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Original Article

Drivers of Community Participation in Participatory Forest Management; An Evidence of Koder Forest in Kenya

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The present thirty-one percent of overall forest cover is not enough to conserve biological diversity globally and so the need to conserve the last global forests (Powlen et al., 2021). Kenya has experienced significant degradation of forest resources in the last 40 years. In 2005, the government passed a forest legislation that allows communities adjacent to forests to co-manage forests. This paper evaluated the driving force of community involvement in participatory forest management. The paper adopted a descriptive research design targeting forest-adjacent communities. A questionnaire and interview schedule were used for data collection. A pilot study was conducted, and research tools were carefully revised to ensure the validity and reliability of the content. The paper used Taro Yamane's sampling formula to extract 255 respondents from a total of 671 households surrounding the forest. Quantitative data were evaluated using inferential statistics. The results were presented in tables and discussed appropriately. The results showed that 45.90% of the respondents are affiliated with one of the conservation user groups, while 54.1% of respondents were not affiliated with any Koder Forest conservation groups. Based on Pearson's chi-square test statistic (43.449 with p-value = 0.000), it was clear that there was a significant association between education level and perception of forest user group importance. Similarly, the chi-square results suggested that there is a statistically significant association between participation in conservation activities and respondents' monthly expenditure at the conventional level of significance ($\alpha = 0.05$).

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INTRODUCTION

Despite a global decline in woodland resources, local populations all over the world nevertheless rely on forestry for their livelihoods (Okumu & Muchapondwa, 2020). Food and Agriculture Organization defines Participatory Forest management (PFM) as an arrangement that allows local forest-adjacent communities to co-manage forest resources along with the state while improving their livelihood and forest health in general. Engaging local people in forest management and conservation is considered key to ensuring resource sustainability worldwide (Lawler & Bullock, 2017).

Local forestry management has developed a promising method of natural resource conservation among many organisational arrangements with benefits that vary from local to international across the world (Lawler & Bullock, 2017).

Participatory forest management attempts to manage, protect, conserve, and sustain forest resources collaboratively by the locals (Kasymov et al., 2022). Cameroon, for example, established participatory forest management back in 1994 to bring on board local communities in forest administration in an attempt to improve the lives of the community through poverty reduction while conserving the forests (Minang et al., 2019). With so many years behind, there is a need to consider whether the management approach is meeting the much-needed sustainable development in the forest sector. Participatory forestry has been operationalised differently in most countries of the world based on their context (Situmorang & Yen, 2022). The Kenyan government started participatory forest management by allowing communities near forests to register with KFS through community forest associations as one of the ways to increase

forest cover and address this issue. However, this has not done much.

According to Global Forest Watch, Homa Bay County had considerable amounts of indigenous forest spanning 5.7% of the County in 2010. Around 17.5 Kilo hectares of land had been lost by 2020. This loss is the same as seven-point six eight megatons of carbon four oxides being released into the atmosphere, causing a build-up of greenhouse gases and global climate change. The driving force behind community participation in PFM is thus necessary for establishing the goal of this strategy locally since local people are interconnected with forest resources and are best known for their cooperation in the conservation of these resources (Agbogidi et al., 2010). Dolisca et al. 2006) suggested that age has a negative effect on community participation in PFM, while family size has a positive effect on participation in PFM of communities adjacent to the forest. The argument here is that households with fewer occupants have less chance of participating in PFM. The limited participation of households in forest management is due to a lack of knowledge (Tadesse et al., 2017). This article has attempted to identify the drivers of community participation in participatory forest management.

