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## EFFECTS OF DELIBERATIVE POLICY APPROACH ON MANAGEMENT OF COMMON POOL RESOURCE IN MAU FOREST, KENYA

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### ABSTRACT

The study sought to fill the existing knowledge gap in the use of deliberative policy approach in the management and conservation of common pool resources with a biased focus on Mau Forest in Kenya. It aimed at exploring effects of deliberative policy approach in the management of common pool resources. The study was based on the view that there has been a growing interest both in deliberative methods and in common-pool resource management. Empirical researches across the world have indicated that co-management of common pool resources and deliberative democracy relate to one another. However, few references have been made on how deliberative democracy has impacted the management of common pool resources. To establish how inclusion of major policy actors affects the management of Mau Forest, to assess how information sharing among major policy actors affects management of Mau Forest and to explore how consultative forums with major policy actors affects management of Mau Forest were main study objectives.



Due to the nature of the study, descriptive case study design was adopted in exploring the effects of deliberative policy approach on the management of Mau Forest. The study targeted communities adjacent to Maasai Mau forest in Naisoya village, Lower Melili sub-location of Narok County. Naisoya village has a total projected population of 6256 with a total number of 1043 based on 2009 census results. A sample of 71 households, 3 CFA officials within Maasai Mau region, 1 Kenya Forest Service officer at Maasai Mau ecosystem conservancy in Narok, Lower Melili location Chief and 2 village elders were selected through purposive, stratified and simple random sampling techniques to participate in the study. The study adopted the use of questionnaires, interviews schedules, observation checklist and existing secondary data as the main data collection techniques. Semi-structured questionnaires coupled with structured interview schedules were used to gather primary data from the selected respondents. Collected data was then be analyzed through computation of both descriptive and inferential statistics.

**Keywords:** *Deliberative Policy, Common Pool Resources, Deliberative Methods, Common-Pool Resource Management and Co-Management*

## BACKGROUND OF THE STUDY

Since Hardin's writing, "the tragedy of the commons", all environmental problems are equated to it (Hardin, 1968). He had used an example of shared pasture in his description of the tragedy of the commons. Since then, his perspective has been guiding the management of the commons. He believed that every individual tries to maximize his or her own gains based on personal desires. This indicates that if people are left to graze in the common field unregulated, it is possible that the field will go into ruins hence resulting to the tragedy of the commons. Hardin thought that a mutual coercion to constrain individual's freedom will help in preventing this tragedy. Thus, promoting the expansion of state intervention in the management of commons through establishment of private property rights. (Hardin, 1968; Ostrom, 2003). Since then, his perspective has been used widely even beyond the scope of natural science (Burger & Gochfeld, 1998). Hardin's perspective resulted in emergence of two distinct school of thoughts; one that supports his thinking and the other school that critiqued his approach. The school that supports Hardin's argument tried to present cases of overexploitation of commons due to population increase. They advocated for a centralize system or state control in the management of the commons. The other school of thought led by Elinor Ostrom with her work, "Governing the commons" criticized Hardin's argument by presenting cases of successful prevention of the tragedy of the commons through management by local people's institution rather than state control or even privatization.

Ostrom and other scholars with similar line of thinking wanted to justify the capability of communities in governing common pool resources through research. With this, there was a basis or intellectual ground for a shift towards community based natural resource management as well as decentralization in environmental policies. This helped to promote the application of deliberation in the common pool resource literature. Despite this, there has been very minimal reference to deliberative democratic theory in the management of the commons, leaving deliberation as a mere communication approach in the spectrum of participatory framework (Parkins & Mitchell, 2005). An example of such value conflict issue within deliberative policy analysis framework is the management of Mau Forest. It is known to be the most important watershed area in Kenya due to its vital contribution to the economic, social and environmental spheres in the county. It plays an important role in recharge of groundwater, protection of biodiversity, river flow regulation, carbon sequestration among other roles that provides favorable conditions for optimum crop production. These benefits have however been fading away despite the spirited efforts by the government to preserve Kenya's most valuable asset. A large portion of



the forest have been destroyed; mostly in the last few decades. Roughly one-quarter of the forest; about 100000ha has been depleted due to encroachment (UNEP, 2009). This trend has always raised a question on the role of surrounding community in conserving the forest.

