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PARTICIPATORY FOREST MONITORING AND CONSERVATION PROGRAMS IN KENYA

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ABSTRACT

Forests have been a significant resource for economic development and growth. However, forests and forest resources are currently declining substantially, thus threatening the current and future local communities' ability to meet their basic needs from the forest. Effective monitoring is important to long term forest conservation programs. The objective of the study was to assess the extent to which participatory forest monitoring influences forest conservation programs. Descriptive survey and correlational research designs were employed. Mixed methods approach was used to collect and analyze data. A sample size of 364 respondents was drawn from a target population of 4100 people engaged in forest conservation program using the Yamane (1967) Formula. A self-administered questionnaire and an interview guide were used to collect data. Findings from the study reveal that, r= -0.021, which shows that there was a weak negative significant correlation between Participatory forest monitoring and Mau Forest Conservation program. Hence, frequent monitoring of forest conservation activities by CFA members led to improved forest condition. With a *p-value=0.721, the null hypothesis failed to be rejected and concluded that there is no significant relationship between participatory Forest Monitoring and Mau*

Forest conservation program. This study suggests that effective monitoring is vital for long term forest management and that communities need to be trained so that they can competently monitor and to select indicators to evaluate changes in forest conditions. It is recommended that strict enforcement of laws guiding forest conservation builds a sense of trust among the CFA members hence promoting Participatory Forest Management initiatives.

Key words: *Conservation programs, Forest monitoring, Forest management, Participatory Management, Participatory Forest Management, Mau Forest.*

I. INTRODUCTION

Globally, forest industries provide employment for 60 million people while some 1 billion people depend on drugs derived from forest plants for their medicinal needs (World Bank, 2006). Forest performs a wide range of critical environmental and climatic functions and it serves as homes to the majority of the world's plant and animal species. The significance of forest can be classified under environmental, social and economic (Abass, 2007), and based on this, humans have historically attached religious, philosophical and aesthetic significance to forest. Forest resources play a key role in protecting the environment and are of tremendous importance to the sustainable development of every society, hence it is a resource that needs to be protected because of its benefits and risks need to be mitigated to prevent depletion of this natural resource.

Participation and decentralization have become leading themes in forest policy and natural resource management (NRM) throughout the world (Baumann, 2000). Based on their study in Asian forest management, Lee and Park (2001) believe that the participation of local people in forest resource management can maintain the integrity of local ecology, that forest co-management can facilitate forest protection and development, help to reduce poverty, and further to meet their survival needs. This is also the case in Kenya since Mau Forest is considered among the main water towers. Comparatively, more scholars in Europe and United States studied on the participatory forestry, such as Anonymous (2010), Kathleen Wolf, Linda Kruger (2010), Reddy (2002). They believe that the participatory method has been used as an important means to protect forests, coordinate partnership between forestry and relevant agencies, and carry out conflict management.

The conservation program in Bangladesh was launched in the 1980s with the objective of involving local communities in managing forest resources. In Ethiopia PFM was recommended by NGOs to solve the problem of forest degradation and led to improved forest conservation (Mustalahti, 2006). While in Kenya, the first PFM site was at Arabuko-Sokoke Forest which was established in 1997, however, there was no supportive legislative framework which made implementation a challenge (Thenya, Wandago and Nahama, 2007). Currently, there are more than one hundred CFAs that are distributed across various parts of Kenya (Ongugo, Mogoi, Obonyo and Oeba, 2008).

According to Wily (2002), Participatory Forest Management (PFM) has been adopted widely in many developing countries as an alternative method of managing forestry resources. In most developing countries, community forestry policies emerge as a response to 'institutional failure' regarding the sustainable management of the forest resources (Siry, Frederick and Ahmed, 2005; and Shahbaz and Ali, 2006). The main thrust of collaborative or participatory forest management is to develop partnerships between local communities and forest departments to manage forests sustainably on the basis of a friendly relationship and trust.

II. LITERATURE REVIEW

Participatory Forest Management is a multi-stakeholder approach where the private sector, institutions and communities are involved in management of forests and sharing of benefits that accrue from such management processes. While PFM can be considered in the wider perspectives of Community Based Natural Resource Management (CBNRM), Community Forest Management (CFM) is the most emphasized approach for implementing PFM in many developing countries. CFM is basically an approach towards achieving forest sustainability and biodiversity conservation with socioeconomic objectives (Kellert, Mehta, Ebbin and Lichtenfeld 2000).These socio-economic objectives include, equity, conflict resolution, awareness, forest production, poverty reduction, and sustainable utilization.

