Community Empowerment and Sustainability of Forest Conservation Projects in Kenya

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Abstract

This study investigated the influence of community empowerment on the sustainability of forest conservation projects in Kenya. It has been observed that many forest conservation projects cease as soon as financial support ends hence the need to investigate the phenomenon. This study was undertaken in the South-Eastern part of Kenya within Taita-Taveta County. Cross sectional survey design was used in the study. The study hypothesized that "There was no statistically significant relationship between community empowerment activities and sustainability of forest conservation projects." It targeted 4138 household heads in five administrative locations considered as clusters in this study. Mixed research methods were used in the collection and analysis of data. A total of 365 quantitative data respondents were selected systematically, while qualitative data respondents were selected purposively. The study ascertained that at least 44.1% of respondents at least agreed that forest projects were sustainable, while 3.9% disagreed. Approximately 52% of respondents neither agreed nor disagreed that forest conservation projects were sustainable. Regression analysis showed F-ratio values of F (4, 360) = 66.438; p < 0.05. The null hypothesis was therefore rejected. The study also ascertained that community empowerment influenced the sustainability of forest conservation projects. The researcher recommended that

community empowerment activities be factored into future projects during the design stage to bolster sustainability.

Keywords: Sustainability, Forest-Conservation, Survey, Mixed-Methods, Community.

Introduction

The aim of this study was to establish the influence of community empowerment activities on the sustainability of forest conservation projects. The sustainability of forest conservation projects has remained a challenge, evidenced by dwindling forest acreage, biodiversity loss, and social conflict (Pasaribu et al., 2020). Most challenges to the sustainability of forest conservation projects emanate from community actions, for instance, unsustainable harvesting and conversions of forestland (Mbuvi & Kungu, 2021). Such community actions emanate from inadequate community empowerment on the management of the forest resources. This research hypothesized that there was no statistically significant relationship between community empowerment activities and the sustainability of forest conservation projects. It is observed that community activities have great repercussions on forest sustainability. In Nigeria, Bisong et al., (2018) observed that community activities positively affected the sustainability of forests where the community was empowered to take positive actions. In Democratic Republic of Congo it was observed that as the community got empowered through training and mentorship, there was a significant reduction in activities considered detrimental to the forestry sector (Loconto et al., 2020). In Kenya, mixed results were observed by Ombogoh et al., (2022) where forest resources increased in some regions while the reverse was observed in other regions where community empowerment was incorporated in projects. Community empowerment in this research was considered a process through which community gains capacity to handle its own affairs and the end results of that process. It entails a community gaining or increasing level of control over their own lives (Zimmerman, 2000). An empowered community is able to continuously undertake forest conservation activities that have a positive influence on forest acreage and biodiversity status, among others (Alsop & Heinsohn, 2005). Community empowerment increases over time based on continued capacity building to increase knowledge and skills that is necessary for the achievement of sustainability of forest conservation projects (Cattaneo & Goodman,

2015). Community empowerment results in community development which is the sum of all efforts aimed at enhancing living standards of an entire community, hedging on their active participation and contribution of their ideas and resources (Situmorang & Mirzanti, 2012). Such community development leads to decreased reliance on natural resources for livelihoods, thus having a direct impact on the sustainability of the resources (Qin et al., 2020). This research sought to demonstrate the influence of community empowerment activities on the sustainability of forest conservation projects by providing empirical data obtained through rigorous and replicable research methods. The findings will likely influence or help forest conservation project designers incorporate community empowerment in their forest conservation projects to enhance sustainability beyond project funding periods