## **STATEMENT OF THE PROBLEM**

This study aimed at filling an existing knowledge gap in the use of deliberative policy approach in the management of the commons with a biased focus on Mau Forest in Kenya. It was premised on the notion of few references made on deliberative democratic theory despite an increase in the emphasis on deliberation in the management of common resources literature (Parkins and Mitchell 2005). This has turned deliberation into a more of communication within participatory framework rather than a specific (Stern, 2005). Various scholars in Kenya have conducted several studies on individual components of deliberative policy analysis such as public participation, inclusion, empowerment and consultation in management and conservation of forests in major ecosystems including Mau Forest, Mount Kenya and other forests. For instance, in 2010, Wamae (2010) conducted a study on the impacts of CFA in Managing Kenyan forests. His research was premised on Kenyan constitutional provision on Participatory management of forest (PFM).

Guthiga (2008) examined the perception of surrounding communities on forest management in Kakamega forest, and affirmed that, community involvement helps to change the attitude of the society on managing forest, thus enhancing efficiency in managing natural resources. A study done by Kinyili (2014) on the PFM approach in OLBolossat established that, community participation is an imperative component in promoting sustainable forest management. Wekesa (2017) concluded that the role of community participation is an effective strategy in transforming knowledge and addressing environmental challenges in his study on community involvement in managing Kimothon forest. All these studies illustrate that community participation is paramount in enhancing forest conservation and management efforts and promoting sustainable forest management. However, none of the studies had looked at the entire spectrum of deliberative policy analysis in the management of forests in Kenya. Components of deliberative policy analysis such as community participation and inclusion were examined in exclusivity. This failed to give a clear picture on the role and effects of community involvement in both formulation and implementation of policies aimed at management and conservation of forests in the country.

## **OBJECTIVES OF THE STUDY**

- i. To establish how inclusion of major policy actors affects the management of Mau Forest
- ii. To assess how information sharing among major policy actors affects management of Mau Forest
- iii. To explore how consultative forums with major policy actors affects management of Mau Forest

## **LITERATURE REVIEW**

### **THEORETICAL REVIEW**

#### **The Tragedy of the Commons**

Contrary to Smith's assertion that individuals are led by invisible hand of the market in pursuit of their own gains, Hardin was of the view that individual's freedom to pursue their own egocentric interest leads to exhaustion of resources hence the tragedy of the commons. He had used an example of shared pasture in his description of the tragedy of the commons. Since then, his perspective has been guiding the management of the commons. He believed that every individual tries to maximize his or her own gains based on personal desires.



This indicates that if people are left to graze in the common field unregulated, it is possible that the field will go into ruins hence resulting to the tragedy of the commons. Hardin thought that a mutual coercion to constrain individual's freedom will help in preventing this tragedy. Thus, promoting the expansion of state intervention in the management of commons through establishment of private property rights. (Hardin 1968; Ostrom 2003). Since then, his perspective has been used widely even beyond the scope of natural science (Burger & Gochfeld, 1998). Hardin's perspective resulted in emergence of two distinct school of thoughts; one that supports his thinking and the other school that critiqued his approach. The school that supports Hardin's argument tried to present cases of overexploitation of commons due to population increase.

They advocated for a centralized system or state control in the management of the commons. The other school of thought led by Elinor Ostrom with her work, "Governing the commons" criticized Hardin's argument by presenting cases of successful prevention of the tragedy of the commons through management by local people's institution rather than state control or even privatization. Ostrom and other scholars with similar line of thinking wanted to justify the capability of communities in governing common pool resources through research. With this, there was a basis or intellectual ground for a shift towards community based natural resource management as well as decentralization in environmental policies. This helped to promote the application of deliberation in the common pool resource literature.