Participatory Forest Management (PFM), a form of decentralization of forest management has been adopted by more than 21 African states as an alternative method of managing forest resources (Wily, 2002). PFM is the local involvement of communities in the management of forests done through a process of inclusion, equity, and democratization of governance of the forest resources (Agrawal and Gupta, 2005). More often than not, PFM promises to increase participation in ways that will profoundly affect who manages, uses and benefits from forest resources. Likewise, greater access to decision makers, higher levels of participation by various social groups in decision making, and the accountability of decision makers are often the claimed effects of participation (Andersson, Gibson and Lehoucq, 2004).

Participatory monitoring is an ongoing process where local forest users systematically record information about their forest, reflect on it, and take management action in response to what they learn. Monitoring subjects range from timber harvesting and honey production to institutional transparency and community forest enterprise accounting. Methods used in monitoring include vegetation samples, transects, fire calendars, field diaries, community workshops, rainfall measurements and many more. There are three general reasons for monitoring: First, it can help tropical forest managers and users answer questions or concerns(Cunha dos Santos 2002) about issues such as sustainable management and livelihoods, biodiversity conservation, human wellbeing, political processes and institutions, and ecosystem services. Secondly, monitoring not only provides answers to questions about forest management, but also creates a culture of questioning. Thirdly, monitoring can be a crucial mechanism for enforcing compliance with important forest management rules, such as resource use and access, conservation, and benefit distribution.

Colfer (2005) discusses how monitoring serves an integral role in the iterative cycle of planning, action, assessment and learning-a cycle that generates systematic progress and adaptation to change (Colfer 2005, Guijt 2007, Fisher, Prabhu and McDougall, 2007). Recent analyses of a large database on forest management have found out that existence of monitoring of resource use and sanctioning of rule violations has a strong correlation with improved forest condition (Ostrom and Nagenra 2006; Coleman, 2009), lending support to the proposition that monitoring and sanctioning or rule enforcement, plays a crucial role in the successful governance of Common Pool Resources such as forests. The study attempted to establish how Community Forest Association (CFA) members' participation in monitoring forest resource use and enforcement of forest laws by punishing law breakers lead to improved forest conservation.

Therefore, effective monitoring is vital to long term forest management. Communities may need to be trained, so they are clear on what they are monitoring and are able to select indicators to evaluate changes in ecological conditions. They also need to be willing to use sanctions for rule breakers. When sanctions are strictly enforced, they prevent free-riding and instill a sense of trust, which motivates more active participation among the CFA members in conservation programs (Ghate and Nagendra 2005). Also, monitoring is judged against outputs,

activities and inputs which have been planned or agreed. Monitoring means observing, and collecting information, and reflecting on what has been observed. In case of Community Forestry-to check, whether users are still on course of achieving their aims and if necessary to change the course in monitoring. Recent analyses of a large database on forest management have found out that existence of monitoring of resource use and sanctioning of rule violations has a strong correlation with improved forest condition (Ostrom and Nagendra 2006; Coleman, 2009), lending support to the proposition that monitoring and sanctioning, or as Gibson et al. refer to it, rule enforcement, plays a crucial role in the successful governance of Common Pool Resource (CPRs) such as forests.

Gibson,Williams and Ostrom, (2005) suggested that rule enforcement is conducted by local user groups, however the data they rely on use a very broad definition of user groups that includes any, "group of people who harvest from, use, and/ or maintain one or more forests and who share the same rights and duties to products from the forest, even though they may or may not be formally organized (Wertime, Ostrom 2007)." In addition, Coleman and Steed (2009), found evidence in International Forestry Research Institute (IFRI) data that institutional factors played a role in explaining variation in monitoring and sanctioning. They find that monitoring and sanctioning, harvesting rights for members of the group, and residual claimancy on the resource by members of the group. They also found that monitoring and sanctioning by external groups was associated with the presence of NGOs in the local area. Where resource users regularly monitor and sanction resource use, the condition of forest resources will likely be better than where rules are not enforced (Banana and Gombya- Ssembajjiwe, 2000; Gibson et al., 2005).

