The Community's' Perception on Conservation Strategies of Protection and Replanting in Chepalungu Forest Bomet County, Kenya

Ronoh Leonard Kiprotich
Kenyatta University, Kenya

***Abstract*: - Biodiversity values at ecosystem depend on how people use, manage and interact with the forest trees and trees outside the forest. Between 1990 and 2010 Kenya's forest cover significantly reduced by 6.5%. The aim of this study was to establish local community's perception on conservation measures and discern viable conservation measures in CF. Primary data constituted responses from randomly sampled local community, the herbalist, cultivators and foresters interviewed. Their response rate was 96%, 100%, 100% and 60% respectively that were analyzed in SPSS. Obtaining firewood, grazing fodder, honey, herbs among others occurred very frequently in 88%, 83% 93% and 90% respectively. Cutting, trampling and browsing as disturbance on trees accounted for 73%, 15% and 12% respectively. 98%, 81%, 75% and 40% of the respondents considered charcoal making, grazing, and browsing and firewood collection to be very destructive human activities occurring in CF respectively. The forest has decreased in a margin of 9% between 1985 and 2010 in its area with 7% attributed to clear-cutting established using change detection technique. CF has a tree diversity of 0.6, 0.4 and 0.3 in the edge, core and middle zones respectively measured on Simpson Species Diversity Index. It is dominated by *Acokantheraschimperi, Tecleasimplifolia and Eucleadivinorum* with common height of 3 mand range of 1 m to 7 m. This data was collected using stratified random sampling with established square quadrats along line transects. The forest is managed by protecting and replanting trees which 91% and 76% of residents and forest officers considers inadequate. The local community feels alienated from the conservation as 89% are of the view that conservation management be done by the residents. Collaboration of all stake holders is preferred by 87% of the respondents and 95% proposed that fencing be done compared to 82% in favor of planting trees on farm among other viable conservation measures. Chi-square was conducted to test the significance of association. The forest has been over exploited by unregulated use. It has low tree diversity and diminishing potential for natural regeneration without which no conservation can be said sustainable. The community has the will though not involved thus alienating them. It is recommended that clear guidelines on the legal activities be developed by the forest department with public participation to regulate use of its resources. The forest department to develop inventory on what they are conserving to allow periodic audit that will guide conservation strategies.**

Key words: **CF-Chepalungu Forest, PFM-Participatory Forest Management**

I. BACKGROUND TO THE STUDY

Forests play a significant role in the mitigation of climate change and improving the livelihood of people directly and indirectly across the world as source of food and water. illegal logging threatens 65% of forests which has devastated public forest around the globe, major disruptions usually set up chain of reaction within the ecosystem because they have been little understood and have not been predicted (Areole, 1991). Kenya‟s closed forest canopy is less than 2% as compared to 9% and 21% for the rest of Africa and the world respectively (Oeba, 2011). At independence, Kenya had 1.8 million hectares which is 3.5% of area of country. Kenya has been losing forest at a rate of approximately 1900 ha per year for the last 20 years (CBS, 2004).

Uncontrolled timber harvesting, conversion of forest to farm and pasture land, increased human population road construction, firewood collection have been identified as the main drivers of deforestation (Mahapatra and Kant, 2005). KIFCON (1994) estimated that 40% of the original indigenous forest will be lost by the year 2015. Most forests in Kenya have received introduced species or have at some stage, suffered cultivation, logging or clear felling.

Local Community Perception in Conservation

This study intended to advance the perspective from which conservation efforts by management are viewed by the local community which should directly translate into either a challenge or a booster to conservation. Areole (1991) discerns that to many people forests represent „vacant‟ or idle land which will be brought into uses such as farming, establishment of housing or industrial estates. Positive view of trees be it for ceremonial purpose or otherwise will in no doubt safeguard certain tree species from the devastating hands of men, Kerich (1990).