### **Deliberative policy model**

The idea of democracy can be traced way back in the Greek city state of Athens. During those days, democracy was exercised through voting. Athenians were given an opportunity to participate in important decisions through voting. This practice later on expanded to other civilizations such as Roman Empire and Persia. With time however, democracy has gradually expanded to include other democratic forms such as deliberation with new theories being derived from the original democracy such as deliberative democracy. Modern democratic theorists are now emphasizing on the significance of deliberation unlike the traditional democratic theorists who emphasized on equality, equity and public good (Cohen, 1989). Unlike traditional democracy, deliberative democracy involves citizens in decision process more broadly. Cohen (2004) views deliberative democracy as the interaction or relationship that exists between people's collective decision and public policies. In this sense, public policies are the outcomes of effective public deliberations. This assertion indicates that every deliberation is democracy, but not every type of democracy is deliberation. It can only become deliberation when those affected by a certain decision combine their individual interest to come up with a common ground that is acceptable to all (Habermas, 1989).

Habermas believed that decisions or policies can only be democratically legitimate when those affected by them are directly engaged in their formulation. According to Habermas (1984), public process should be on basis of moral consideration and citizen participation should not be limited in any way. No individual should dominate the process. All concerned citizens should be given equal opportunity to participate in coming up with public decisions. This will promote the virtues of justice and equity according to Rawls (1993). To engage in meaningful public deliberation, Elster (1995) believes that all participants should have required information to empower them to take active role in deliberation. Empirical researches across the world have indicated that co-management of common pool resources and deliberative democracy relate to one another. Both natural resource experts and deliberative policy analysts are more interested in policy decisions that are generated through public participation. Common pool resource managers across the world are constantly striving to enhance the level of acceptability to their decisions. This has made deliberation a key component of common pool resource management (Smith & McDonald 2001).



Decisions made through public deliberations are highly preferred over decisions resulting from lower rung public processes. This has been the basis for empowerment and local control of common pool resources (Knopp & Caldbeck, 1990).

## **EMPIRICAL LITERATURE REVIEW**

### **Inclusion and Management of Common pool resources**

In managing the commons, scholars often use terms such as participation, involvement and representation in reference to public engagement. On the other hand, democratic theorists prefer the term inclusion to refer to public engagement (Carr & Halvorsen, 2001). These terms have therefore been used interchangeably in different spheres. According to Ostron (1990), collective choice arrangement is key to sustainable management of common pool institutions. Both deliberative democrats and common pool resource scholars are interested in decisions generated through public participation. The procedures associated with resource management decision making has been improving gradually since the pre-World War II period (Berger 1977). Most nations including Nepal, India, Canada, America, and some African countries have so far adopted community based common pool resource management where community participation is central to policy making. India and Nepal were the first countries to streamline public participation in natural resource management (Pathek & Gour-Broone, 1999). Empirical studies have demonstrated that public participation has taken a centre stage in managing shared resources. In attempts to integrate the community in managing forest, Indian government enacted the National Forest Policy which provided for public participation in forest management (Maharjan, 2005).

Nigeria, Tanzania, Uganda, Morocco, Senegal, and other African nations have embraced community-based approaches used in Nepal and India to increase community involvement in forest management. Titus (2014) in his study in Nigeria postulates that community participation should be viewed as an effective tool to empower communities and increase efficiency in environmental management. The aspect of including communities in decision-making and implementation processes tend to strengthen conservation ethics because communities understand that their existence depend on how they conserve the environment (Guthiga, Mburu& Holm-Mueller, 2008). A study done by Iddi (2010) on community participation in forest management in Tanzania confirms that, some of the forests in Kilimanjaro, Rukwa, and Shinyanga areas are conserved and managed by communities for traditional rituals. The Tanzanian government has enhanced involving the community in managing forests and other shared resources through the enactment of effective forest policies. The enactment of the 1998 National Forest policy granted communities the right, power, and responsibilities to be co- managers of public forest resources via PFM, JFM and other collaborative approaches.

In Kenya, forest destruction and environmental degradation has always been attributed to absence of inclusive and relevant policies to encouraged communities to participate in forest conserving programs. The forest policies that the government employed were ineffective because they alienated the community in management efforts (Ongugo, 2009). In a move to revive the sector and reduce forest destruction, the government enacted effective legislations to encourage communities to take part forest conserving and management efforts. In 2005, the government through an act of parliament enacted the Forest Act 2005 that, endorses the role of communities and indigenous people in forest management. The Act grants communities' power, right, and responsibilities to be contract managers or co-managers of forest resources (Ongugo, 2009).





