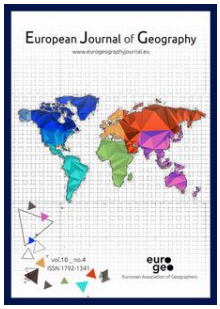

European Journal of Geography

Volume 11, Issue 3, pp. 153 - 163

Article Info:
Received: 05/09/2020; Accepted: 13/12/2020
Corresponding Author: * mailto:skithiia@yahoo.com
https://doi.org/10.48088/ejg.s.kit.11.1.153.163

Impacts of Forest Resource Use Conflicts on Conservation Efforts within Enderit Forest Block in Mau Forest Complex, Kenya

Shadrack Mulei **KITHIIA**[1*],
Robert Kipkemoi **KOECH**[2]

[1] *University of Nairobi, Kenya*
[2] *Institution of Surveyors of Kenya*

Keywords:
border,
tourism,
green corridor,
cooperation,
sustainable development

Abstract

This paper examined the relationship between forest resource use conflicts and conservation, which are contemporary issues in the field of environment conservation. The study was carried out in Enderit forest block, Mau forest Complex. The study findings indicate that the forest block has lost considerable vegetation cover in the recent past due to resource use conflict which in turn attracted conservation efforts from various stakeholders. The identified conflicts not only threaten the sustainability of these efforts but also community livelihoods that depend on this vital resource in the long term. The study therefore sought to establish the types of forest resource use conflicts, identify the stakeholders and their areas of focus and examine how the forest resource conflicts are affecting forest conservation efforts. Both quantitative and qualitative research methods were used. The results indicate that there exist various forms of conflicts within the forest block while various actors are involved in the forest conservation efforts. However, despite the concerted conservation efforts, there existing forest resource use conflicts that frustrate these efforts and slow the implementation of conservation programs. Based on the findings, the study recommends that for sustainable conservation of the forest block, the Government and the stakeholders should put in place policy measures aiming at increasing income and generating off-farm employment activities for the forest adjacent communities. This will reduce forest dependency and consequently enhance biodiversity conservation and sustainable use of the forest resources.

The publication of the European Journal of Geography (EJG) is based on the European Association of Geographers' goal to make European Geography a worldwide reference and standard. Thus, the scope of the EJG is to publish original and innovative papers that will substantially improve, in a theoretical, conceptual or empirical way the quality of research, learning, teaching and applying geography, as well as in promoting the significance of geography as a discipline. Submissions are encouraged to have a European dimension. The European Journal of Geography is a peer-reviewed open access journal and is published quarterly.

1. INTRODUCTION

Mau forest complex is one of the water towers in Kenya and forms the largest closed-canopy forest ecosystem in Kenya. The complex comprises of 22 forest blocks which have recently been affected by human settlements and deforestation activities that has reduced the river flows and decimated the forest cover. This threat forced the Government of Kenya to initiate the process of forest recovery and conservation efforts within the forest complex. This paper examines the conservation efforts within the Enderit forest block against the resource use conflicts witnessed in the study area. It is a result of an extensive research study over a period of one year. It is meant to bring into light the various resource use conflicts which tend to affect the forest conservation efforts.

2. STUDY BACKGROUD

Forest resource use conflicts are emerging threats to conservation of forests worldwide. This is mainly because forest resources are by their nature common pool resources that attracts multiple and competing interests by various groups to control their access, use and benefits. World Bank (2006b), estimates that more than one billion poor people worldwide depend on forests to sustain their livelihood and majority others according to Harwell *et al.,* (2003); Ongugo *et al.,* (2008), Anderson *et al*., (1996), Ayling and Kelly (1997) compete for these resources to enhance their livelihoods. This scenario does not only threaten the existence of the forest resources, livelihoods and economies that depend on these resources, but also undermine the conservation efforts.

In Kenya, forest resource use conflicts have contributed to forest degradation that has almost reduced the once green country to a dry land. Ng'weno (2004) notes that the country's forests cover currently stands at 2 per cent of the total land area, which is way below the 10 per cent recommended by the Food and Agricultural Organization. This situation is likely to worsen especially because the population keeps on increasing which increases pressure to convert forest land to agricultural and settlement purposes.

Enderit forest block, like the other blocks within Mau Forest Complex, has been at the center of forest resource use conflicts. The forest block, which covers approximately 8,600 hectares out of a total 417,000 hectares, has had a long history of conflict especially between the indigenous Ogiek community, who lay claim on the forest land on the basis of historical use and occupancy and the Government who claim ownership by virtue of the forest gazettement and declaration of 1942 under Forest Act (CAP 385) (Sang, 2001). These conflicts have been enhanced by political interests and ever increasing population which increased demand for land to settle the landless, grazing pasture and land for cultivation. Subsequently, the block has been encroachment into and illegal use of forest resources taking toll on the resources. The consequences of these illegal forest resource uses became apparent with most rivers drying up mostly affecting the Mara ecosystem and erratic weather patterns threatening the livelihoods of the largely agricultural communities within the region. Further, the revenue generated by the forest has been reduced therefore denying the government much needed resources to support the forest programmes. These realities prompted the local stakeholder's as well as international community to put pressure on the government to initiate conservation efforts.