MATERIALS AND METHODS

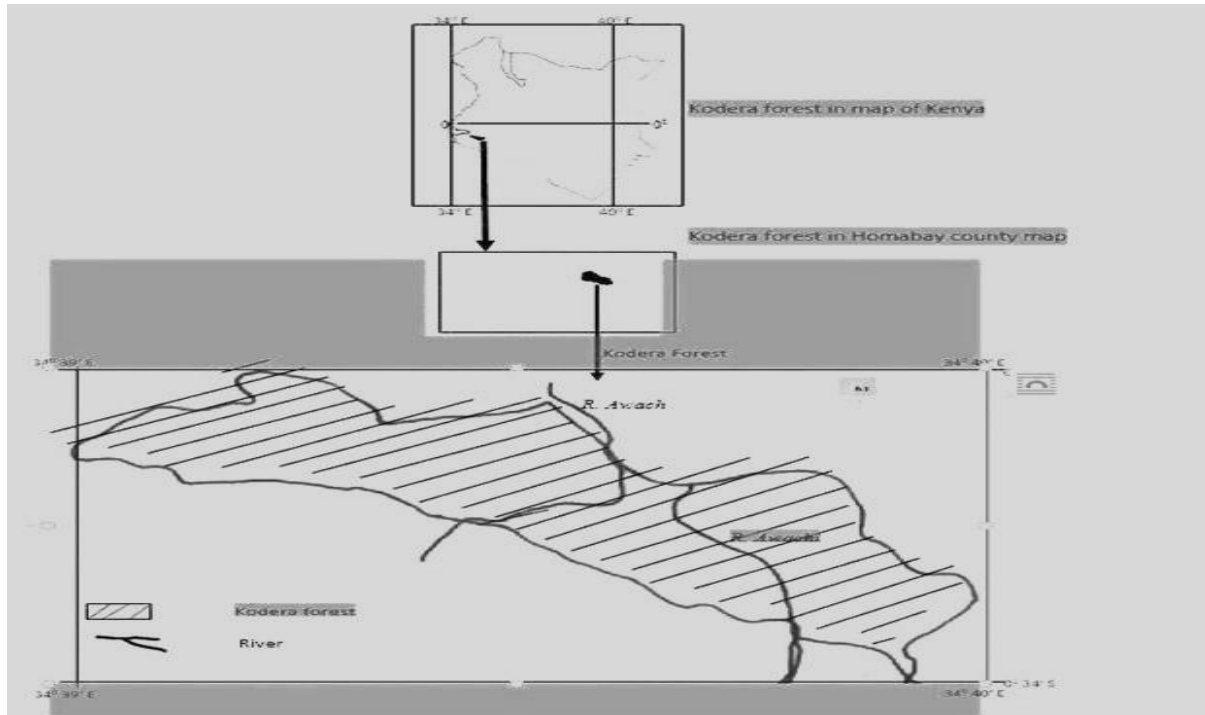
Study Area

The study was carried out in Kodera Forest and the surrounding community within Homa Bay County in Kenya. According to several publications, there are ongoing reports of forest degradation due to illegal logging, grazing, forest fires, and agricultural activities. Kodera Forest is located at the following coordinates: 0033N:340 Latitude-0.55691° or 0°33' 2" South, Longitude 34.66436° or 34°39' 5" East, and Altitude 1,329 meters (4,360 feet). Kodera forest covers an area

of 399 hectares. Hot and rainy weather is common in the area. Farmers make up most of the population, and some of them use the “Shamba system” with rivers such as the Awach, Agido,

Nyamache, and other small streams pouring into Lake Victoria. Koderia forest receives an annual rainfall of between 1800 and 2000 mm, according to Kenya’s meteorological statistics.

Figure 1: Map of Koderia Forest



Source: Odiény, 2022

Methodology

Design: The study used a descriptive survey method. This design was suitable for collecting data describing existing phenomena by questioning individuals about the perceptions, values, norms, beliefs and attitudes needed to establish the impacts of participatory forest management. The paper adopted a mixed method. This research model enables researchers to analyse data with research independence and flexibility.

Target population: The study targeted the community around Koderia Forest as well as forestry-related organisations, including Kenya Forest Service officials, community forestry associations, and local opinion leaders, as sources of primary data.

Sampling approaches and tools; - Using purposive and systematic sampling methods, data were collected from 22 March 2023 to 24 March

2023, respectively, using a questionnaire. In addition to this, interview schedules and field observation sheets were also used to verify the responses from the participants. The questions were digitised into ‘Survey Monkey application software for ease of analysis, monitoring, and protection of the data collected.

Sample; - 250 households surrounding the Koderia Forest were sampled from a total of 671 households that surround the forest. In addition to this, 5 Key informants were also interviewed, giving a total of 255 respondents, calculated through Yomane and Taro (1967) sampling formula as $n = N / (1 + N(e)^2)$, $n = 671 / (1 + 671(0.05)^2) = 250$ plus 5 interviewed officials.

Validity and reliability - On validity and reliability, expert opinion was sought in this regard, along with the opinion of seasoned researchers; again, 30 respondents were randomly interviewed to inform the validity of the tool before the actual exercise was carried out.