Communities that have an interest to co-manage forest resources with KFS and other stakeholders are required to form and register community forest Associations, (CFAs), as stipulated in Section 46(1) of the legislation. The KFS is required to enter into enforceable agreements and management plans with County Councils (CCs), CFAs and other involved partners as envisioned in Article 2: Section 4 of the act (Mogoi, et al, 2012). Following enactment of 2005 Forest Act and other effective forest policies, more than 100 CFAs have been formed, thus inspiring communities to take part in environmental conservation efforts in varied ecosystems.

### **Information Sharing and Management of Common pool resources**

In democratic deliberation, information should be available for each participant (Gastil, 1993). It is difficult to expect people to govern themselves without proper knowledge of the process and data that needed to engage in decisions. Therefore, availability of information is not solely empowering participants to deliberate policy decisions, but they need to be educated and comprehend the nature of the process in advance (Nabatchi, 2010). Gouran and Hirokawa (1996) arguing that a more effective deliberative discussion is the one that integrates with the adequacy, reliability of information and knowledge based. Studies have shown that communities tend to respect forest resources that have cultural, religious, economic, and social value. According to Macharia (2013), The Mijikenda community in Kenya have protected Kaya Forest for religious purposes. Such communities have undertaken the role of managing and conserving forest resources because they understand the benefit of engaging in forest management programs. In most cases, if communities are equipped with adequate knowledge, information and resources they tend to participate in forest management practices, thus promoting bio-diversity in the ecosystem. In order to increase community awareness and their involvement, the government should organize education forums to sensitize communities on the importance of protecting, conserving, and managing forest resources.

### **Consultative forums and Management of Common pool resources**

In the past, voting was the only way to pursue democracy. This has however changed in the recent past where deliberation has gained more importance in the evaluation of democracy and public participation (Chang, 2012). Public deliberation is a multi-dimensional theory which has been studied in various types of research across the world. It is an important motive of democratic governance where citizens and stakeholders are encouraged to participate in the governing process. Deliberation process could be in place through the use of public discussions or public debate (de la Porte & Nanz, 2004). Deliberative forums; also known as Consultative forums are commonly used to assist people in the deliberation process. In these forums, citizens raise issues and discuss them so as to find common solution to their problems. Availability of relevant and reliable information to participants, coordination with policy makers, diversity of views, preservation of participant's interests and responsiveness are other vital elements of successful public deliberation (Gastil, 1993).

In the field of common resource management, public consultative forums have been used in various occasions. This is evident through a number of empirical researches that has been undertaken across the world (Lengyel 2016). Civic Preference Forum on community gardening in Hungary in 2017 is a case in point on how consultative forums have applied in the management of the commons. The analysis of the process in Funäsdalsfjällen, Sweden on snowball regulations can also help to strengthen the view that public deliberation can enhance management of the commons (Alexandersson 2000). Forest stewardship council and Canadian standard association that have developed mechanisms for conversation between common people, researchers, scientists and government on forest management can also serve as a case in point (Auld &