Literature Review

Community empowerment activities considered in this study included knowledge and skills empowerment activities, decision-making empowerment activities, conflict resolution empowerment activities and income generating empowerment activities. Knowledge and skills are acquired through formal and informal training. Training entails equipping learners with the knowledge and skills necessary for undertaking specific tasks immediately or later (Patrick et al., 2015). Knowledge and skills acquisition takes place at any stage of life for as long as learners retain the willingness and capacity to learn. The process of knowledge and skills acquisition has continued to evolve over time with learners, including community members and teachers, such as forest conservation project managers and monitoring and evaluation experts adopting different styles and techniques for training. Empowerment through knowledge and skills acquisition can take the form of short courses, mentoring and demonstrations, among other strategies. Most important is the value pegged on continuous knowledge and skills attainment to keep up with evolving expertise and work related dynamics (Bell et al., 2017) including new silvicultural practices in forestry related enterprise. This research considered aspects of community empowerment related to competence in tree seed selection and management for purposes of propagation outside the protected/forest areas, organization of farmlands to increase the number of trees that can be grown per unit area using science of farm forestry (Kennedy & Gangulin, 2016) and book keeping to manage the income generated from

the forestry and other related activities within and outside the farmland. Knowledge and skills on resource mobilization at the local and higher levels were also examined in the study because it was hypothesized to have some influence on the sustainability of the forest conservation projects. Lundvall & Rasmussen (2016) in their study, noted that as Community Forest Association (CFA) membership continued to gain knowledge and skills in forestry, they also brought their personal experiences, which occasionally enriched the learning process and at other times constrained it based on flexibility and capacity to accommodate varying views by learners. There is, therefore a need for CFA membership to continue reflecting on what they learned and balance it with their context (Motta, 2016). Peer learning, including taking advantage of concepts in modelling, comes in handy at the CFA learning level (Klinge, 2015). Decision making as a concept can be viewed as the process of making a choice amongst several options in one's interest or that of the represented organization. It brings into focus scanning of the context and examining available alternatives to arrive at conclusions aimed at improving certain conditions or taking advantage of existing opportunities. Making decisions at the individual level greatly varies from the same activity at CFA or group level. Collective decisions such as the ones at the CFA level are replete with differing levels of personal proficiencies, enlightenment, culture and viewpoints (Dong et al., 2015). Collective decision making calls for a consensus process, the selection of best alternatives, and arriving at a considered conclusion (Xu & Liao, 2015; Dong, Zhang et al., 2015). The consensus process is time consuming and may have a direct effect on the achievement or loss of opportunities for the project, thus affecting sustainability (Kadurenge et al., 2017). Group decision making mainly considers majority opinion. Dissenting views may be heard and considered but final decisions are made in favour of the majority views (Xu & Liao, 2015). The downside of such an outcome or decision is that the dissenting views may, in the long term employ negative energy and derail project activities, thus affecting project sustainability. Conflict is a challenging concept to define. It encompasses trade embargos and outright war to differing opinions and views (Mac Ginty et al., 2016). A conflict could also be viewed as the absence of peace (Mac Ginty et al., 2016). Causes of conflicts, especially in a CFA environment may range from relationships, principles, the boundary of forest resources to forest related commodities. Other causes may include competition between two or more individuals over power, scarce resources, status and values that are viewed as beneficial in one way or the other (Cary,

2014). Conflicts may be categorized as intrapersonal when an individual experiences roles conflict or ambiguity, interpersonal when an individual's views or ideas vary with those of others, intragroup which happens between individuals of a group and intergroup when a group encounters misunderstandings with other groups working within the same locality or sharing certain resources (Cary, 2014). This study recognized the fact that occasionally causes of conflicts overlap, and a conflict may result from a combination of a number of causes. Individual and group or CFA tolerance to conflicts differ considerably depending on socialization and status. A study by Bilali, Çelik, & Ekin, (2014) established that CFAs with big membership may be less aware of their privileged position than CFAs with small membership who are more aware of their underprivileged position. CFAs composed of small memberships are likely to suffer low self-worth and perceptions of fear which affects their social and political tolerance. Privileged individuals in society can easily be viewed as domineering and exploitative by the underprivileged CFAs. At the same time, the perceived underprivileged CFA members may appear as unnecessarily aggressive, dangerous and irrational in the view of society and other privileged groups (Bilali, Celik & Ekin, 2014). Such a situation affects cohesion which intern has detrimental effects on the working relationship of individuals and the group as a whole. Income generating activities (IGAs) are the initiative(s) implemented with a view to enhancing the economic value of a resource and livelihoods of the community involved. Forest based IGAs help forest adjacent communities who are mainly members of CFA increase benefits realized from the forest resources that are necessary for improving their livelihoods (Wunder, Angelsen, & Belcher, 2014). Key among the forest based income generating activities implemented by CFA's located adjacent such resources include bee keeping, harvesting of medicinal products, fishing, butterfly farming and tree nurseries (Sainsbury, Burgess, Sabuni, Howe, Puise, Killenga & Milner-Gulland 2015). Beekeeping for example yields a number of products including honey, bees wax, propolis, pollen and royal jelly which can be value added for improved returns (Ominde & Nyonje, 2016). Butterfly farming (rearing and selling butterfly pupae) in some coastal forests in Kenya, including Ngangao forest, for instance, earns the local community impressive returns every year between March and October when the market demand is at its peak (Chiawo & Kombe, 2018). In Papua New Guinea forests, butterfly farming was introduced in the early 1970's through the integrated conservation and development paradigm