Data Analysis and Presentations

Quantitative data generated were descriptively analysed with the aid of inferential statistics. This entailed; - frequency counts and percentages as well as correlation analysis, while qualitative data endured transcription and was later reported in themes and sub-themes. The questions were coded and notched to yield quantitative answers and measured either in the form of interval or ratio scale and later keyed into SPSS statistical software for further analysis. The relationships between variables were determined and later presented appropriately.

RESULTS AND DISCUSSIONS

Introduction

This study evaluated the drivers of community participation in Participatory Forest Management

using Kodera Forest as a case study. Twenty young local graduates, well conversant with the study area, collected the face-to-face data through an online Survey Monkey link. The target population was the households living and believed to be in direct contact with the forest under investigation. Two hundred fifty-five responses representing a 100% return rate were retained after data cleaning and quality assurance checks.

Demographic Characteristics of the Respondents

Demographics are distinctive features of a given population or society that are categorised as age, education, gender, and income. Demographic characteristics of a community help researchers to understand the population dynamics and attributes of the society or population in the study.

Table 1: Demographic Characteristics of Respondents

Demographics		Frequency	Percentage
Gender	Male	119	46.7
	Female	136	53.3
	Total	255	100.0
Level of Education	Primary	97	38.0
	Secondary	81	31.8
	Post-secondary	77	30.2
	Total	255	100.0
Age groups	18-24	28	11.0
	25-34	42	16.5
	35-44	55	21.6
	45-54	62	24.3
	55-64	40	15.7
	65 plus	28	11.0
	Total	255	100.0
Main occupation	Working on farm	143	58.1
	Self-employed	51	20.7
	Paid employment	39	15.9
	Students	22	8.6
	Total	246	100.0

As shown in *Table 1* above, the percentage of male respondents was 47%, while women were 53% respectively, indicating that there are more female births than men as well as low life expectancy for men than women at Kodera Forest at the time of the survey.

Among the respondents, the least recorded education level was post-secondary education at

30.2%. The secondary school education level stood at 31.85%, while the Primary school level was the most at 37.83% respectively. The data depicted an improved level of literacy in the rural as shown by percentage distributions in *Table 1*.

Regarding age, 45-54 age bracket (24.3%) formed the majority, followed by 35-44, 25-34, and 55-64 at 21.6%, 16.5%, and 15.7% respectively. The

younger and older generations were the least represented because of the rural nature of the case study area and the low life expectancy, respectively, being that the survey was conducted during the day and schools were open, the younger generation could be in schools while the older generations indicate that community is risking inheritance of traditional resources and mentorship to the younger generation.

On occupation, more than half of the respondents (58.1%) worked on their farms as a means of earning revenue, while 20.7% were self-employed outside the farm. Only 15.9% were in regular paid employment (working as civil servants or in the private sector), while students formed 8.6% of the respondents. The results indicate farming as a major economic activity of the community, thereby making forest conservation vital in the area.

Existing Forest User Groups and Community Perception Towards Participatory Forest Management

Community forest associations and other related, well-established conservation user groups help create forest conservation movements. According to the Forests Act of 2005, a member of a forest community may establish a Community Forest Association under the Societies Act with other members or local residents. The registered association may submit an application to the Director of Kenya Forest Service asking for permission to participate in forest conservation. According to the act, the association may consist of, among others, CBO, CFA, farmer groups, and cooperatives. It is through these user groups that the term participatory forest management was born.

Table 2: Existing Forest user groups and perception of the community on the contribution of the conservation groups to forest conservation

	Variable	Frequency	Percentage
Existing user groups at Koder Forest	C.B.O	19	7.5
	C.F.A	57	22.4
	Cooperatives/farmer groups	41	16.1
	None	138	54.1
	Total	255	100.0
The usefulness of the group in conservation	Strongly agree	90	35.3
	Agree	83	32.5
	Neutral	25	9.8
	Disagree	56	22.0
	Strongly disagree	1	0.4
	Total	255	100.0

On forest existing user groups, 54.1% of the respondents had not joined any of the conservation groups at Koder Forest at the time of this survey. 22.4% were members of CFA, while 16.1% had joined cooperatives. Community-based organisations recorded the lowest membership at just 7.5%, implying that the community at Koder has recognised the contributions due to PFM. Slightly more than a third of the community (35.3%) were in strong agreement that the groups played a useful role in forest conservation, while another 32.5% were in agreement. 9.8% neither agreed nor disagreed with the effects of the group's operation. Only one

respondent (0.4%) expressed extreme dissatisfaction with the group's ability to conserve the forest. Based on the results, the community acknowledged the efforts made by the forest user groups, with only a handful of members still doubtful.