As a result, the Government together with other stakeholders in the recent past put concerted effort to rehabilitate the forest block. Further encroachment of forest land and together with other stakeholders, rolled out ambitious programmes to rehabilitate the forest. Forest Act Cap 385 was repealed to strengthen protection of forest resources. These efforts have not realized tangible results as far as conservation of the forest resources is concerned. However, forest resource use conflict is still ongoing and threatens the sustainability of these initiatives.

3. METHODOLOGY

3.1 Study Area

The study was carried out within the Enderit forest block as shown in Figure 1. The block is part of Sururu forest which is one of the eight blocks within the Mau forest complex. It has four beats namely; Station beat, Gatimu beat, Lepolos beat and Kanorero beat. It lies within the following coordinate bounds: (161,237m, E, 9,937,639m, N); (161,237m E, 9,924,748m N), (177, 3018 m E, 9,937, 637m N), and (177,3018m E, 9,914,748m N) in addition, it is positioned within an altitude range of 2,400 to 2,900m above sea level.

The Forest reserve is part of the larger Mau Forest Complex which has a regional ecological and economic significance to the region. Mau Forest Complex is one of the five main water towers supporting livelihoods, environment and economic services within its environs and the greater Eastern Africa and Nile Countries. Besides this ecological significance, the reserve generates revenue to support forestry programmes as shown in Table 1.

Table 1: Forest Revenue

Year	Amount (Kshs)	Source of Revenue
2005	76,007	Minor forest produce, firewood, grazing and compounding of offences
2007	56,422	Minor forest produce, firewood and grazing
2008	28,560	Minor forest produce, firewood, grazing

Source: Forest Management Plan (2010 – 2014

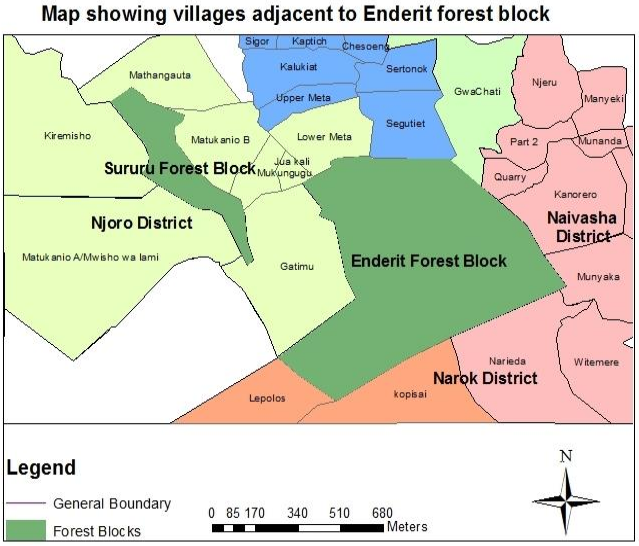

Figure 1: Map showing villages adjacent to the Enderit Forest block (Source: Field data, 2017)

3.1.2 Research design and sampling frame

The study used both qualitative and quantitative research design. The sampling frame included the forest adjacent communities, Kenya Forest Service station managers and stakeholders who are involved in conservation programmes within the selected study area.

3.1.3 Sampling procedure

Purposive sampling method was used to select Enderit Forest block. This was purposively selected on the criteria of being adjacent to the forest block and has been affected by forest resource conflicts. Three villages; *Gatimu, Gwa Chati* and *Segutiet* were selected for the purpose of the study. Since the ultimate sampling unit was the local people from the surrounding community, a sample of 150 households was randomly selected from the three villages. In addition, Chief Forest Officer based at Sururu Forest Station, officials of the MASULIFOCA, representatives from provincial administration, staff of the Africa Wildlife Foundation (A.W.F) were also sampled. These formed the units of study for the purposes of the research.

4. RESULTS AND DISCUSSION

4.1 Household characteristics

a) Gender

The study found out that majority of the respondents were male representing 76%, while female represented 24% of the total respondents While on age limit the study found that majority of the respondents were of the ages between 40-44 years (14.7%) and 55-59 years (14.8%). The average family size was between 3 and 6. Figure 2 shows that 62.4% of the respondents in the study area have attained primary schools education followed by secondary education with 34.4% and those who had attained tertiary education represented 5.6%. 1.6% respondents have not have attended school. With such high level of low education, it is quite impossible for the community members to get a 'white collar job' and therefore are likely to depend on their forest resources as source of livelihood.