aimed at helping forest adjacent dwellers improve their livelihoods through income generation (Moyle & Small, 2016). Despite the benefit of wildlife farming, especially to tourism and community livelihoods, studies have alluded to the paucity of data on terrestrial wildlife farming, including butterfly farming making it very difficult to make good managerial decisions. Data inadequacy leads to fears that wildlife farming may influence overharvesting, leading to depletion of wild stocks (Moyle & Small, 2016). In Ecuador, local farmers benefit greatly by collecting butterfly eggs laid on host plants and rearing them in specific enclosures to the pupae stage that earns income through sales. Occasionally, farmers have been noted to harvest wild pupae especially where regulatory framework is inadequate or lax thus compromising rejuvenation of wild stocks (Checa, 2009). However, in forests around Gumi village of Papua New Guinea, it was observed that butterfly farming especially of Goliath butterfly species led to rejuvenation of wild stocks as the community became volunteer security agents of the forest habitat relied upon by the Goliath butterfly species owing to the financial benefits that accrued from the venture (Moyle & Small, 2016). It is noted that forest adjacent dwellers or forest border inhabitants are mostly at the lowest level of the socio-economic hierarchy (Choudhury, 2016). This implies they heavily rely upon forest resources for survival. Blueprints for managing forests across the world allow harvesting of food fodder, and fuel from the resources by fringe dwellers who in-turn provide additional security for the resource through reporting unauthorized activities (Ghosal, 2014). In Kenya, the forest legislation allows the formation of Community Forest Associations with rights to take part in the management of forest resources and earn benefits, including regulated income generation (Government of Kenya [GoK], 2005). In this study, community empowerment entailed the ability of the community to independently undertake forest conservation activities and also share knowledge and skills with their peers regarding the implementation and management of forest conservation projects. Through forest conservation projects implemented by different stakeholders in the target study sites, the community gains skills and knowledge as they implement different forest project activities. The community continuously uses the skills gained through training which enhances the sustainability of the forest conservation projects (Eden, 2016). Community members who in one way or the other are deficient of the requisite skills in forest project management

gain the same from their peers through peer learning which greatly contributes to the sustainability of forest conservation projects.

Methodology

The study used the cross-sectional survey design to establish the influence of community empowerment on the sustainability of forest conservation projects in Kenya. The study relied on mixed methods in data collection and analysis. Specifically, quantitative data collection and analysis as well as qualitative data collection and analysis methods were used in the study. The study was conducted in the Mbololo and Mwambirwa forest areas within the County of Taita-Taveta, located in the South-Eastern part of Kenya, approximately 30 25'S, 380 20'E (Himberg et al., 2009). A total of 4138 household heads from the study site were targeted. The sample size of 365 respondents was picked using the Yamane formula shown below;

$$n = \frac{N}{1 + N(e)^2}$$

where n – sample size; N – Population size, and e- Level of precision (Cochran, 1977).

The 365 systematically sampled respondents answered survey questionnaires (quantitative data), while qualitative data were collected from six respondents who were purposively picked from the Monitoring and Evaluation Officers and Project Managers of the organisations operating in the study location. The study sample was proportionately allocated in the five clusters, which were the five administrative zones (clusters) in the study area based on the number of households as established from the Kenya Population Census of 2009 (GoK 2009). After the proportionate allocation of the sample per cluster, systematic sampling was applied to pick the respondents. The proportionate allocation of clusters is shown in Table 1.

