s community decision-making across FMNR landscapes, with local socio-cultural contexts shaping the depth of participation. While women’s presence in decision structures is notable, true empowerment requires strengthening their voice, influence, and leadership legitimacy. As seen in Osiligi, where only 79.46% reported women’s engagement, cultural barriers still constrain female authority despite women being active in restoration roles. These findings highlight the need for gender-sensitive FMNR policies and culturally grounded engagement strategies, leveraging local authority figures and role models to normalise female leadership in natural resource governance.

CONCLUSION

The study has elucidated the complex interplay of determinants of women’s participation in FMNR in selected areas of Kenya. It was evident that women are active contributors to household farming and are present in community forums, yet they face significant hurdles in translating that participation into leadership and influence. Deep-rooted socio-cultural norms from patriarchy in traditional institutions to gender stereotypes and limited female land rights continue to limit women’s decision-making power. At the same time, there are clear entry points for change: Community members themselves recognise the need for more support and training for women, and influential leaders (religious and traditional) hold sway that can

potentially be harnessed to champion greater inclusion.

Recommendations

- There is a need for the provision of targeted training to address practical attendance barriers like scheduling and childcare to dramatically improve women’s skills and confidence.
- Transforming socio-cultural landscapes through community conversations, showcasing positive deviants, and ongoing sensitisation is key to achieving enhanced sustainable women participation in FMNR practice.
- Strengthening partnerships with faith-based institutions and cultural leaders can legitimise women’s leadership and participation in FMNR by aligning restoration with shared spiritual values.
- There is a need to focus on the quality of engagement with a key goal of moving from women being present to women being heard, with decision outcomes increasingly reflecting women’s input.

REFERENCES

- Anderson, A. A. (2005). *The community builder’s approach to theory of change: A practical guide to theory development*. Aspen Institute Roundtable on Community Change.
- Agarwal, B. (2021). *Gender and Green Governance: The Political Economy of Women’s Presence Within and Beyond Community Forestry*. Oxford University Press.
- Chomba, S., Sinclair, F., Savadogo, P., Bourne, M., & Lohbeck, M. (2020). Farmer-managed natural regeneration: A review of pathways to scale. *Agricultural Systems*, 182, 102841. <https://doi.org/10.1016/j.agsy.2020.102841>
- CWE Journal. (2023). *Women at the Forefront of Environmental Conservation*. Retrieved