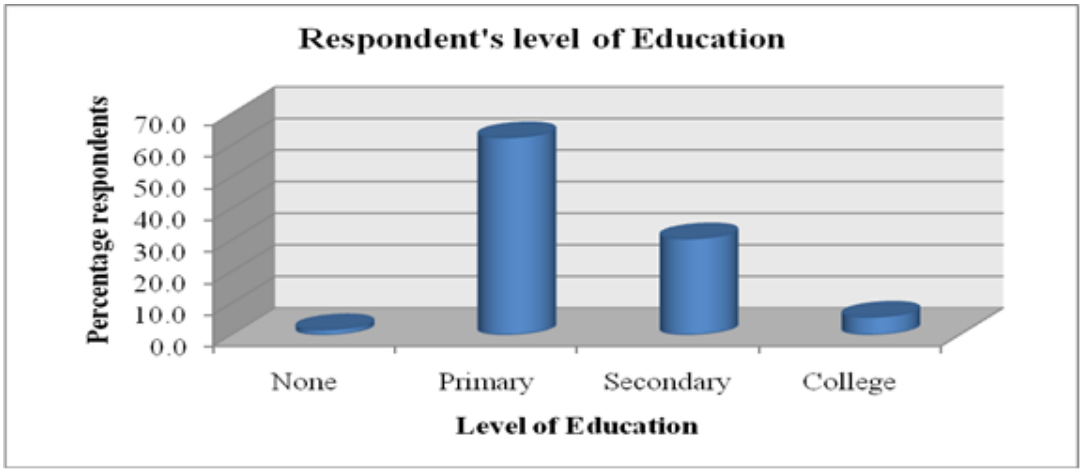

Figure 2: Respondent's level of education

4.2 Main occupation of household heads

The study found out that majority of the respondents in the study area are peasant farmers who practice mixed farming with average income of between Kshs. 6,000 – 10,000 per month. The dominant crops grown in the area are maize (46%), potatoes (32%), beans (16%) and wheat (6%). The implication of this is that for these communities, forest resources matter greatly to them since they would need more land for farming. The high dependence on farming as source of livelihood further compounds the problem of land shortage. To enhance their livelihoods, the community needs to increase farm produce which requires more land since technology for farming in the area is still poor. Thus, in such situations, encroachment onto the reserve for more land becomes inevitable resulting to forest resource use conflicts. The other causes of conflicts in the area hinges on landownership and the fight to enhance people's livelihoods.

4.3 Land ownership

The study found that majority of the respondents representing about 94.4% indicated that they own land within the study area. The remaining 5.6% were either on short term assignments in the area, for example, teaching or those looking for casual labor in the study area.

In addition, the sizes of land in the study area varied from between 1-5 acres (91.8%), 6-10 acres (6.6%) and with a few (1.6%) with over 10 acres which implies shortage of land in the area is pronounced. The shortage of land drives the community to move into the forest reserve in search of land for grazing, cultivation among others uses since the community depends mainly on subsistence agriculture for their livelihoods. This breeds conflicts between them and the Kenya Forest Service (KFS). According to Njogu (2004), even if the people with small landholdings do not directly encroach on the reserve for farming, they may engage in a lot extractive activities such as poaching and illegal cutting of trees for firewood, thereby exerting excessive pressure on the reserve which may eventually be a precursor of conflicts between the local communities and the KFS.

4.3 Main types of forest resource use conflicts

Means k., *et. al.,* (2002) classifies forest resource use conflicts into; conflicts within and among communities; between communities and governments; and within other community-based organizations, NGOs, Commercial interests and other external players. Based on his classification, the study identified the following types of the forest resource conflicts in the study area.

4.3.1 Conflict between the forest adjacent communities and the Kenya Forest Service over illegal forest resource use

The forest adjacent communities, through Community Forest Association, signed a Forest Management Agreement with the Kenya Forest Service (K.F.S). The agreement allows the forest adjacent communities, with permission and upon payment of prescribed fees to; access the reserve to graze their livestock and harvest grass, practice bee keeping and

honey harvesting, collect medicinal herbs, carry out eco-tourism and recreational activities, collect firewood, establish plantation through PELIS, assist in carrying out specified slivicultural, seed production, carbon trading, Fish farming, collection of forest produce, murram collection, water abstraction, butterfly farming, soil collection, seed collection, silkworm farming and mushroom farming. Lopez-Carr, *et al.*, (2017) articulated that deforestation is caused in Guatamala by in migration into forest areas in search of better agricultural land which is a phenomenon witnessed in the study area.