Drivers of Community Participation in Participatory Forest Management

Tedesco et al., 2023 reported 'gender, household size, marital status, income levels and education influence the community's participation in PFM. Community perceptions are essential in engaging locals in planning and managing natural

resources. Literature has shown that major decisions and participation in forest conservation are made by males (Walle & Nayak, 2022). Dolisca et al., 2006, on the other hand, argued that age has a negative influence on community participation in PFM. In addition to this, community capacity in the implementation of the silvicultural programs depends on skills and knowledge acquired. Many publications have

indicated significant association between income levels and community participation in forests conservation, Kimutai & Watanabe, 2016, reported that revenue obtained from plantation establishment and livelihood improvements schemes caused a great change and disparity of income levels between members and non-members of CFA.

Table 3: Chi-square tests for various hypothesised variables driving community participation in participatory forest management.

Variables	Value		df	Likelihood Ratio Tests		N of Valid Cases
	Pearson Chi-Square	Likelihood Ratio		Asymp. Sig. (2- sided)		
Marital status	3.103 ^a	3.532	6	0.796	0.740	255
Education level	36.494 ^a	34.807	22	0.027	0.041	255
Household monthly expenditure	125.615 ^a	116.654	100	0.042	1.22	255
Age	11.701 ^a	12.431	14	0.630	0.572	255
Gender	6.988 ^a	7.397	4	0.137	0.116	255
Perception	169.5788 ^a	192.735	10	0.000	0.000	255
Training	71.712 ^a	72.593	18	0.000	0.000	255

The test statistics, Pearson Chi-Square, and Likelihood Ratio are reported along with their associated degrees of freedom and p-values as in the chi-square table above.

The results suggested that there was no statistically significant relationship between participation in conservation activities and gender at a conventional significance level ($\alpha = 0.05$). Both the Pearson Chi-Square (6.988) and Likelihood Ratio (7.397) test statistics do not reach statistical significance. Again, for age, the chi-square results indicate that there is no statistically significant relationship between participation in conservation activities of the groups and the age of the respondents at $\alpha = 0.05$ confidence level. Marital status showed no statistical significance for both the Pearson Chi-Square (11.701) and Likelihood Ratio (12.431) test statistics do not reach statistical significance. The results indicate that there is no statistically significant relationship between participation in conservation activities and marital status at a conventional significance level ($\alpha = 0.05$). Both the Pearson Chi-Square (3.103) and Likelihood

Ratio (3.532) test statistics do not reach statistical significance.

Unlike gender, age, and marital status, the results here indicate that there is a statistically significant relationship between involvement in conservation activities under PFM and level of education at $\alpha = 0.05$ (significance level). Both the Pearson Chi-Square (36.494) and Likelihood Ratio (34.807) test statistics reach statistical significance. This indicates that those with higher levels of education understand the need to be part of forest conservation activities at Kodera than those with lower levels of education across all levels of education. For the household monthly income, the calculated Chi-Square value is 125.615, with 100 degrees of freedom. The associated p-value is 0.042. Since the p-value is less than 0.05, there is evidence to suggest a significant association between participation in conservation activities and household monthly expenditure. In other words, those associated with any conservation user groups have higher monthly expenditures than their counterparts not in support of the existing conservation groups.

Further, the chi-square test carried on the data confirms there is a significant association between an individual's perception of group importance and whether or not the individual is a member of a group (Pearson Chi-Square = 169.578, $df = 10$, $p < .001$). This indicates that the driving force of community participation in conservation activities under PFM is related to their perception of the group's contribution to forest conservation. Finally, regarding training (Pearson Chi-Square = 71.712, Likelihood Ratio = 72.593, $df = 18$, $p < .001$). This means that the implementation of certain silvicultural measures is related to whether or not someone in the household has received training. Generally, households with a member who has received forest conservation-related pieces training are more likely to have had one or more on their land as opposed to those with completely no training. Thus, training plays a significant role in fueling community participation.

CONCLUSION

All in all, Participatory Forest management presents a vital prospect to lessen the existing burden of forest degradation by the neighbouring community. This strategy has provided incentives and consensus-building to encourage behavioural change, which will soon decrease deforestation and forest degradation through training and advocacy on the program. The findings suggest that there is a significant association between the community's perception, training, level of education, household expenditure and household decisions to take part in participation in forest management at Koderia Forest, which forms the lesson from this study.

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