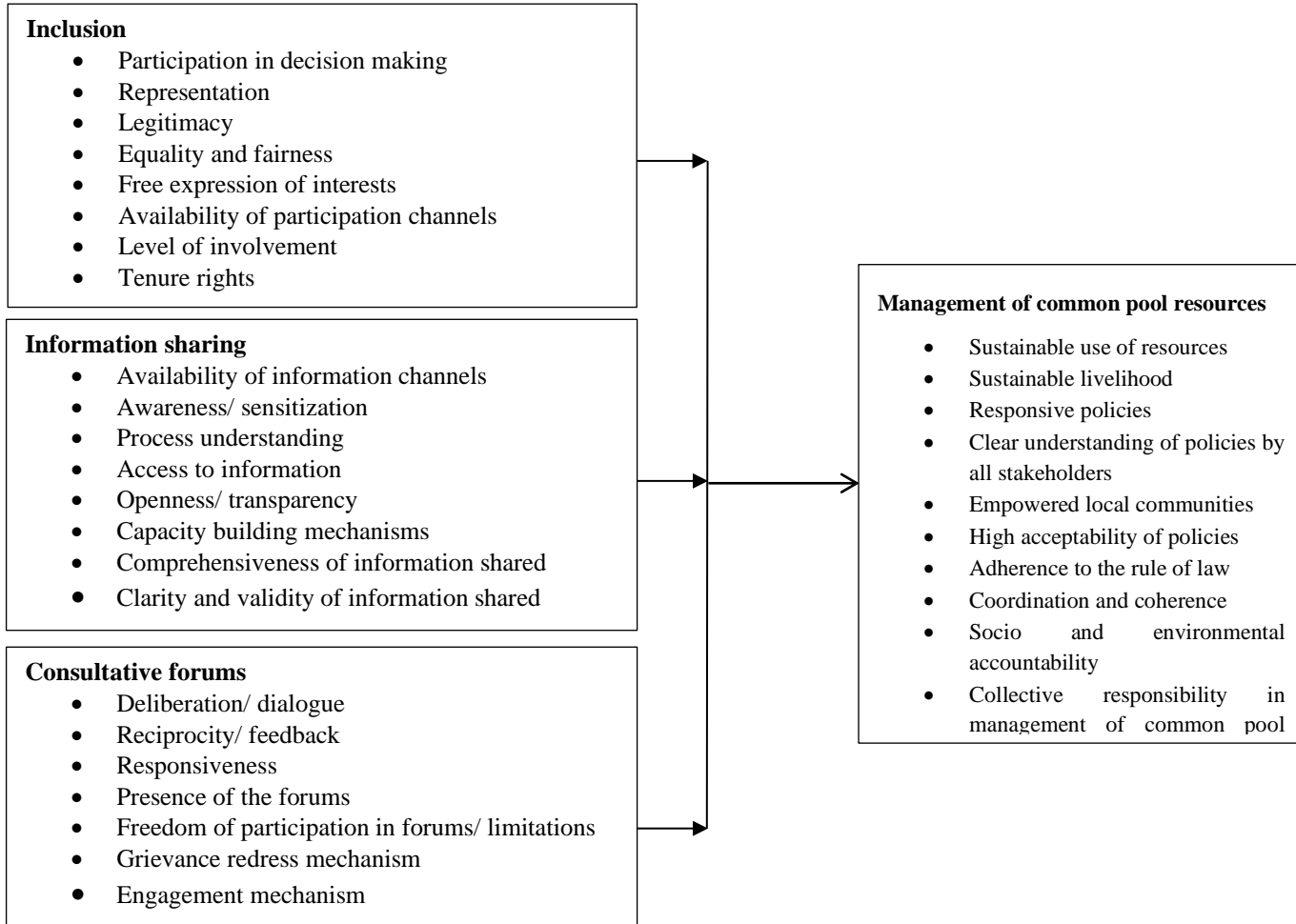


Bull, 2003). In Africa, experience from Zambia has demonstrated that consultations with local communities have improved forest management in Kenya.

## CONCEPTUAL FRAMEWORK

### Independent variables

### Dependent variable



**Figure 1: Conceptual Framework**

## RESEARCH METHODOLOGY

A descriptive case study design was used due to its ability to describe the state of an event or phenomena as well as comparing it with occurrences elsewhere. The research was undertaken among communities along the Maasai Mau Forest stretch within Narok County. The section is the southern part of Kenya's largest catchment area; Mau Forest. Located 17 kms from Narok town, the 46,278 hectares section is designated as a trust land, managed by Narok County. Maasai



Mau section of the Mau complex was selected for the study due to several reasons. Leaving the section to be managed by the Narok County council left it exposed to exploitation by both the county council officials and the local communities. This made the section more prone to encroachment and destruction by adjacent communities.

A sample of 71 households were selected from target population of 1043 households for interviews. Purposive sampling technique was used to decide on the general target population. The study area was then subdivided into sections (strata) where respondents were drawn randomly to form part of the sample population. Questionnaires, interviews schedules, observation checklist and existing secondary data as the main data collection techniques were used. Analysis of collected information took the form of computing descriptive and inferential statistics. Data analysis looked at various variables, which includes; demographic characteristics of respondents, socioeconomic characteristics of respondents, inclusion of major policy actors in management of Mau Forest, information sharing among policy actors and presence of consultative forums with major policy actors. Within the spectrum of inclusion, aspect such as participation in decision making, legitimacy, representation, equity and equality as well as consideration of local interests were put into consideration. Regression analysis was carried out to determine how the independent variables relate with the dependent variable. Correlation and regression analysis was carried out using SPSS. The Multiple regression obtained was as shown below:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

Where;

y = Management of common pool resources;  $x_1$  = Inclusion;  $x_2$  = Information Sharing;  $x_3$  = Consultative forums;  $\beta$  = Coefficients to be estimated (constant; other variables that affects management of common pool resources apart from deliberative policy analysis).