Table 1: Proportionate allocation of sample

Location	Sub location	Number of Households	Study Sample
Mbololo location	Mraru	1,413	125
	Tausa	748	66
Ngolia location	Wongonyi	500	44
	Ndome	723	64
	Ghazi	754	66
Grand Total		**4,138**	**365**

(Source: GoK, 2009 with modifications by the researchers)

Quantitative data was collected using 5-point likert scale type of questionnaire with 24 different research items on each variable with the values of 05 representing "Strongly agree"; 04 represented "Agree"; 03 represented "Neither agree nor disagree"; 02 represented "Disagree"; and 01 represented "Strongly disagree". Aggregate scores for all 24 items in each variable were obtained using SPSS version 21.0 software and averaged. In data analysis, it means that a respondent who scores "5" strongly agree on all items would have aggregate score of 120 while one who scores "1" Strongly disagree would have aggregate score of 24 respectively. Qualitative data was collected using interviews and buttressed with document analysis as well as observations in the field as the researcher crisscrossed the study area collecting required data. Qualitative data were analysed by coding and categorizing them into different themes. Correlation and statistical regression techniques were used to analyse the data, enabling necessary scientific deductions to answer the research question.

Results and Discussion

This section is organised into three subsections which are sustainability of forest conservation projects as the independent variable, community empowerment and sustainability of forest conservation projects as the dependent variable and lastly, conclusions and recommendations. Under the dependent variable, the researcher delved into descriptive statistics for the quantitative data, then presented qualitative data tying with literature and coming up with necessary findings. The data on the influence of the

independent variable on the dependent variable were analysed descriptively and inferentially and tied up with literature to come up with findings. Based on the findings, the researcher concluded and made recommendations of the study.

Sustainability of forest conservation projects

The researcher assessed how respondents rated the achievement of different aspects of sustainability of forest conservation projects in the research site. Table 2 presents the frequency of responses and respective percentages.

Table 2: Distribution of responses on the sustainability of forest conservation projects

Range of Responses	Frequency	Percentage (%)
01 Strongly Disagree	1	0.3
02 Disagree	13	3.6
03 Neither Agree nor Disagree	190	52.1
04 Agree	159	43.6
05 Strongly Agree	2	0.5
Total	**365**	**100.0**

The data indicated the highest frequency of respondents190 (52.1%) neither agreed nor disagreed that forest conservation projects implemented in the research area had been sustainable. A frequency of 159 (43.6%) of respondents agreed that forest conservation projects had been sustainable, while 2 (0.5%) respondents strongly agreed the forest conservation projects were sustainable. A total of 3.9% of respondents disagreed or strongly disagreed that forest conservation projects in the research area were sustainable. This is compared to the combined percentage of 44.1% of respondents who either agreed or strongly agreed that forest conservation projects in the research area were sustainable. It shows the combined percentage of respondents who at least agreed that forest conservation projects were sustainable in the research area was much higher than those who at least disagreed.

The researcher sought to understand the spread of responses by analysing the mean and standard deviation of the responses, as shown in Table 3

Table 3: Mean and standard deviation of responses on the sustainability of forest conservation projects

	N	Minimum	Maximum	Mean	Std. Deviation
Sustainability of Forest Conservation Projects	365	48.00	92.00	70.7233	8.03068
Valid N (list wise)	365				

The results indicated that the minimum value obtained was 48.00, and the maximum value obtained was 92.00. The mean value obtained was 70.72. The results show that the standard deviation was 8.03, which was considered small. Based on the findings, the researcher noted that responses were aggregated around the mean value of 70.72, which was interpreted to mean neither agree nor disagree that forest conservation projects in the research site were sustainable. However, from the results, the minimum value obtained was 48.0, which means disagree, while the maximum value obtained was 92.0, which was interpreted to mean agree. The results meant there were negligible responses on the extreme views of either strongly agree or strongly disagree that forest conservation projects were sustainable in the research area. Based on these findings, the researcher noted that responses to research questions were varied, with the majority of responses indicating neither agree nor disagree that forest conservation projects were sustainable. This shows that forest conservation projects were implemented in the research area, but their level of sustainability was average, as indicated by mean responses of 70.72. It also shows that cases of forest conservation projects that achieved exemplary performance (strongly agree) in sustainability were not recorded, just as there were no forest conservation projects that were totally not sustainable (strongly disagree).

