

Economic and Social Empowerment of Rural Women and Natural Resource Management in Nanighi Ward Kenya

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Abstract-

This study examined the separate relationships of economic and social empowerment with self-reported natural resource management among rural women in Nanighi Ward, Fafi Sub-County, Kenya. It used a quantitative, cross-sectional correlational design guided by an empowerment framework. A census approach targeted 194 beneficiaries of three community-based organisations. The analytical dataset contained 139 respondents, representing 71.65% of the target. Economic empowerment, social empowerment and natural resource management were measured as separate questionnaire mean scores. Pearson correlations tested the two relationships, with Spearman correlations used to check the findings. Economic empowerment was positively associated with natural resource management, $r(137) = .529, p < .001, 95\% \text{ CI } [.397, .639]$. The Spearman result supported this relationship, $r_s = .535, p < .001$. Social empowerment had a smaller positive Pearson association, $r(137) = .252, p = .003, 95\% \text{ CI } [.089, .401]$, but the Spearman result was not significant, $r_s = .163, p = .055$. The economic relationship was therefore consistent across the two methods, while evidence for the social relationship was less clear. The findings describe associations in reported scores and do not establish that empowerment caused environmental improvement. Economic support linked to conservation activities merits evaluation, while the social finding requires further investigation using stronger measures and independently verified outcomes.

Keywords: rural women, economic empowerment, social empowerment, natural resource management, Nanighi Ward

Date of Submission: 02-10-2026

Date of Acceptance: 12-10-2026

I.INTRODUCTION

Women's participation in natural resource management involves access to resources, the ability to influence decisions and opportunities to act collectively. These aspects are related but should be measured separately. A review by James et al. (2021) found that social and cultural norms, limited resources and institutional practices can restrict women's engagement in conservation. It also cautioned against treating women as a uniform group. Differences in livelihood circumstances and decision-making opportunities matter when examining participation.

Economic empowerment concerns access to and control over productive resources and livelihood opportunities. Social empowerment concerns participation, networks, confidence and leadership. Greater economic resources may enable women to take part in conservation activities, while social relationships may create opportunities to share knowledge and influence decisions. These are plausible relationships to investigate; they do not establish that higher empowerment necessarily produces better environmental outcomes.

Evidence from different settings illustrates these links. Mello and Schmink (2017), using interviews with women involved in collective microenterprises in the Brazilian Amazon, reported greater environmental awareness and decision-making power over land use. In Kenya, Maybom and Funder (2025) showed how women used an environmental intervention to pursue livelihood priorities and negotiate gender relations. Their findings draw attention to women's own aims and the constraints within which they act.

The present study focused on women linked to Woman Kind Kenya, Girl Kind Kenya and Pastoralists Girls Initiative in Nanighi Ward. It examined economic empowerment and social empowerment separately, each in relation to reported natural resource management. The two empowerment scores were not combined into one index.

Statement of the Problem

Participation in an empowerment programme or women's group does not by itself show whether a woman has greater control over resources or contributes more effectively to conservation. Similarly, agreement with questionnaire statements about resource management is not direct evidence of improved water quality, vegetation cover or soil condition. A local assessment therefore needs to distinguish empowerment dimensions, measure their associations with reported management practices and state the limits of the evidence.

For the women represented in this study, the question was whether economic empowerment and social empowerment were each related to natural resource management. This focus provides local evidence about the two relationships without assuming that empowerment programmes caused environmental improvements.

II. Objective of the Study

The study examined the separate relationships of economic empowerment and social empowerment with natural resource management among rural women in Nanighi Ward, Fafi Sub-County, Kenya.

Research Hypotheses

H01: There is no statistically significant relationship between economic empowerment and natural resource management among rural women in Nanighi Ward.

H02: There is no statistically significant relationship between social empowerment and natural resource management among rural women in Nanighi Ward

III. Literature Review

Theoretical Framework

The study drew on the empowerment framework described by Page and Czuba (1999). They conceptualised empowerment as a social process through which people gain greater control over matters important to their lives. This approach supports examining both individual resources and participation in collective decisions. Economic access and social participation represent different aspects of empowerment rather than interchangeable indicators.