Agrawal and Goyal (2001), however, point out that monitoring is a lumpy collective: a certain amount of monitoring is required before it can be minimally effective. Thus, they argue that very small groups may be unable to engage in effective monitoring because they may not be able to hire enough guards to exclude outsiders from using the resource. They develop a model and evaluate empirical evidence from the Indian Himalaya which suggests that medium sized groups may be more effective than either small or large groups. For the purposes of forest management, the effect of group's size may also be mediated by forest size: larger forests likely require more monitoring than small forests, holding group size constant. Where resource users regularly monitor and sanction resource use, the condition of forest resources will likely be better than where rules are not enforced (Gibson et al., 2005). There is need to determine the influence of monitoring by CFA members on conservation programs in Mau Forest.

Theoretical Framework

This research study was guided by Forest Transition theory (Angelsen and Rudel, 2013). Countries go through an initial period of industrialization and economic and population growth, causing increases in deforestation. At a later stage of development, deforestation leads to a perceived decrease in the ability of forests to provide environmental services and goods forcing the government and private sector to provide incentives for policies and activities geared towards tree planting, sustainable forest management, general reforestation and regeneration of forests and conservation of remnant forest areas (Rudel, et al., 2005; Angelsen and Rudel, 2013). This is also the case in Mau Forest as different stakeholders are involved in monitoring forest conservation programs. The conceptual framework which guided the study tried to determine how participatory forest monitoring; independent variable influenced forest conservation program; the dependent variable. This explained how regular planting, thinning and pruning of trees planted, sanctioning of law breakers and even control of cattle grazing within the forest area influence forest conservation.

Statement of the Problem

Kenya has a relatively low forest cover with closed canopy forest covering about 1.24 million hectare while plantations, 0.16 million hectare. The decrease in forest cover is primarily due to encroachment, expansion of human settlements into previously forested areas, illegal logging, forest fires, and agriculture and government excisions (NEMA 2009). The Mau Forest Complex is the largest closed-canopy montane ecosystem in Eastern Africa. However, in the past three decades or so, the Mau Forest Complex (MFC) has undergone significant land use changes due to increased human population demanding land for settlement and subsistence agriculture. The encroachment has led to drastic and considerable land fragmentation, deforestation of the headwater catchments and destruction of wetlands previously existing within the fertile upstream parts. Currently, the effects of the anthropogenic activities are slowly taking toll as is evident from the diminishing river discharges during periods of low flows, and deterioration of river water qualities through pollution from point and non-point sources (Kenya Forests Working Group [KFWG], 2001; Baldyga, Miller, Driesse and Gichaba, 2007). In total, the forest excision and widespread human encroachments led to a total loss of about 25% of the more than107, 000 ha in the Mau between 1989 and 2009 (GOK, 2009). The situation of forest degradation has further worsened which has attracted calls from different quarters to step up efforts to conserve the forest. This study therefore, sought to determine the influence of Participatory Forest monitoring on Mau Forest conservation programs.

Purpose of the Study

The purpose of the study was to determine the influence of Participatory Forest Monitoring on conservation programs in Kenya

Objective of the Study

The objective of the study was to establish the extent to which Participatory Forest Monitoring influence Conservation programs in Mau Forest

Research question

How does Participatory Forest Monitoring influence Conservation programs in Mau Forest?

Research Hypotheses

H0: There is no significant relationship between Participatory Forest Monitoring and Conservation programs in Mau Forest

III. RESEARCH METHODOLOGY

Research Paradigm

The paradigm that guided this study was pragmatism. Concerning mixed methods research as the research approach, Johnson and Anthony (2004) indicate that pragmatism paradigm is the best suited for mixed methods research approach. For this study, both quantitative and qualitative aspects of PFM were investigated which called for the need of pragmatism.

Research Design

Descriptive survey and correlational research designs were used in this study because descriptive and inferential data analysis were required. Both the causal effects of relationships as well as the extent to which the combination of predictor variables influenced the outcome of the dependent variable was desired, which called for descriptive and correlational research design.

Target Population

The study targeted 4100 people comprised of 50 Kenya Forest Service officers (KFS), 100 chairpersons of Community Forest Association (CFAs) committees and 3950 households living adjacent to South West Mau Forest in Bomet County. These households surrounded four administrative units (Kenya Forest Service) departments of Bomet forest stations- Itare, Mara-Mara and Ndoinet (KNBS, 2013). These people were the Community Forest User groups living within a distant of one to five Kilometres from the edge of the forest. For every household, one representative who is the household head, alternate head or an adult who had been in the household for a period not less than six months was targeted.