Qualitative data from all the respondents affirmed that forest conservation projects in the study site were sustainable. The forester in charge of Mbololo and Mwambirwa forests as well as the Ecosystem Manager from KFS, who

are the legal custodians of all forest resources in the research area on behalf of the Government of Kenya, said that forest conservation projects in the target area were sustainable. The forester, for instance said

> "…most forest conservation projects introduced or reinforced a new aspect of incomes in forest conservation that helps the community to earn more from their farmlands thus reducing pressure for forest-related goods and services on the protected forest. The incomes aspect motivates the community to carry on with activities indefinitely"

An example of a Bamboo ago-forestry project that earned farmers adjacent the forest incomes had been cited as one such examples of sustainable forest conservation activity. Respondents who participated in the project earned incomes from the sale of seedlings and further remained expecting higher returns when bamboo trees matured, which motivated them to continue with the forest activity implying sustainability. The forest conservation Project Managers from TTWF and MAZIDO as well as the Monitoring and Evaluation Officers from the two organisations, also reported that the forest conservation projects were to a great extent, sustainable. For instance, the Monitoring and Evaluation Officer from TTWF averred that

> "…all forest conservation activities initiated and supported by the community have continued to perform at impressive levels even after lapse of formal project support".

Nine out of fifteen documents analysed by the researcher from the selected organisations had evidence of the sustainability of forest conservation projects in the research site. The documents attested to continued income to community members from project activities such as tree nurseries, farm forestry and beekeeping initiated by different projects within the research site. The researcher noted from one project document that there was also an initiative started on butterfly farming but it was at its nascent stages, and the community was still learning. The project team gradually introduced the butterfly farming concept to ensure the community adjusted and adapted accordingly. This showed that the project team understood that learning is a process and community would require some time before fully understanding the new concept of butterfly farming. Such understanding is paramount for the sustainability of forest conservation project activities initiated. Forest conservation project activities are implemented by respecting local people

and their cultures, ensuring a full understanding of forest conservation project activities yield higher returns and remain sustainable for longer periods (Elkington, 1997). Observations made by the researcher in the community farmlands adjacent to the forest while traversing the research area during data collection showed evidence of farm forestry and income generating activities attested by traditional and modern bee hives. In total, the researcher observed seven bee hives in individual community farmlands and five tree nurseries of different tree species. The Monitoring and Evaluation Officer reported that some bee hives were installed through the support of former forest conservation projects. This is in line with the findings of Eskerod and Huemann (2013), who argued that the sustainability of forest conservation activities entails its ability to continue providing benefits long after initiation and funding support. Further, sustainability of forest conservation projects entails continued provision of socio-economic benefits to the community, ecological benefits and continued learning visits (Chen et al., 2016). Based on the results, forest conservation projects were considered sustainable because they continued to benefit the community, attracted fall-on projects and served as learning points beyond project funded period.

Community empowerment and sustainability of forest conservation projects

The research determined the influence of combined community empowerment activities on the sustainability of forest conservation projects. The researchers asked, "How do combined community empowerment activities influence the sustainability of forest conservation projects?" The researchers hypothesized that there was no significant relationship between combined community empowerment activities and the sustainability of forest conservation projects. To analyze the research question, the researcher assessed how the different community empowerment activities including knowledge and skills empowerment activities, decision making empowerment activities, conflict resolution empowerment activities and income generating empowerment activities jointly influenced the sustainability of forest conservation projects. To understand the spread of responses on the influence of combined community empowerment activities on the sustainability of forest

conservation projects, the researcher calculated the mean and standard deviation of data and presented the results in Table 4