However, despite the agreement, some community members access the forest and carry out illegal harvesting of timber and poles, carry out charcoal burning and game hunting.

The study further established that forest adjacent communities have also encroached into the forest reserve to carry out farming activities. Table 2 indicates that the encroachment is common in *Gwa Chati,* Gatimu and *Segutiet* villages. The respondents attributed the encroachment into the forest reserve for farming activities to land scarcity (58.8%), unclear boundaries (17.6%), ignorance (11.8%), poor fertility outside the reserve (9.8%) and greed (2%).

Table 2: Encroachment into the Forest Reserve

Village * Are you aware of people cultivating on forest land Cross tabulation				
		Are you aware of people cultivating on forest land		Total
		Yes	No	
Village	Gwa Chati	15	16	31
	Gatimu	21	18	39
	Segutiet	12	31	43
	Kalukiat	1	3	4
Total		**49**	**68**	**117**

Source: Field (2017)

The findings above are consisted with Ongugo (2001) assertion that the community members rely on the forest reserve to get quick income, especially from the sale of the charcoal and firewood collected from the forest reserve. Table 3 shows the estimated volume of products in Kshs/year derived from the forest.

Table 3: Estimated volume of products in Kshs/year derived from the forest

Product/Services	**Unit Cost per day**	**Average/day**	**Annual Est.**	**Value/HH/Kshs/Yr**
Wood fuel	10 Kshs/Kg	5kg	1,825 Kg	18,250
Charcoal	15 Kshs/Kg	3 kg	1,095 Kg	16,425
Pastures	1 Kshs/Livestock	3 livestock	1,095 days	1,080
Honey	80 Kshs/Kg	0.1 Kg	36.5 kg	2,920

Source: Forest Management Plan (2010-2017)

Considering that the average population in the surrounding villages is estimated at 140,000, the pressure on the forest resources is immense. These would therefore require more than 255,500 tons of fuel wood annually at a cost of Kshs. 365 million with a corresponding 153,000 tons of charcoal annually at an estimated cost of 360 million

(Forest Management Plan, 2014). This amounts to a serious forest resource degradation and further affecting other resources in the reserve such as water.

This type of conflict is further compounded by the prevailing attitude of the community versus the attitude required if Participatory Forest Management (PFM) implementation is to ensure sustainability of the block. The community still has the attitude that they are fully entitled to the forest land, a right they have been denied for so long and are bitter about. If the forest land were at their discretion, most community members would convert it to agriculture which is perceived to be a more profitable land use.

4.3.2 Human wildlife conflicts

Enderit forest is a habitat for the vertebrates and invertebrates found in the forest. They include; - mammals, birds, reptiles, insects, ambiphians and mollusks. Mammals include Buffalo, Antelopes, Giant forest hog, hare, Mongoose, Porcupine, Mrush rabbits, Warthogs, Wild pigs, Tree hyrax. Primates include black and white Columbus monkeys and blue monkey. Carnivores include; Leopard, Spotted Hyena, African wild dog, wildcat. Birds include Africa spotted eagle Owl, Africa Eagle hawk, Guinea fowl, Great honey guide and weaver bird among others. Insects include butterfly, wild bees, stingless bees, grasshoppers and locusts. Reptiles include common lizards, snakes and Chameleons.

The study established that there is conflict between human and wildlife in the study area. Wild animals occasionally stray into settlement area destroying crops and attacking livestock and humans. This was confirmed by 45.4 % of the respondents. The respondents cited baboons and hyenas, leopards as being the most troublesome animals, as shown in Figure 4. Human- wildlife conflicts in the study area can be attributed to the degradation of the forest block over the years by the human activities. In the context of these changes, humans depress wildlife mainly through competition, either directly for space or indirectly for resources that are used by domestics stock and human populace. Consequently, wild animals reacting to the impact negatively on human mainly through human injury or death, damage to agricultural crops, depredation of domestic animals, competition for space, competition with livestock for pasture and water, transmission of diseases to domestic animals and destruction. The impact is also in terms of loss of freedom and security. These impacts have many other related social and economic impacts on the people affected. Loss due to injury and/or death of breadwinner is usually devastating to families, while materials losses often cause unbearable financial suffering, particularly when agricultural loans are involved. In some areas, farmers have abandoned good cropland because of sheer futility of trying to raise crops to maturity in the presence of uncontrolled wild animals.

Njogu (2004), noted that the nature and extent of human-wildlife conflict, within a forest reserve are related to socio-economic and ecological factors, all of which are very dynamic and sometimes unpredictable, such as droughts. Competition for land is the main unrelenting problem, since human beings tend to occupy and settle permanently in new areas initially by wildlife. In the same vein, human needs increase with rising population numbers. Since the local people depend on agriculture, more land is needed for farming and livestock keeping. The local communities in the study area, as noted earlier, rely on the natural environment for various products. In this context, competition for land and natural resources is intense among people themselves and between the

wildlife. This complicates the conflict nexus between the resources uses and conservation efforts of the forest resources.