Sample size and Sampling Procedure

The sample size was determined using Yamane (1967).The formula was used to calculate the sample size (n) given the population size (N) and a margin of error (e). It is a random sampling technique formula to estimate sampling size. The study used a 95% confidence level, which leads to a significance level of 0.05.

$$n = \frac{N}{1 + NE^2}$$

Where:

n = no. of samples

N = total population

e = error margin / margin of error (0.05)

$$n = \frac{4100}{1+(4100x\ 0.05^2)}$$

n=364

Using this formula, a sample size of 364 respondents were obtained from a target population of 4100 people.

Sampling procedure

To select the respondents, multi-stage sampling technique was used. This helped the researcher to select respondents through three sampling stages giving respondents more reliable equal chances of being selected starting with selection of sub-locations at the first stage, followed by selection of homesteads at the second stage and finally selection of Households. Oso and Onen (2009) observe that a multi-stage sampling procedure progressively selects smaller areas until the individual members of the sample have been selected through a random procedure. 50% of the eight sub-locations were arranged alphabetically and every even number was selected. The four selected sub-locations formed the research sub-populations. Then households (research categories) were randomly selected the four sub-locations. The households were selected in the field using a systematic random sampling where Kenya Forest Stations were used as the central point. Every 4th homestead to the east and west and 3rd to the north and south was sampled and in each homestead, one household head was randomly selected until 284 households were realized. Also, Purposive sampling technique was used to select a respondent from every household who was a household head, alternate head or an adult household member who had lived in the household for more than six months (Le, Brick, Diop, and Alemadi, 2013). In addition, purposive sampling technique was also used to select the respondents from Kenya Forest Service officers and Community Forest Association (CFA) executive committees. According to Gay (1981) a correlation research requires thirty (30) cases or more. Therefore, 30 Kenya Forest Service officers were selected and 50 chairpersons of CFA committees.

Instruments for Data Collection

The quantitative data was collected using questionnaires administered to household members (CFUGs) and chairpersons of CFA committees. Also, an interview guide was used to collect the qualitative data administered from KFS officers in Mau forest. The use of an open-interview strategy enables better exposure of the interviewees' personal perspectives, their deeper thoughts, emotions and ambitions (Paton, 1990). Research instruments were pilot tested in Chepalungu Forest in Bomet County. According to Cooper and Schilder (2007), the pilot test should constitute 10% of the sample, therefore; the pilot test was conducted in line with his recommendation.

Out of the 36 respondents selected, 28 households were selected and 5 Community Forest Association committees responded to the questionnaires. In addition, 3 KFS officers were purposively selected to respond to interview guide.

Validity of Research instruments

There are three types of validity that are of interest to researchers: content related, criterion related and construct validity (Donald and Delno, 2006). Content validity was checked to assess the accuracy with which research instruments captured the variables under investigation through the guidance of research experts from the University of Nairobi, Kenya Forest Service officers and Community Forest Association committees. Construct validity was also ascertained by examining whether a consistent significant proportion of high scores in items investigating independent variables would correlate positively or negatively with scores in items investigating the dependent variable. This was done by comparing several scores from different subjects.

Reliability of Research instruments

The research instruments were tested for reliability using split half technique since it required only one test administration (Allen and Yen, 2002). External reliability was addressed by making the questions straightforward and understandable as possible, and this would decrease misunderstandings and guide direct responses to the questions. To test for internal consistency, Cronbach Alpha coefficient was used. (Cronbach's alpha, 1951). A coefficient of zero implies the tool has no internal consistency while that of one implies complete internal consistency, therefore, this implied that the research instruments were reliable. According to Nunnaly (1978), a score of 0.7 is acceptable reliability coefficient. Hence, in the pilot test conducted, the composite Cronbach alpha reliability coefficient for the research instrument was 0.7186. Then the test instrument used in this study satisfied this criteria and was considered highly reliable and appropriate for data collection.

Data collection procedures

Tashakkori and Teddlie, (2010) indicate that the type of data collected is informed by the objectives of the study. The researcher visited the Kenya Forest Service offices in Bomet County, and the local administrative offices for introduction and clearance to undertake research in the region. The researcher recruited research assistants and data quality managers who aided in distributing and collecting questionnaires. The researcher requested the household heads and CFA executive committees to fill the questionnaire as honest as possible and follow up was done to check if the questionnaires were duly filled.

Data analysis techniques

Mixed methods data analysis techniques were employed in this study by incorporating both descriptive and inferential data analysis. Quantitative data was coded and entered into Statistical Packages for Social Scientists (SPSS Version 25.0) and analyzed using descriptive and inferential statistics. Qualitative data was analyzed using "discourse analysis and content analysis" while parametric data was analyzed using Pearson's Product Moment

Correlation Coefficient (r) and Stepwise Regression (R2) analysis. Also, Hypothesis testing was done using p – value approach.