- from <https://www.cwejournal.org/vol2no2/pwomen-at-the-forefront-of-environmental-conservationp>
- Duke University. (2021). *Women's Participation in Environmental Decision-Making*. Retrieved from <https://dukespace.lib.duke.edu/bitstreams/745f5ec4-f8f8-47fe-8a9a-b5d733c26b03/download>
- FAO. (2023). Gender in climate-smart agriculture: Case studies from sub-Saharan Africa. Food and Agriculture Organization of the United Nations.
- Farnworth C.R., Fischer G., Rugalabam J. Islahi Z.S. (2023). Gender-transformative agricultural experimentation and decision-making: Piloting GALS tools in Tanzania. *Women's Studies International Forum* 101 (2023) 102836. <https://doi.org/10.1016/j.wsif.2023.102836>.
- Global EverGreening Alliance. (2024, October 16). Why women are essential to sustainable land restoration efforts. Retrieved from [https://www.\(Global EverGreening Alliance, 2024\)/\(accessed Oct 2024\)](https://www.(Global EverGreening Alliance, 2024)/(accessed Oct 2024)).
- IUCN. (2023). *Empowering the Unheard: Why Women's Voices are Crucial in Environmental Policy and Action*. Retrieved from <https://iucn.org/story/202303/empowering-unheard-why-womens-voices-are-crucial-environmental-policy-and-action>
- Kinyili, B.M., E, Ndunda & E, Kitur. (2021). Socio-Economic and Institutional Factors Influencing Adoption of Agroforestry in Arid and Semi-Arid (ASALs) Areas of Sub Saharan Africa. *International Journal of Forestry and Horticulture (IJFH)* Volume 6, Issue 1, 2020, PP 8-18
- Kristjanson, P., Waters-Bayer, A., Johnson, N., Tipilda, A., Njuki, J., Baltenweck, I., ... & MacMillan, S. (2021). Women's empowerment in agriculture: Progress and future directions. *World Development*, 135, 105089. <https://doi.org/10.1016/j.worlddev.2020.105089>
- Laidlaw, L. (2024, October). From roots to resilience: FMNR is a winning regreening approach. *World Vision International (COP29 Opinion Piece)*.
- Mfitumukiza, (2020) Influence of Literacy on the Smallholder Farmer's Ability to Adapt to Drought in t in Pallisa District, Eastern Uganda. *Journal of Environment and Earth Science* www.iiste.org ISSN 2224-3216 (Paper) ISSN 2225-0948 (Online) Vol.7, No.8, 2017
- Njuki, J., Sanginga, P., & Kaaria, S. (2022). *Women, Livestock Ownership, and Markets: Bridging the Gender Gap in Eastern and Southern Africa*. Routledge.
- Nyasimi, M., Amwata, D., Huyer, S., & Jost, C. (2019). Gender-responsive strategies for climate change adaptation in Africa: Lessons from Kenya. *Climate and Development*, 11(5), 383- 392. <https://doi.org/10.1080/17565529.2019.1601385>
- Ojuok, I., & Ndayizigiye, T. (2020). Women Participation in Farmer Managed Natural Regeneration for Climate Resilience: Laisamis, Marsabit County, Kenya. In W. Leal Filho et al. (Eds.), *African Handbook of Climate Change Adaptation* (pp. 1– 19). Springer. https://doi.org/10.1007/978-3-030-42091-8_152-1
- Reij, C., & Garrity, D. (2022). Farmer-managed natural regeneration: A key strategy for restoring degraded lands and improving livelihoods. *Global Landscapes Forum*.
- Reuters. (2024). *Comment: Women are Custodians of Nature - and Key to Improving the Integrity of Carbon Markets*. Retrieved from <https://www.reuters.com/sustainability/land-use-biodiversity/comment-women-are-custodians-nature-key-improving-integrity-carbon-markets-2024-12-02/>

- Tanui, P. T., Chesire, M. A., Kigen, C., Korir, J., & Munyao, C. M. (2025). Enhancing Gender Equality, Disability and Social Inclusion through Farmer Managed Natural Regeneration in Central Rift, Kenya. *International Journal of Environmental Sciences*, 8(Special Issue 1), 65-74. https://wwfgeftracks.com/sites/default/files/2023-01/MAINSTREAMING%20GENDER%20IN%20ENVIRONMENTAL%20PROJECTS_Final_Spring%202021.pdf.
- UN Women. (2021). *Informational Paper on Gender Equality and Women's Empowerment in Environmental Conservation*. Retrieved from https://unwomen.org/sites/default/files/Headquarters/Attachments/Sections/C/SW/66/EGM/Info%20Papers/UN%20Women_CSW66%20Informational%20Paper.pdf
- UNCCD. (2023). Land restoration through FMNR: A global approach to combating desertification. United Nations Convention to Combat Desertification.
- Webology. (2023). *Women's Role in Environmental Sustainability: Empowerment and Policy Implications*. Retrieved from <https://www.webology.org/data-cms/articles/20230823121417pmWEBOLOGY%209%20%282%29%20>
- Weston, P., Hong, T., & McDonald, L. (2020). Farmer-managed natural regeneration: A scalable approach to restoring degraded lands and improving livelihoods. World Agroforestry Centre.
- World Vision Australia, (2020). Evidence of Impact: Farmer Managed Natural Regeneration (FMNR). (Available from World Vision FMNR Hub).
- Weiss, C. H. (1995). *Nothing as practical as good theory: Exploring theory-based evaluation for comprehensive community initiatives for children and families*. In J. Connell et al. (Eds.), *New approaches to evaluating community initiatives* (pp. 65–92). Aspen Institute.
- WWF. (2021). Mainstreaming Gender in Environmental Projects. Retrieved from