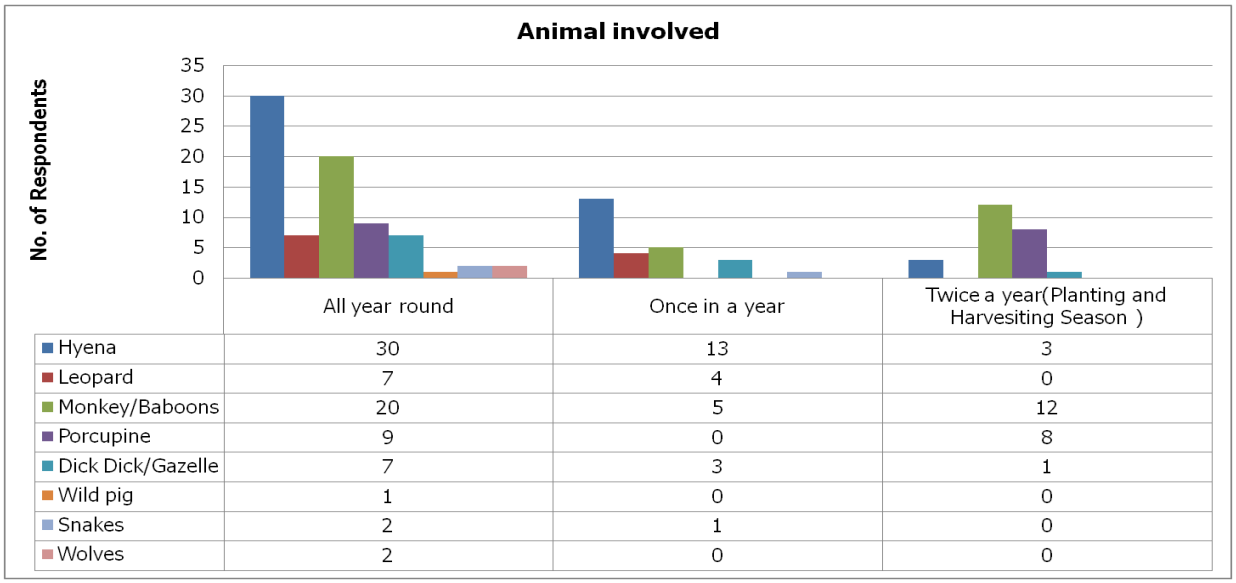

Figure 4: Animals involved in conflicts with humans

4.3.3 Conflict between communities upstream and downstream over scarcity and quality of water

Enderit forest block is a source of several tributaries of River Nderit which is a lifeline of the livelihood in the study area. As shown in Table 5, 62.6% of the respondents noted that River Nderit supplies their water for domestic use. It is also a source of water for irrigation and for watering livestock of the forest adjacent communities.

Table 5: Source of Water for domestic use

Water source	No of respondents	Percent respondents
Enderit river	97	62.6%
Borehole	26	16.8%
Rainwater	31	20.0%
Dams	1	0.6%
Total	**155**	**100.0%**

Source: Forest Management Plan (2010-2017)

River Nderit has a permanent catchment area of 520 km^2 and an estimated annual discharge of 605 X $10^3 m^{-3}$, which is variable depending on the season of the year (Forest Management Plan, 2010-2014)

The study established that there exists conflict over water use between communities living downstream (*Gwa Chati* area) and those living upstream (Gatimu area). Disputes over water in the study area arise due to increasing farming activities upstream and livestock practices within the forest glades. These two activities mainly pollute water downstream and cause temporary shortage during the dry seasons. The study found out that during dry seasons, the communities downstream are forced to compete for few water points leading to dispute which have occasionally resulted to physical confrontation amongst the affected community members.

Water has potential to fuel conflicts. The current situation between the communities living upstream and downstream has caused some tensions in the area with a potential to escalate into fighting. In most cases, water related conflicts are mainly due to the inaccessibility and adequacy of clean water. The brunt of this inequality is borne by women and the poor amongst the community, who cannot afford to drill their own boreholes. The inequalities are complicated by the absence of adequate control over water sources and fluctuating water flows.

4.3.4 Conflict between stakeholders involved in Conservation of the forest

There are various stakeholders who are involved in the conservation of the Enderit Forest block as shown in Table 3 in the context of their rights and responsibilities.