IV. DISCUSSION OF FINDINGS

Table 4.1: Participatory Forest Monitoring and Conservation Programs in Mau Forest

Statement	SD	D	N	A	SA	Mean	SD
	f %	f %	f %	f %	f %		
D1. You monitor planting and caring of trees in the forest	14 (4.7)	14 (4.7)	8 (2.7)	132 (44.4)	129 (43.4)	4.17	1.024
D2. You participate in thinning and pruning of trees in the forest	2 (0.7)	7 (2.4)	9 (3.0)	130 (43.8)	149 (50.2)	4.40	0.725
D3. You control cattle grazing in the forested areas	26 (8.8)	22 (7.4)	30 (10.1)	112 (37.7)	107 (36.0)	3.85	1.236
D4. Law breakers are normally sanctioned in Mau forest conservation programme	9 (3.0)	24 (8.1)	55 (18.5)	110 (37.0)	99 (33.3)	3.90	1.052
D5. You monitor and control forest fires and other natural disturbance in the forest	37 (12.5)	34 (11.4)	51 (17.2)	93 (31.3)	82 (27.6)	3.50	1.336
D6. Monitoring system usually update data on regular intervals	42 (14.1)	58 (19.5)	39 (13.1)	90 (30.3)	68 (22.9)	3.28	1.381
D7. You participate in monitoring protection of water sources in Mau forest	18 (6.1)	32 (10.8)	41 (13.8)	90 (30.3)	116 (39.1)	3.86	1.220
D8. Monitoring reports are publicly disclosed on a regular basis	40 (13.5)	47 (15.8)	45 (15.2)	95 (32.0)	70 (23.6)	3.36	1.354
D9. Monitoring system utilize remote sensing and other relevant technology in forest management	142 (47.8)	82 (27.6)	36 (12.1)	18 (6.1)	19 (6.4)	1.96	1.192
D10. You participate in monitoring changes in forest cover	93 (31.3)	101 (34.0)	34 (11.4)	41 (13.8)	28 (9.4)	2.36	1.305
Composite Mean and Standard deviation						**3.464**	**1.183**

From the findings, 132(44.4%) of the respondents agreed and 129(43.4%) strongly agreed with a mean of 4.17 and SD of 1.024 that they monitor planting and caring of trees in Mau Forest. This positively influences Forest conservation programme because trees planting lead to increase in forest cover. Whether CFA members participate in monitoring control of cattle grazing in forest area, 112(37.7%) of the respondents agreed and 107(36.0%) strongly agreed with a mean of 3.85 and SD of 1.236. Controlling grazing of cattle within the forest area had a significant positive influence on Mau Forest conservation programme since it allowed natural regeneration of trees and other vegetation in the forest.

110(37.0%) of the respondents agreed and 99(33.3%) strongly agreed with a mean of 3.90 and SD 1.052 that law breakers are normally sanctioned in Mau Forest. This implies that people who violate laws and regulations governing forest conservation were punished through payment of fines. This validates the findings of other

scholars that where resource users regularly monitor and sanction resource use, the condition of forest resources will likely be better than where rules are not enforced (Gibson, Andersson, Ostrom and Shivakumar, 2005).

Also, 93(31.3%) of the respondents agreed and 82(27.6%) strongly agreed with a mean of 3.50 and SD of 1.336 that they monitor and control forest fires and other natural disturbance in the forest. When CFA members monitor and control forest fires, it positively influence Mau Forest conservation programme in that, trees and other natural vegetation are not destroyed. CFA members acknowledged that they occasionally witnessed forest which has been damaging natural vegetation in the forest.

Whether monitoring system usually update data on regular intervals, 90(30.3%) of the respondents agreed and 68(22.9%) strongly agreed with a mean of 3.28 and SD of 1.381.This implies that when CFA members update their monitoring records on a regular basis promotes transparency and accountability which build trust among the groups. Monitoring enables CFA members to gather evidence about not only completing the initiative as planned, but also succeeding in a way that has the intended effect. In addition, examining outcomes and impacts is a crucial part of this, and it provides answers for the stakeholders' and other interested parties' demand of results and accountability (Kusek and Rist 2004).