Kabeer (1999) linked empowerment to resources, agency and achievements. Resources provide opportunities, agency concerns the ability to make and act on choices, and achievements concern the resulting outcomes. This distinction is useful for the present study: access to credit, participation in a group and successful conservation are related ideas, but one should not be used as proof of another. The framework provides a basis for expecting relationships while recognising that institutions and other conditions may affect them.

Economic Empowerment and Natural Resource Management

Mello and Schmink (2017) examined women participating in collective microenterprises in the Brazilian Amazon. Their qualitative findings linked economic participation with environmental awareness, access to resources and land-use decision-making. This provides a plausible explanation for an economic association, although it does not supply an effect estimate for women in a Kenyan dryland setting. The present study therefore assessed the relationship directly within its own respondent group.

Maybom and Funder (2025) found that women's involvement in a Kenyan environmental intervention reflected wider livelihood priorities and efforts to alter gender relations. Their analysis suggests that economic activities and environmental participation need to be understood in relation to women's circumstances. In this study, economic empowerment was measured through questionnaire statements on resource access, ownership, financial services, employment and benefit sharing. The score represented reported experiences and perceptions, rather than independently measured income growth or programme effectiveness.

Social Empowerment and Natural Resource Management

Choudhury et al. (2018) examined women's exclusion from collective resource management in wetland communities in Bangladesh. They found that social position and prevailing norms limited women's agency, while social networks and cultural resources could support it. Their findings show why formal participation may differ from meaningful influence over decisions. The present study treated social empowerment as participation, networks, leadership and involvement in community discussions.

James et al. (2021) also emphasised the need to address barriers within conservation institutions and programmes. Their review supports investigating women's opportunities to participate, but it does not justify assuming that group membership or meeting attendance will always improve resource management. Comparing Pearson and Spearman correlations provides a check on whether an observed relationship is consistent across two methods.

IV. Method

Design and Participants

The study used a quantitative, cross-sectional correlational design. This observational design measures the study variables at one time and allows their associations to be examined (Setia, 2016). The target population comprised 194 women beneficiaries linked to the three community-based organisations in Nanighi Ward. A census approach sought to include the whole target group. The analytical dataset contained 139 respondents, representing 71.65% of the target. The response proportion describes participation and does not establish that respondents and non-respondents were comparable. The unit of analysis was the individual woman.

Questionnaire and Scoring

The quantitative analysis used the closed-response component of a semi-structured questionnaire. Items were recorded on a four-point scale: 1 = strongly disagree, 2 = disagree, 3 = agree and 4 = strongly agree. The natural resource management section covered catchment protection, soil and water conservation, rangeland rehabilitation, biodiversity, groundwater use and waste management. The resulting score combined perceptions of participation, practices and management conditions; it was not a direct measure of ecological change.

The sections used in this article initially contained 18 economic empowerment items, 20 social empowerment items and 30 natural resource management items. The economic scale retained 17 items after Economic3 was excluded following item screening. Further research should check whether this scale works reliably with another group of respondents. All 20 social items and all 30 natural resource management items were retained.

Each variable was measured using the average of several questionnaire items rather than a response to a single statement (Sullivan & Artino, 2013). The study's scoring rule required at least 80% of the retained items to be answered: 14 economic empowerment items, 16 social empowerment items and 24 natural resource management items. Missing responses were left missing. All 139 respondents had scores for the three variables and were included in both correlation analyses.

Reliability and Measurement Checks

The questionnaire underwent expert review for content and face validity. Internal consistency was assessed separately for the three scales using respondents who answered every retained item in the relevant scale. The study used .70 as its working Cronbach's alpha criterion, with reliability estimated separately for each scale (Tavakol & Dennick, 2011). Table 1 presents reliability estimates from the analytical sample.

Table 1
Internal Consistency of the Three Study Scales

Scale	Items	Complete cases	Cronbach's α
Economic empowerment	17	138	.724
Social empowerment	20	138	.950
Natural resource management	30	137	.781

Note. Complete cases refer to respondents who answered every retained item in that scale. Reliability tests used respondents with complete answers, while average scores also included respondents with a small number of missing answers.

All three scales met the working alpha criterion. The very high social empowerment alpha ($\alpha = .950$) warrants checking for overlapping item content. Internal consistency alone does not establish that a scale measures a single construct or is fully valid (Tavakol & Dennick, 2011).