These stakeholders run independent conservation programmes with different objectives as well as expectations. Kenya Forest Service is the central coordinating organ of all the other stakeholders involved in conservation of the forest. It gives permission to the various stakeholders wishing to carry out conservation activities within the forest. The stakeholders who in most cases, are the Non-Governmental Organizations, mobilizes the community members through Community Forest Association towards this cause. Conflicts between stakeholders therefore arise when the conservation interests of the other stakeholders are not in line with those of the Kenya Forest Service.

Table 3: Analysis of the rights and responsibilities of the various stakeholders

Stakeholder	Category	Rights	Responsibilities
Kenya Forest Service	Primary	Protecting forest Controlling other stakeholders Implement government legislations, policies and directives Follow up on forest management plans and strategies Communicate forest management programs Implement provisions of forest management agreement	Facilitate cooperation between stakeholders; Monitoring and evaluation Discussion with the community on the forest issues; Co-ordinate activities Awareness creation Follow up on the protection
Kenya Wildlife Service	Primary	Wildlife conservation and management	Control of game damage to plantation
National Environmental Management Authority	Primary	Enforcement of environmental regulation	Coordination of Environmental Impact Assessment
Kenya Forest Research Institute	Primary	Forest Research	Undertake research on emerging forestry challenges
National Museums of Kenya	Secondary	Research & Conservation of historical sites	Document and gazette cultural sites
Water Resource Management Authority (WARMA)	primary	Provision and regulations of water services	Regulation of water projects in the forest

Office of the President	Primary	Law enforcement and public administration	Provide security and community mobilization and administration
Africa Wildlife organization	Secondary	conservation of wild life species in their habitats	partnering with CFA in tree planting and facilitating the income generating activities and recruitment of scouts among others
Green belt organization	Secondary	tree planting	Partnering with CFA
Kenya Forest Working Group	Secondary	Enhancing technical capacity of CFA as well as advocating for sound conservation policies at National level	Partnering with CFA
Nature Kenya	Secondary	Bird monitoring	Educate on conservation matters
World Visions	Secondary	building of schools, planting trees, sponsoring orphans and physical challenged children, water projects	partnering with CFA
Yokohama university	Secondary	research activities on the tree species	partnering with CFA and K.F.S
University of Nairobi	Secondary	tree planting and research	partnering with CFA and K.F.S
Egerton University Mt. Kenya University	Secondary	tree planting	Partnering with CFA and K.F.S
CMC motors group Local banks and credit Institutions	Secondary	corporate social responsibility	Partnering with CFA and K.F.S
ERMIS Africa	Secondary	developing forest management plan	Partnering with CFA and K.F.S
Mau Sururu Likia Community Forest Association (MASULICOFA)	Secondary	Access to various forest resources; beneficiaries	jointly protect and conserve the forest with KFS and other Stakeholders Capacity building Benefit sharing
Water Resource Users Association (WRUA)	Secondary	Contribute towards, sustainable water resource management	jointly protect and conserve water sources with WARMA and other Stakeholders
Consortium of CBO's: Conservation and Management of Eastern Mau Group	Secondary	undertaking grassroots environmental conservation activities, Supporting Setting up tree nurseries, Tree planting	Coordinating CBO's activities with Eastern Mau Conservation

Source: Field (2017)

4.4 Impacts of the various conservation efforts on the sustainability of Enderit forest block

The forest conservation activities carried by the various groups are highlighted in the following sub-sections.

4.4.1 Restoration/replanting of degraded sites

The main restoration activities in the forest are carried out by Africa Wildlife Foundation (A.W.F), who procures indigenous seedlings to be planted from the Community Forest Association (CFA). The CFA, further supply labour whereas Kenya Forest Service plays overall supervisory role. Yokohama University is also involved in tree planting, but for research purposes.

The study noted that tree planting has achieved notable results in the block with some of the degraded sections having been successfully rehabilitated. According to Tarus *et al.,* (2013), successful tree planting exercise, can be attributed to participatory forest management. Various forest sites have been successfully restored mainly through the support of Green Zones Support and Development Project (GZSDP). However, unreliable weather patterns, pests and diseases, livestock grazing has undermined the survival of the tree seedlings and subsequently the successful rehabilitation of other section of the block. The study noted that efforts by the NGOs have been hampered by limited financial resources coupled with local political will by the local leaders.

4.4.2 Enforcing forest regulations

The Forest Service, Community Forest Association and Africa Wildlife Foundation (A.W.F), collaborate to enforce the existing forest regulations and agreement under the Forest Management Agreement. The wardens, recruited by K.F.S work alongside the scouts recruited by A.W.F from community.

The study further found out that there are approximately ten (10) forest wardens and five (5) scouts charged with enforcing regulations in approximately 8,600 ha of the entire Enderit block.

This number of the forest wardens and the scouts is low given the increased threat to the forest resources. Scouts were recruited from the local community, so as to provide intelligence information to the forest guards, who act on the information to enforce the forest regulations. The study also found out that the scouts are ineffective mainly because they are few in numbers and also in some instances collude with the poachers to abet their illegal activities in the forest.