In addition, 116(39.1%) of the respondents strongly agreed and 90(30.3%) agreed with a mean of 3.86 and SD of 1.22 that they participate in monitoring protection of water sources in Mau Forest. Monitoring protection of water sources by CFA members had a positive influence on forest conservation since water catchment areas within the forest are maintained leading to availability of clean drinking water.

95(32.0%) of the respondents agreed and 70(23.6%) strongly agreed with a mean of 3.36 and SD of 1.354 that monitoring reports were publicly disclosed on a regular basis. Sharing of monitoring reports by CFA members enabled all stakeholders engaged in forest conservation activities to track their progress, improve their monitoring approach which positively influenced conservation of forest.

But, 142(47.8%) of the respondents strongly disagreed and 82(27.6%) disagreed with a mean of 1.96 and SD of 1.192 that monitoring system utilize remote sensing and other relevant technology in forest management. This indicate that the members do not incorporate use of modern technology in forest conservation program which negatively influenced efficiency of CFA members in implementing forest conservation activities. The results were supported by the qualitative data from the KFS officer interviewed at Mara Mara Forest station who said that:

> "Monitoring forest conservation programmes need adequate human resource and there is a big challenge since Kenya Forest rangers were few and could not patrol the entire forest. KFS should employ more scouts from the community to aid in monitoring activities" KFS officer

Table 4.2: Correlation results between Participatory Forest Monitoring and Mau Forest Conservation Programme

Variables		Mau Forest Conservation Programme	Participatory Forest Monitoring
Mau Forest Conservation Programme	Pearson Correlation	1	-.021
	Sig. (2-tailed)		0.721
	N	297	297
Participatory Forest Monitoring	Pearson Correlation	-.021	1
	Sig. (2-tailed)	0.721	
	N	297	297

From Table 4.2, the Pearson's Product Moment Correlation coefficients showed the value of r = -0.021. Since r = -0.021 in this case, then there was a weak negative significant correlation between Participatory forest monitoring and Mau Forest Conservation programme. The p-value of 0.721 was more than 0.05 level of significance implying that this weak relationship was significant. This weak relationship could have been contributed by challenges faced by the respondents as some indicated that they were not properly conversant with what to monitor in the forest. Monitoring is judged against outputs, activities and inputs which have been planned or agreed. Since CFA members sanctioned law breakers, it was in line with the findings of other scholars who said that when sanctions are strictly enforced, they prevent free-riding and instill a sense of trust, which motivates more active participation (Ghate and Nagendra 2005).

R squared was used to show variation in Mau Forest conservation programme which can be explained by Participatory Forest Monitoring and the results are presented on Table 4.3.

Table 4.3: Regression Results between Participatory Forest Monitoring and Mau Forest conservation Programme

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.021[a]	0.000	-.003	4.50856
a. Predictors: (Constant), Participatory Forest Monitoring				

R^2 =0.000 shows how much participatory forest monitoring predicts Mau Forest Conservation programme. The finding shows that participatory forest monitoring in Mau Forest conservation programme still remains a challenge. However, the standard error is 4.509 which is lower than 5% implying that effective participation by CFA members in monitoring conservation programs would significantly improve forest condition in Mau Forest.

Testing of Hypothesis

H0: There is no significant relationship between participatory forest monitoring and Mau Forest conservation programme. The p-value was 0.721 which is more than 0.05, therefore; due to insufficient evidence, the null hypothesis failed to be rejected and it was concluded that there is no significant relationship between participatory forest monitoring and Mau forest conservation programme.

V. CONCLUSION

The paper concludes that Participatory Forest monitoring play a major role in improving the condition of Mau Forest. The findings indicated that stakeholder participation in monitoring forest conservation activities had a positive influence on sustainability of forests. However, the Community Forest Association (CFA) members were not empowered to carry out effective monitoring because there is inadequate enforcement of forestry laws guiding implementation of Participatory Forest Management programmes. Though forest monitoring acts to preserve commitment of Community Forest User groups and ownership by allowing them to adapt swiftly to observed challenges, implementing agents should address issues such as incentives, transparency and accountability so as to ensure economic and social sustainability in forestry management.

VI. RECOMMENDATIONS

Recommendation made for policy action is that effective monitoring is vital for long term forest management. But, communities need to be trained so that they are clear on what they are monitoring and are able to select indicators to evaluate changes forest conditions. They also need to be willing to use sanctions for rule breakers because when sanctions are strictly enforced, they prevent free-riding and instill a sense of trust; which motivates more active participation on forest conservation among the CFA members.

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