Table 4: Mean and standard deviation for combined community empowerment activities on sustainability of forest conservation projects

	N	Minimum	Maximum	Mean	Std. Deviation
Knowledge and Skills Empowerment Activities	365	41.00	90.00	71.2329	7.06353
Decision Making Empowerment Activities	365	41.00	100.00	73.7863	9.79478
Conflict Resolution Empowerment Activities	365	40.00	103.00	71.3479	7.65729
Income Generating Empowerment Activities	365	35.00	96.00	68.1068	7.62169
Valid N (listwise)	365				

Results show that the lowest aggregate minimum value obtained was 35 for income generating empowerment activities which meant disagreement. The highest aggregate value obtained was for conflict resolution empowerment activities which meant agree. The lowest mean value obtained was 68.12 and the highest mean value was 73.77. Both aggregate mean values meant neither agree nor disagree. The standard deviation obtained was 9.79 for the highest value for decision making empowerment activities and the lowest was 7.06 for knowledge and skills empowerment activities. All standard deviation values were considered small, which meant the data was

closely concentrated around the mean values in all cases. The results were interpreted to mean that combined empowerment activities took place at the research site. Further, the activities had different levels of influence on the sustainability of forest conservation projects when considered singularly and also had a joint influence on the sustainability of forest conservation projects when considered together. The researcher used a correlation matrix to determine the strength and direction of association for the influence of combined community empowerment activities on the sustainability of forest conservation projects. Table 5 is the correlation matrix developed for combined community empowerment activities' influence on the sustainability of forest conservation projects.

Table 5: Correlation matrix for combined community empowerment activities on sustainability of forest conservation projects.

		Sustainabi lity of forest projects	Knowledg e and skills activities	Decision making activities	Conflict resolution activities	Income generating activities
Sustainability of forest projects	Pearson Correlation	1	.565**	.561**	.596**	.555**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	365	365	365	365	365
Knowledge and skills activities	Pearson Correlation	.565**	1	.277**	.263**	.235**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	365	365	365	365	365
Decision making activities	Pearson Correlation	.561**	.277**	1	.122*	.450**
	Sig. (2-tailed)	.000	.000		.020	.000
	N	365	365	365	365	365
Conflict resolution activities	Pearson Correlation	.596**	.263**	.122*	1	.192**
	Sig. (2-tailed)	.000	.000	.020		.000
	N	365	365	365	365	365
Income generating activities	Pearson Correlation	.555**	.235**	.450**	.192**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	365	365	365	365	365

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The Pearson's Product-Moment Correlation Coefficient results indicated the lowest correlation and highest correlation results between ($r = +0.555$; $p < 0.05$) for income generating empowerment activities and sustainability of forest conservation projects and ($r = +0.596$; $p < 0.05$) for conflict resolution empowerment activities and sustainability of forest conservation activities.

The results show positive linear relationships between independent variables and the sustainability of forest conservation projects, and the relationships were statistically significant. Individuals involved in combined community empowerment activities were likely to engage in forest conservation activities that influenced the sustainability of forest conservation projects. The null hypothesis that there was no significant relationship between combined community empowerment activities and the sustainability of forest conservation projects was rejected. Regression analysis was conducted on the four variables: knowledge and skills empowerment activities, decision making empowerment activities, conflict resolution empowerment activities and income generating empowerment activities. The results were presented on Table 6, the regression model summary; Tables 7 Statistical significance and Table 8, the linear regression coefficients.

Table 6: Regression analysis model summary of combined community empowerment activities and sustainability of forest conservation projects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.652[a]	.425	.418	8.40052

a. Predictors: (Constant), Income Generating Empowerment Activities, Knowledge and Skills Empowerment Activities, Conflict Resolution Empowerment Activities, Decision Making Empowerment Activities

In this multiple variable regression, the R-square was not used to interpret the results because of the possibility of raising the R-square statistic due to adding unrelated independent variables to the model. Instead, the adjusted R-square statistic was relied upon to interpret the results. The r value of +0.652 indicated a strong positive linear correlation between combined community empowerment activities and the sustainability of forest conservation projects. From the model, the adjusted R-square statistic is +0.418, which implies that the combined community empowerment activities jointly explained up to 41.8% of variations in the sustainability of forest conservation projects. Table 7 shows the appropriateness of the regression model in analyzing research data on the influence of combined community empowerment activities on the sustainability of forest conservation projects.