## **RESEARCH FINDINGS**

### **Inclusion of major policy actors in the management of Mau Forest**

Survey outcomes reveals that majority of respondents (97%) are not members of any community forest association. The survey however revealed that the once vibrant Naisoya community forest association is no longer strong due to changes in forest management policies. According to the respondents, community members are no longer allowed to do farming in the forest as it used to be in the past. This has significantly reduced membership in forest associations. It was however revealed that some residents are still members to either forest grazers or forest farmers association. Majority of those who admitted to belong to CFAs had no managerial roles in their respective CFAs.

On the contrary to the observation of majority respondents who believes that community forest associations are diminishing in the areas along Mau Forest, the CFA chairman indicated that there was still some CFAs which are still strong. One of the CFA with majority membership in the region was said to be Naisoya community forest Association. However, further analysis indicated that at least 2 out of every 3 respondents was not even aware CFA existence.

### **Participation in Decision Making**

It was indicated that 82% of respondents revealed that they have never taken part in Mau Forest management decisions. Only 18% were found to have been part of certain decisions on Mau Forest. The major reason for lack of participation in decision making as indicated by majority respondents (70%) is that they have never been invited to participate. Other reasons mentioned includes; Being unconcerned with forest management, Not being legitimate to participate, lack of time





to participate and consultative forums taking place far from home. This accounts for 12%, 9%, 7% and 5 % respectively. The outcomes of the regression analysis as presented in the table below is a clear indication that the level of participation in forest management is determined by among other factors; accessibility to forest related information, sensitization of the local community on the need to take part in Mau Forest management, presence of consultative forums, education level of an individual.

### **Information sharing amongst major policy actors in the management of Mau Forest**

#### **Access to information**

Majority of residents (80%) are said to have no access to relevant information that can help them take active roles in the conservation of Mau Forest. It was only about 20% of respondents that indicated to have access to relevant information on Mau Forest. Even for those with access to information, about 85% stills feels that the available information is not sufficient, comprehensive, valid and clear enough to allow them make sound contributions on the Mau Forest management decisions. Only 15% were comfortable with sufficiency, comprehensiveness, validity and clarity of the available information on Mau Forest.

#### **Sources of information on Mau Forest**

According to survey findings, information on Mau Forest conservation is accessed through local administrators like chiefs and village elders (64%), public forums (21%), local KFS office (9%) and media (6%). According to the study findings, poor information sharing on forest management and conservation has resulted to frequent forest related conflicts. The conflicts range from illegal logging, trespass, grazing in the forest-to-forest land grabbing. This has resulted to forest degeneration, legal proceedings and to extreme cases; violent evictions. In the view of most respondents, effective information sharing and civic education on community forest management and conservation will go a long way in minimizing forest related conflicts which are common in the areas along Mau Forest and improve forest conservation. 92% of respondents indicated that they have never seen or been part of any sensitization program by the government, NGOs or even CFAs on the need to take part in the management and conservation of Mau Forest. It was only 8% that indicated to have been sensitized on the need for collective management and conservation of Mau Forest; by CFAs in most cases.

### **Consultative forums with major policy actors in the management of Mau Forest**

About 30% of respondents indicated to have taken part in consultative forums Mau Forest. According to the findings, a number of issues ranging from the role of the community in forest management, forest boundary, encroachment into the forest, farming in the forest, trespassing in the forest to illegal logging were discussed in those consultative forums. It was revealed that consultative forums on management and consultative meetings are only held on need basis. There are no structured timelines for consultative forums. The respondents who had never attended any consultative forum on the management and conservation of Mau Forest attributed it to; poor information n sharing (40%), not being concerned with forest management (20%), never head of consultative forum (30%) and forums being held far away (10%).