4.4.3 Awareness creation on conservation activities

Awareness creation amongst the forest adjacent communities on the importance of conserving the forest resources is a significant effort in boosting the forest conservation efforts. When public appreciates the importance of the forest, they change their perception and ultimately support the conservation activities.

Awareness creation is the primary responsibility of the Kenya Forest Service in conjunction with Community Forest Association. These two stakeholders are yet to carry out comprehensive awareness creation among the forest adjacent communities as reported by 70% of the respondents in the study.

This level of awareness creation in the study area is attributed to inadequate capacity within these two stakeholders, as well as internal conflict in the CFA. Consequently, this has reduced its relevance to few sections of the forest adjacent communities.

4.4.4 Participatory Forest Management

Participatory Forest Management, according to Tarus *et al.,* (2013) is an approach used to achieve sustainable conservation of the forests through inclusion of local communities, equity and democratization of control of forest resources. Participatory Forest Management allows forest adjacent communities to use the natural forest products after obtaining permits from Kenya Forest Service.

Kenya Forest Service and the forest adjacent communities, through Community Forest Association (CFA), implement participatory forest management in a structured Participatory Forest Management Plan (PFMP) and Forest Management Agreement signed by both parties.

The participatory forest management framework has achieved significant conservation of the forest. This is corroborated by a study carried out by Tarus *et al.,* (2013), which concluded that participatory forest management has been largely beneficial in restoration programmes within the forest.

However, Participatory Forest Management in the study area has not been fully explored. This is partly because the CFAs have not been very effective. They are grappling with leadership wrangles, conflict of interests and inadequate resources. Furthermore, CFA composition is perceived to be from one tribe. These challenges, the study established, have impacted negatively on the relevance of the association to the forest adjacent communities and ultimately conservation efforts.

Nonetheless, Participatory Forest Management mainly through the existing arrangement between KFS and Community Forest Association has great potential to contribute to sustainable forest conservation. The Community Forest Association, for instance, have people who have worked in forestry sector and have wealth of knowledge and experience in tree planting and management. Furthermore, the members of the CFA have extensive knowledge of the trees as well as their use. Such knowledge is important in education, research and ecotourism efforts which can be used to generate more resources to the communities.

The study noted that community involvement in forest management and environmental conservation is crucial since it contributes to cohesiveness of the community members and ensure sustainability of conservation initiatives.

4.4.5 Riparian reserve pegging

This is an effort by the Water Resource Management Authority (WARMA) and other stakeholders to mark a distance of 60 meters from the river bank for conservation of the river channel. There have been efforts to undertake pegging of River Nderit and its tributaries by the Water Resource Users Authority (WARUA) in conjunction with other stakeholders without much success. Majority of the farmers who border the river channel, have cultivated up to the river bank with much disregard to the riparian reserve. This was found to be contributed by the belief by the farmers that their land includes the river bank and due to lack of proper demarcations by the survey department. As a result, river siltation due to farming activities along the river banks is experienced every rainy season. This has affected the quality of water and also deprived the farms of rich nutrients. The study found that there is need for proper riparian river pegging to reduce these devastating effects of the environment and the river system.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusions

The study concludes that, though Enderit forest block is an important resource not only to the government and the forest adjacent communities, it is facing constant threat from extinction due to the conflicts which have led to further destruction of the forest block and negatively affecting sustainable conservation of the forest. Illegal use of forest resources, for instance slows down the efforts of the various stakeholders to rehabilitate the forest. Conflicts between the various stakeholders involved in the conservation frustrate their original interests in the conservation and subsequently slows the conservation efforts.

Forest resource conservation in Kenya took a paradigm shift, with the enactment of Forest Act, 2005. It gave the communities ability to manage the forest resources, through Community Forest Association (CFA). This presents a great opportunity for conflict resolution and sustainable conservation of the forest block. Sustainable forest resource conservation is both socio-economic and environmental as well as an institutional issue. There is therefore need for all the stakeholders to work together to resolve the existing conflicts, and work towards ensuring that sustainable conservation is achieved. The study further established that there is no harmony in the forest conservation efforts among the various stakeholders which tends to affect the conservation efforts. This needs to be streamlined in line with the forest Act of 2005.

4.2 Recommendations

This study recommends the following measures that would enhance sustainable conservation of the forest resources within Enderit forest block. These recommendations focused on the following: Government agencies, the Africa Wildlife Foundation and Community Forest Associations who are the key stakeholders in the conservation of the forest resources within the block.