In Chepalungu Forest, it is essential to establish awareness level of the locals in significance of conservation and its benefits and reasoned thought about the degrading activities spilling into the forest from the community and the objective of participatory management for sustainable development. People are resistant to assertive messages however authoritative their source or medium until they understand the message and the value for themselves and their families in

horizontal communication by word of mouth and work (Pearl and Western, 1992). Participatory Forest Management (PFM) states the need for clear guidelines with definition of community forest associations‟ responsibilities and contributions that are central to its success and the need to build on experiences from within the region, Mathu (2007).

Statement of the Problem

Rapid population increase exerts pressure on natural resources; census record in the study area indicates 723,813 persons in 2009, 782531 in 2012 and expected to reach 891,168 by 2017 of which 80% are youth active and likely to overstretch available resources in all respects.

Undisturbed forest habitats are capable of self-sustenance in terms of vegetative productivity, and without serious fluctuation in species density, richness, abundance and canopy structure. Chepalungu forest has mature trees with nearest neighbor distance of (70–100) m and (500 – 700) m which signifies low density. Its zones are dominated by *Acokantheraschimperi*, *Eucleadivinorum* and *Tecleasimplifolia* indicating low richness and abundance. The range of tree height 1–11 m of signifies poor vegetation productivity and canopy structure. The edge has been cut and encroached virtually degraded; edge effects exposing the forest further. Local community has unlimited interaction with the forest. Having consumed all dry wood; community has turned to cutting young fresh twigs. Uncontrolled tree coppicing is detrimental. The exploitation of is unsustainable indicating that the conservation measures in Chepalungu Forest are not effective.

The underlying issues are that: unregulated human activities are detrimental to vegetation; illegal activities undermine conservation; insufficient community participation is a factor in sustainable conservation. Effective conservation measures are supposed to facilitate the self-sustenance of nature while maintaining complexity of any forest. Chepalungu Forest reserve faces challenge of transformation by human disturbance forms and increased edge effects. It has poor potential for closed canopy growth. Illegal activities include forest clearing, tree poaching, setting on fire vegetation, charcoal making using traditional kilns and driving goats into the forest. Being a gazette forest property of the government, the community has alienated itself from their resource allowing over exploitation. This situation should be managed to avoid total loss of natural habitat. Chepalungu Forest is at verge of extinction. In view of this problem, there was need to determine key factors in degradation and viable conservation strategies in protection, reforestation and restoration for optimal conservation.

Research Question:

The researcher sought to answer the following question

i. What are the perceptions of the local community on the conservation strategies in Chepalungu Forest?

Research Hypotheses

Chepalungu Forest is a protected area managed by Kenya Forest Service of the Ministry of Forestry and Wildlife with authorized and non-authorized human activities taking place in the forest. This study formulated the following research hypotheses:

H01.There is no link between local community's perception and conservation strategies in Chepalungu Forest.

Significance of the Study

This study generated useful information that will assist Bomet forest zonal area in the process of conservation management. From the study, Enactment of relevant policies requires knowledge on human perception of forest conservation. Major management decisions are often implemented by government institutions with very little community participation, this study will assist the Ministry of Environment of Bomet county and department to embrace participatory forest conservation strategies. This study will contribute towards forest policy development in Bomet County and the wider Kenya.

By availing the research findings to the local community the study will assist to improve local awareness of the importance of forest and create positive perceptions among the local people in terms of their role in conservation for sustainable development.

The results of the study may serve as reference for scholars, researchers and students interested in Chepalungu Forest. It will supplement the knowledge already in existence and contribute to the effective conservation strategies hence more sustainable forest management. The salient features and vegetation aspect of Chepalungu Forest will benefit scholarly world.

The study was confined to culture and wetland conservation. Broader scope is required to all fragile natural resources whose existence is threatened by communities living around and depending on them for their livelihood.

II. RESEARCH METHODOLOGY DESIGN

Based on method of data analysis, Mugenda and Mugenda, (1999) descriptive research is a process of collecting data in order to test hypotheses or answer questions concerning the state of subject in the study and descriptive research determines and reports things the way they are. Steps involved in this research were formulation of objective, designing method of data collection, selecting the sample, data collection and analysis.

Survey research provide for a questionnaire or numeric description of trends, attitudes or opinions of population by studying a sample of that population. Questionnaires or structured interviews are used for data collection with the interest of generalizing from a sample to a population (Creswell, 2009).