Table 7: Statistical significance of combined community empowerment activities on sustainability of forest conservation projects

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18753.844	4	4688.461	66.438	0.000[b]
	Residual	25404.759	360	70.569		
	Total	44158.603	364			

a. Dependent Variable: Sustainability of Forest Conservation Projects

b. Predictors: (Constant), Income Generating Empowerment Activities, Knowledge and Skills Empowerment Activities, Conflict Resolution Empowerment Activities, Decision Making Empowerment Activities

The F-ratio values obtained were $F_{(4, 360)} = 66.438$; $p < 0.05$. The statistical significance (p-value) obtained for the regression model F-test is less than 0.01.The model was considered significant, implying there was only 1/100 chance that the relationship results realised in this model could be achieved using a different method, such as comparing means. Since the P value obtained was less than 0.05 in the model, the null hypothesis of no significant relationship between combined community empowerment activities and the sustainability of forest conservation projects was rejected. The regression model showed that combined community empowerment activities could be used to predict the values for the sustainability of forest conservation projects. The researcher examined estimated coefficients and fitted the coefficients on the regression equation;

$y = a + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$. T

he regression coefficients were presented in Table 8.

Table 8: Linear regression coefficients for combined community empowerment activities on sustainability of forest conservation projects

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	13.971	3.587		3.895	0.000
	Knowledge and Skills Empowerment Activities	0.253	0.061	0.239	4.124	0.000
	Decision Making Empowerment Activities	0.734	0.339	0.616	2.165	0.031
	Conflict Resolution Empowerment Activities	0.324	0.068	0.298	4.734	0.000
	Income Generating Empowerment Activities	-0.484	0.331	-0.421	-1.459	0.145

a. Dependent Variable: Sustainability of Forest Conservation Projects

In this analysis, the researcher noted that all the variables had a statistical significance of less than alpha (< 0.05) except income generating empowerment activities, whose significance value was 0.145. Therefore, income-generating activities were not statistically significant in this model and were removed.The results showed that in the influence of combined community empowerment activities on the sustainability of forest conservation projects, only Knowledge and skills empowerment, decision making empowerment and conflict resolution empowerment activities can be used to predict the values for the sustainability of forest conservation projects

$(y) = 13.971 + 0.253X_1 + 0.734X_2 + 0.324X_3 + e.$

Research findings established that different community empowerment activities influence the sustainability of forest conservation projects

at different levels. The regression model showed that decision-making empowerment contributed highest at 0.734, conflict resolution empowerment activities at 0.324 and knowledge and skills empowerment activities at 0.253. Income generating empowerment activities were found to contribute to sustainability in the model at -0.484 negatively. The findings were corroborated by scholars who observed that community empowerment activities had varying levels of influence on the sustainability of forest conservation projects. Noe et al, (2014) noted that knowledge and skills empowerment activities enhance efficiency in project activity implementation, thus contributing to sustained project activities. Forest resources, including biodiversity, were observed to be improved by enhanced performance of stakeholders in forestry project activities courtesy of knowledge and skills empowerment (Vıˊtkova' et al., 2016). Exchange visits and peer learning were also observed to be among the forest conservation project activities that highly benefited the sustainability of forest conservation projects, as noted by (Buyinza, 2016). Shepherd & Rudd (2014) observed that decision making empowerment activities significantly contributed significantly to the sustainability of forest conservation projects despite being easily affected by demographic factors and cognitive and personal attributes. Individual experiences, assumptions and context also influenced the decisions that were made on forest conservation projects with a relatively high degree of influence on the sustainability of the projects (Kastner & Stern, 2015). Schulte-Mecklenbeck et al. (2017) observed that a forest adjacent community member's decision-making process could also be influenced by factors such as prior experiences, which influence the sustainability of forest conservation projects. Prieto-remón et al. (2015) noted that there were many sources of conflicts, including people focused where opinions, ideas and variances in personalities play out, communication gaps where information is either distorted, provided in small bits unnecessarily or other barriers that hinder the smooth flow of information. The ability for conflict resolution amongst community members ensures cohesiveness which positively influences the sustainability of forest conservation projects. Erbaugh & Oldekop (2018) also noted that benefits that accrue from income generating empowerment activities in forests enhanced the local community's appreciation of the resource and the activities undertaken within it, which positively influenced the sustainability of forest conservation projects. Data analysis indicated that in the combined community empowerment activities, one activity, namely income generating empowerment activity, did not add