Government

The Government working together with all the stakeholders should put in place policy measures that aim at increasing income and generating off-farm employment activities for the forest adjacent communities to reduce forest dependency and consequently enhance biodiversity conservation. The Government should address human wildlife conflicts as soon as it occurs in the study area to deter individuals from taking law into their hands.

The Government should formulate a policy to guide on resource sharing under Participatory Forest Management Framework. This system has not been established in the study area purportedly due to lower revenue collected from the reserve yet the communities know about it. The scheme needs to be established and implemented to plough back to the forest adjacent communities. The mode of revenue sharing should include construction of schools, offering scholarships, carrying out environmental awareness activities and starting income generating activities for the forest adjacent communities.

The Kenya Forest Service should enhance enforcement of the existing laws that safeguard the forest.

Forest adjacent communities need to be trained in ecotourism. This may include training on making arts and crafts that can be sold to tourists. This will earn income for the local people and improve their livelihoods thereby reducing illegal activities in the forest. The Government should recruit more forest wardens and address their integrity issues to restore public confidence. The Government should also demarcate and fence the forest boundary to control forest invasions and illegal forest activities.

Africa Wildlife Foundation

Africa Wildlife Foundation should recruit and train more scouts who shall work together with the Forest Wardens.The Government and relevant non-state actors should build capacity of the Community Forest Association, so that they can effectively carry out their mandate and resolve the internal conflicts.

Community Forest Associations

Awareness about the importance of forest resource conservation should be increased among the local communities. Community Forest Association should therefore sensitize its members about the benefits of conservations through a critical analysis of the cost-benefits accruing from the forest conservation efforts. Kenya Forest Service, working with the CFA, and other relevant stakeholders should strengthen forest management through intelligence gathering and sharing on the illegal activities in the forest. This process shall also profile the poachers.

ACKNOWLEDGEMENTS

The authors of this paper wishes to acknowledge the following institutions for their financial support towards data collection and write up of the paper. Among these is the University of Nairobi for allowing the project to commence and be completed in time and for the award of the scholarship for data collection and report writing. The committee in charge of the Mau Forest Protection and Conservation for allowing access to the forest block. This is highly appreciated.

REFERENCES

Anderson, J., Gauthier, M., Thomas, G. & Wondolleck, J. (1996, Jan-26 April). *Setting the stage*. Paper Presented at the Global e-Conference on Addressing Natural Resource Conflict Through Community Forestry. Forests, Trees and People Programme of the Food and Agriculture Organization of the United Nations, Rome, Italy.

Ayling, R. & Kelly, K. (1997). Dealing with conflict: natural resources and dispute resolution. *Commonwealth Forestry Review*, *76(3),* 182–185.

FAO. (2006). *OECD – FAO Agricultural Outlook 2006-2015*. Retrieved July 18, 2013 from http://www.euroqualityfiles.net

Harwell, E. (2003). *Without remedy: Human rights abuse and Indonesia's pulp and paper industry.* Washington, DC: Human Rights Watch.

Kenya Forest Service. (2010). *Sururu Forest Management Plan (2010-2014).* Nairobi: Government Printer.

Leach, M., & Means, R. & Scoones, I (1999). Environmental entitlements: dynamics and institutions in community-based natural resource management, *World Development* 27(2): pp. 225-247. Great Britain: Elsevier Science Ltd.

Lopez-Carr, D., Martinez, A , Bilsborrow, R.E and Whitmore, T.M (2017). Geographical and Individual determinants of rural out-migration to a tropical forest protected area: the Maya biosphere reserve, Guatemala, *European Journal of Geography*, 8(2):78-106.

Ng'weno, F. (2004). Community Guide to Forest Conservation. *Nature Kenya – Environmental Legislation and Policy Working Group*. 42 P.

Njogu, J.G. (2004). *Community-Based Conservation in an Entitlement Perspective: Wildlife and Forest Biodiversity Conservation in Taita, Kenya..* (PhD Thesis University of Amsterdam) Leiden: Africa Studies Center

Ongugo, *et al.* (2008). *The effects of Internal Human Conflicts on Forest Conservation and Sustainable Development in Kenya*. Paper presented to the ISAC Conference 11th – 19th July 2008 Cheltenham, England

Sang, J. (2001) 'The Ogiek in Mau Forest' [electronic version]. http://www.forestpeoples.org/documents/africa/kenya_eng.pdf (accessed 17 June 2013).

World Bank. (2006b). *Making Finance Work for Africa.* Washington D.C: World Bank Africa Financial Sector Unit.

Yasmi, Y, Kelley, L. & Enters, T. (2010). Conflict over forests and land in Asia; Impacts, causes and management. *The center for people and forest*. RECOFTC; Bangkok, Thailand. Retrieved on April 20th 2013 available at http://www.recoftc.org/site/uploads/content/pdf/Issuespaperweb_109.pdf.