Interview schedule was used to acquire data from the local community in Chepalungu forest on the resources they obtain, the legal and illegal activities their views on conservation programmes and suggestion for sustainable use of Chepalungu forest resources. Coding data, statistical computation such as averages percentages were worked out. The appropriate statistical computations with the use of appropriate test of significance using the chi-square were carried out to safeguard the drawing of conclusions concerning the study.

III. RESULTS AND DISCUSSION

Overview of the Study Participants

It is important to highlight the characteristics of the study's participants as this assists in interpreting some of the study findings. This section highlights the participants" characteristics including their age, gender, and the duration of time they have lived near the forest and how they interact with the forest.

Members of the Local Community Response Rate

The researcher used structured interviews to obtain data from the local community. The researcher targeted 200 individuals and was able to interview 197 of them. This gave a response rate of 98.5% which is adequate for analysis and reporting of findings (Mugenda and Mugenda, 2003).

Respondents' Age

The researcher interviewed individuals of different ages as summarized below;

Age distribution of members of Chepalungu local community

Age	Frequency	Percent
25 to 35	114	57.9
36 to 45	40	20.3
46 to 55	23	11.7
56 to 65	12	6.1
66 to 75	6	3.0
Over 75	2	1.0
Total	**197**	**100.0**

It shows, more than half of the respondents (57.9%) were between 25 and 35 years old. Those between 36 and 55 years of age accounted for 32% of the individuals interviewed. These findings suggest that most of the people living near the forest are young.

Respondents' Gender

The researcher interviewed members of both genders in order to get a more representative sample. Below is the proportion of respondents of either gender.

Respondents' gender Chepalungu local community

Gender	Frequency	Percent
Male	132	67.0
Female	65	33.0
Total	**197**	**100.0**

As Table 4.2 shows, male respondents (67.0%) were twice as many as the female respondents (33.0%).

Respondents' Education Level

The members of the local community had different levels of education. Table 4.3 summarizes their education levels.

Education levels of members of Chepalungu local community

Level of education	Frequency	Percent
Graduate	5	2.5
Diploma	11	5.6
Certificate	14	7.1
KCSE	31	15.7
KCPE	87	44.2
None	49	24.9
Total	**197**	**100.0**

An examination reveals that most of the people who were interviewed had relatively low levels of education. Individuals with no formal education accounted for 24.9% of the respondents, 44.2% had only KCPE certificates and 15.7% had KCSE certificates. Only 15.2% of the community members had tertiary qualifications of any kind.

Members of Chepalungu local community duration of stay close to the forest

Duration of stay	Frequency	Percent
5 to 10 years	12	6.1
10 to 15 years	17	8.6
15 to 20 years	15	7.6
Over 20 years	153	77.7
Total	**197**	**100.0**

Local Community's Perception on Conservation Strategies in Chepalungu Forest

An examination reveals that the respondents" views on who should be in charge of conserving the forest. Seventy-eight respondents (39.6%) were of the view that residents should take charge of conserving the forest. Seventy-one respondents (36%) were of the opinion that all stakeholders should be involved in conservation. Only 14.2% respondents felt that the role should be left to forest department. Twenty respondents were of the view that conservation should be done by Non-Governmental Organizations, Religious Organizations or Local Authorities.

The respondents were asked to indicate which programmes they knew were being done to conserve the forest. They were required to choose between two options, which were, planting trees and protection campaign. They could also state other programmes in addition to these two.

Known conservation programs being done in Chepalungu forest

Program	Frequency	Percent
Planting new trees	114	57.9
Protection campaign	83	42.1
Others	0	0.0
Total	**197**	**100**

As the results, the community members are only aware of the two strategies, namely; planting new trees and protection campaigns. More people were aware of the tree planting strategy (57.9%) compared to the protection campaign (42.1%). The researcher inquired whether the community members thought the conservation measures in place were very adequate, adequateor in adequate.