Principal component analysis was used as an exploratory check of item dimensions (Jolliffe & Cadima, 2016). The economic items represented more than one dimension. The social scale had KMO = .947, and its first principal component explained 51.51% of item variation.

Statistical Analysis

Means and standard deviations described the three separate scores. Pearson correlations assessed each linear relationship with natural resource management, while Spearman correlations checked the relationship using ranked scores (Schober et al., 2018). Shapiro–Wilk tests assessed score normality (Shapiro & Wilk, 1965) and

indicated departures from normality for economic empowerment ($W = .977$, $p = .018$), social empowerment ($W = .945$, $p < .001$) and natural resource management ($W = .979$, $p = .033$). The Spearman findings were therefore considered alongside Pearson when interpreting each hypothesis.

Pearson confidence intervals used Fisher's transformation. Spearman confidence intervals used paired bias-corrected and accelerated (BCa) bootstrap resampling with 9,999 samples (Efron, 1987). Spearman p values used 99,999 random permutations and average ranks for tied scores. The calculation included the observed arrangement so that permutation p values could not be zero (Phipson & Smyth, 2010). All tests were two-sided, with $\alpha = .05$ and 95% confidence intervals.

V. Results

Respondent Profile

The largest age group was 35–44 years (59 respondents, 42.45%). Business was the most commonly recorded occupation (89, 64.03%). Eighty-two respondents (58.99%) were in the lowest recorded monthly household-income category, below KES 10,000. Membership was recorded as Woman Kind Kenya for 63 respondents (45.32%), Girl Kind Kenya for 39 (28.06%) and Pastoralists Girls Initiative for 37 (26.62%). Sixty-eight respondents (48.92%) reported natural resource management training, while 71 (51.08%) did not.

Forty-six respondents (33.09%) reported access to financial resources and 93 (66.91%) did not. Land-access information was available for 138 respondents: 107 (77.54%) reported access and 31 (22.46%) did not. These results describe the respondent group and should not be interpreted as estimates for all rural women in the ward.

Descriptive Statistics

Table 2
Descriptive Statistics for the Three Study Scores

Variable	<i>N</i>	<i>M</i>	<i>SD</i>
Economic empowerment	139	2.75	0.36
Social empowerment	139	2.75	0.65
Natural resource management	139	2.95	0.28

Note. The response scale runs from 1 to 4. All three scores use 139 respondents. M = mean; SD = sample standard deviation.

Table 2 shows that economic and social empowerment had similar means (both $M = 2.75$), but social scores varied more widely ($SD = 0.65$ compared with 0.36). Natural resource management averaged 2.95 ($SD = 0.28$). These means summarise questionnaire responses and do not establish programme effectiveness or the condition of local ecosystems.

Correlation Results

Table 3
Relationships with Natural Resource Management

Empowerment score	Test	<i>N</i>	Coefficient	95% CI	<i>p</i>
Economic empowerment	Pearson	139	.529	[.397, .639]	< .001
Economic empowerment	Spearman	139	.535	[.398, .650]	< .001
Social empowerment	Pearson	139	.252	[.089, .401]	.003
Social empowerment	Spearman	139	.163	[−.009, .327]	.055

Note. Pearson coefficients are r ; Spearman coefficients are r_s . Spearman p values use permutation tests and confidence intervals use paired bias-corrected and accelerated (BCa) bootstrap resampling. All tests are two-sided. Table 3 presents the two correlation analyses. Economic empowerment had a positive Pearson relationship with natural resource management, $r(137) = .529$, $p < .001$, 95% CI [.397, .639]. Spearman's result agreed, $r_s = .535$, $p < .001$, 95% CI [.398, .650]. H_{01} was rejected at the .05 level. Women with higher economic scores tended to report higher natural resource management scores.

Social empowerment had a smaller positive Pearson relationship, $r(137) = .252$, $p = .003$, 95% CI [.089, .401]. The Spearman result was not significant, $r_s = .163$, $p = .055$, 95% CI [-.009, .327]. Pearson therefore rejected H_{02} , while the Spearman/rank-based check did not. The evidence does not support an unqualified conclusion of a consistent social association across methods.