The findings reveal that presence of consultative forums has so far been able to; reduce a number conflicts in some areas bordering Mau Forest (27%), reduced illegal logging (23%), enhanced the relationship between forest management and surrounding communities (30%), enhanced policy understanding by the community members (13%), reduced encroachments into the forest hence minimizing evictions (7%). These impacts have however only been felt in some



areas. In areas without consultative forums on Mau Forest, a number of forest related conflicts has been reported. Some of which has escalated to evictions of forest adjacent communities or even deliberate forest fires and destruction.

A multiple regression analysis was also conducted to establish the relationship between forest related conflicts and the level of public participation in forest related decision making, accessibility to forest related information as well as presence of forest related consultative forums. The results in Table 1 indicated that participation in forest management decision making, access to relevant information on the management of the forest, inviting family members for a forest consultative meeting and being sensitized on the need to take part in forest management don't significantly affect participation in forest management decision making (P-value > 0.05).

**Table 1: Multiple Regression Analysis**

Model Summary					
R		R Square	Adjusted R Square	Std. Error of the Estimate	
.244 <sup>a</sup>		.059	.002	.377	
ANOVA					
	Sum of Squares	df	Mean Square	F	Sig.
Regression	.591	4	.148	1.040	.393 <sup>b</sup>
Residual	9.381	66	.142		
Total	9.972	70			
Coefficients					
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Independent variables:	.843	.484		1.742	.086
Participation in forest management decision making	-.087	.116	-.090	-.751	.456
Do you have access to relevant information on the management of the forest	.222	.115	.236	1.932	.058
Have you or family member invited for a forest consultative meeting	.034	.098	.043	.348	.729
Have you ever been sensitized on the need to take part in forest management?	.014	.162	.011	.088	.930
Dependent Variable: Management of common pool resources					
Predictors: (Constant);					
Have you ever been sensitized on the need to take part in forest management?					
Have you or family member invited for a forest consultative meeting,					
Participation in forest management decision making,					
Do you have access to relevant information on the management of the forest					

## CONCLUSIONS

This study concludes that indeed; deliberative policy approach has a direct effect on the management of forests which is one of the common pool resources. The study has confirmed that inclusion of local communities in forest management, information sharing and consultative forums are very important aspects in managing forests in Kenya. This was to affirm the views from various literature reviewed which had indicated that individual components of deliberative policy analysis have a direct effect on managing the commons. According to the study findings, in areas where there was public participation in decision making, accessibility to valid forest information and frequent consultative forums, there is very minimal forest related conflicts. This is because, the local communities have been made part of the forest management.



In such areas, forest related policies are very clear and acceptable to everyone in the community since they participated in coming up with those policies.

As the study findings reveals, despite having low level of adoption of deliberative policy approach in the management of Mau Forest, Naisoya village in Lower Melili sublocation has to a great extent benefited from them as compared to other neighboring villages which has witnessed numerous forest related conflicts. There has been fewer instances of forest degeneration and subsequent evictions in the area as compared to other areas along Mau Forest. It is therefore clear that; proper inclusion of the community in forest management, public participation in forest related decision making, availability of clear and valid forest related information and frequent consultative forums on the management and conservation of Mau Forest will help in addressing many of the conflicts that have been witnessed along Mau Forest. This will not only protect the local communities from being evicted from the area but also protect the forest from deliberate destruction and degeneration.

## **POLICY RECOMMENDATION**

The constitution of Kenya (2010) entails that the state should ensure sustainable exploitation, utilization and management of natural resource. This will encourage communities to take part in environmental management, and utilize the environment and natural resources for the benefit of the people of Kenya. Further, all Kenyans have a duty constitutionally to take part in protection and conservation of environment. It has rightly been argued by policy experts that communities can be vital in protecting natural resources when they are involved.

The findings of this study indicates that the existing policies on conservation of natural resources in the country are sufficient. This is in relations to the provisions for the involvement of local communities in managing common pool resources. However, the problem has always been with the operationalization and clear application of these policies in managing the commons. Thus; this study calls for the government and KFS to establish mechanisms on how fully implement the constitutional provisions on involvement of common people in management of natural resources including Mau Forest.

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## **CONFLICT OF INTEREST DECLARATION**

The authors registered no conflict of interest in this study.

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