value to the sustainability of forest conservation projects when considered alongside other community empowerment activities. This is underscored by the fact that the community would likely still undertake income generation empowerment activities even in the absence of forest conservation projects. The income generating empowerment activity did not necessarily have a lot of influence on forest conservation project sustainability. However, the influence of the other three community empowerment activities increased substantially when considered jointly, possibly because the empowerment activities synergized each other.Interviews with the Project Manager from MAZIDO indicated that all community empowerment activities were undertaken in the research site at different levels. The Project Manager from MAZIDO reported,

> "…individuals always prefer activities that earn them income besides contributing differently to their livelihoods. When payment for certain forestry activities takes place there is a lot of interest as opposed to activities not backed by payments"

Forest conservation activities undertaken in the research site mainly targeted conservation of the forest resource which helps the community to better their livelihoods from the provisioning and regulating services that accrue from forestry. Benefits such as water and herbal medicine accessed from the forests ensure continued community interest hence sustainability of forest conservation activities such as the protection of the forest resource from unregulated exploitation. Document analysis showed evidence that community empowerment activities, including income generation such as beekeeping, knowledge and skills empowerment, decision making empowerment and conflict resolution empowerment activities, were implemented at the same time. The community received training while at the same time, they solved conflicts that arose in the course of their activities. A field report by MAZIDO showed evidence of community members planning for CFA elections while at the same time, they took advantage of the gathering to make decisions on the members to participate in a training session facilitated by the project. It was therefore evident that combined community empowerment activities took place in the research site, and contributed to the sustainability of forest conservation projects.Field observation showed that all the community empowerment activities were undertaken at different levels dictated by different environmental situations, such as the availability of water. Income generating empowerment activities were concentrated along

the forest fringes and where individual farmlands were large enough to accommodate such activities as bee-keeping in addition to normal farming practices. This was because sometimes bees pose a danger to humans and livestock hence the need to site hives away from areas of intense human activity such as tree nursery areas and footpaths. However, tree planting was observed in most farmlands since trees are compatible with other human activities.

The researchers noted that forest conservation enthusiasts got a higher sustainability result in their forest conservation projects when they combined community empowerment activities, especially knowledge and skills, decision making and conflict resolution empowerment activities. The challenge of forest depletion currently being experienced worldwide is likely to be managed with the combined use of different community empowerment activities, which yield sustainability of forest conservation projects.

Conclusion and recommendation

Multiple regression analysis values for statistical significance obtained were $F_{(4, 360)} = 66.438$; $p < 0.05$. The p-value obtained was less than 0.01. The model was considered significant, which implied there were only 1/100 chances that the results of the relationship realised in the model could be achieved using a different method, such as the comparison of means. Since the P value obtained was less than 0.05 in this model, the null hypothesis of no significant relationship between combined community empowerment activities and sustainability of forest conservation projects was rejected. The regression model showed that combined community empowerment activities could be used to predict the values for the sustainability of forest conservation projects. Qualitative information, including interviews, secondary data and observations, supported the findings, while literature corroborated the findings. The researcher concluded that combined community empowerment activities positively influenced the sustainability of forest conservation projects.The research recommends that project planners and implementers include the community empowerment component and respective budgets dedicated to ensuring community empowerment. This is because the empowered community are likely to take actions that ensure the sustainability of forest conservation projects which has been a challenge for long time.

Conflict of Interest

The authors declare no conflict of interest

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