Additional Check of the Social Relationship

Six respondents gave the same answer to every social empowerment item. This pattern does not by itself establish an invalid response, so all six were retained in the main analysis. When they were temporarily excluded for comparison ($N = 133$), the Pearson correlation was smaller but remained significant, $r(131) = .181$, $p = .037$. The Spearman correlation remained non-significant, $r_s = .095$, $p = .278$. This comparison reinforces the need to qualify the social finding; it is not a basis for deleting these respondents.

VI. Discussion

Economic Empowerment

Economic empowerment showed the more consistent relationship with natural resource management. Pearson and Spearman correlations were similar and positive, and both confidence intervals excluded zero. Women with higher economic empowerment scores tended to report higher natural resource management scores. This describes an association within the respondent group; it does not show that providing credit or introducing an empowerment programme would improve conservation.

The direction is compatible with Mello and Schmink's (2017) account of economic participation, access and resource-use decisions. It is also consistent with Maybom and Funder's (2025) emphasis on women using environmental initiatives to pursue livelihood priorities. However, different settings and methods limit direct comparison. The present survey cannot determine whether economic opportunities preceded resource-management participation, whether participation improved economic opportunities, or whether another factor affected both.

Social Empowerment

Social empowerment requires a more cautious interpretation. Pearson identified a small positive association, but the Spearman result was not significant at the .05 level and its confidence interval included zero. The additional check excluding the six respondents with identical answers across the social items also produced a non-significant Spearman result. The evidence therefore does not support a firm claim that the social relationship is consistent across methods. Nor does a non-significant result establish that no relationship exists.

The findings do not show that social participation is unimportant. Choudhury et al. (2018) distinguished formal participation from the ability to exercise agency, while James et al. (2021) identified institutional and social barriers to women's engagement. In the present instrument, meeting attendance, networks and leadership were combined in one score. Different forms of participation may relate differently to management practices, but this study did not test those separate pathways. Further measurement and source checks are needed before offering that explanation as a finding.

VII. Limitations

The survey measured responses at one time, so it cannot establish the order of events or causation. All variables came from the same questionnaire, creating a possibility that common response tendencies contributed to their relationships. Some items in the empowerment scales also refer directly to natural resource management, which may introduce content overlap between the empowerment and natural resource management scores. Independent observations of practices and ecological indicators would strengthen future research.

The natural resource management score combined reported behaviour, opinions about management conditions and beliefs about conservation. It should therefore be interpreted as a questionnaire score rather than an objective sustainability indicator. Its exact item dependency requires verification against source questionnaires. Exclusion of the economic item was exploratory within the same sample. Alpha and component analysis do not establish full construct validity.

The 139 respondents represented 71.65% of the target group, and differences between respondents and non-respondents were not assessed. Participants were linked to three organisations, so the findings should not be generalised automatically to all women in Nanighi Ward or elsewhere. Possible dependence among respondents

within organisations or local groups was not established from field records. The reported confidence intervals and p values assume independent respondents and accurate recorded responses.

VIII. Conclusions and Recommendations

Conclusions

Economic empowerment showed a positive relationship with self-reported natural resource management that was consistent across Pearson and Spearman correlations. Social empowerment showed a smaller positive Pearson relationship, but this was not supported by a statistically significant Spearman result. H01 was rejected by both methods; H02 was rejected by Pearson but not by the Spearman check. The findings describe two separate associations in reported scores and do not establish that empowerment programmes caused environmental improvement.

Recommendations

Garissa County departments responsible for community development and natural resources, the participating organisations and women's groups should consider linking economic support to clearly defined conservation activities. Financial access, livelihood inputs and practical resource-management training can be piloted together, with women involved in choosing activities that fit their circumstances. Evaluation should track independent measures of participation and environmental change, rather than assuming that programme attendance or higher questionnaire scores demonstrate effectiveness.

Women's networks and leadership opportunities should be supported as ways to improve access to information and meaningful participation. Their effectiveness should be assessed through documented decision-making roles and observable management actions. The uncertain social finding does not support promising that group membership or meeting attendance alone will improve natural resource management.

Further Research

Further studies should use independently validated scales, include women beyond organisation beneficiary lists and compare respondents across wards. Longitudinal designs could examine whether empowerment changes precede changes in management practices. Independent records of conservation activities, water quality, soil condition or vegetation cover would help distinguish perceptions from outcomes. Sampling and analysis should also account for any grouping of women within organisations or communities.

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