Ratings of the adequacy of conservation measures

Rating	Frequency	Percent
Very adequate	4	2.0
Adequate	43	21.8
Inadequate	150	76.1
Total	**197**	**100.0**

It reveals that only 21.8% of the community members were of the view that the conservation measures were adequate with four of them stating that the measures were very adequate. From the findings presented several conclusions can be made, that 39.6% of respondents were of the opinion that the residents had the responsibility of conserving the forest. This shows that approximately one third of the community members are willing to embrace conservation, also it shows that 36% of respondents felt that everyone should participate in conserving the forest and only 14.2% of respondents were of the view that only forest officers should be tasked the role of conserving the forest.

These findings suggest that the community is willing to take part in conserving the forest if the local people are involved. It is important for the communities that exploit forest resources to be involved in conservation (Areole, 1991). This study found that the people in Chepalungu are willing to participate in conservation therefore; the forest management should include them in conservation efforts.

The findings show that the local community is only aware of two forms of conservation measures that are being implemented in Chepalungu Forest, namely; planting of trees and protection campaigns. This leads to the conclusion that the local community is not well-informed about all the conservation programmes being undertaken. At the same time, these findings suggest that there is need to educate the public more about conservation. Table 4.43 shows that most respondents (76.1%) thought that the conservation measures in place were inadequate. This could be because they are not well informed about the conservation activities going on coupled with the fact that these activities may not be very effective.

Hypothesis Test for Perception and Conservation Strategies

This study hypothesized that there is no link between local community's‟ perception and conservation strategies in Chepalungu Forest. To establish this, the study concentrated on the question of who should conserve the forest, and to answer this fundamental question that a strategy gains support or is doubted and rejected by the parties. The local community perceives that conservation strategies are in the wrong hands implying denied right in as far as resource ownership is concerned and thus the success of any strategy in conservation is rendered less effective despite implicit potential. The Kenya Wild Life Service now recognizes that the survival of Kenya‟s protected areas depends on the positive attitude of the local people (Bennun and Graff, 1992).

Perception on who should conserve the forest

Institution	F	%	E
Government	28	14.2	28
NGOs	5	2.5	28
Religious institutions	3	1.5	28
Local authorities	11	5.6	28
Residence	78	39.6	28
Collaboration of all	71	36	28
Not sure	1	1	28

The expected value (**E**) 28 is derived from the mean of the percentage value of the cases. Since some values were less than 10 regrouping was done in order to allow for the establishing of chi-square to test the hypothesis based on

Results of chi-square of Perception on who should conserve the forest

Calculated value	177.22
Degrees of freedom	4
Critical value at 0.5	9.49
Critical value at 0.1	13.28

Since the calculated value is greater than the table value at both critical levels with 4 degrees of freedom, it is on this basis that the null hypothesis is rejected. The forest has been degraded because the conservation strategies are less effective and this can be attributed to the perception among the locals that it should be themselves to spearhead conservation or that they have been undermined in the process of conservation and or otherwise which makes conservation endeavors futile . For the purpose of policy-making, this fact underscores the need

to fully involve the local community in conservation. Participatory forest management is an ideal paradigm that is appropriate in designing conservation plans. This is very important considering that significant percentage (71%) of the respondents is of the view that collaboration of all stakeholders is the way to go in as far as conservation is concerned.

IV. CONCLUSIONS

Participation of the local community is essential for successful conservation efforts. This study investigated how the community perceives conservation strategies that are currently in place in Chepalungu Forest. Three quarters of the respondents were of the view that conservation should be done by the residents and by collaboration of all the stakeholders. This finding is very important for the government because it shows that the community is aware of its role in conservation and is willing to be involved in the efforts to conserve Chepalungu Forest. When asked to state which conservation activities being done in the forest they were aware of, the community members only mentioned tree planting and protection campaigns. Only 23.8% of the people in the community felt that the conservation measures in place were adequate.

The county government of Bomet should create awareness on the link between forest resource and help and livelihood of the community and positive look of trees. Involve the locals in all the steps on conservation and the eventual returns to benefit the whole community. Illegalize all the forms of encroachment into its boundaries. Design economic enhancing project like bee keeping butterfly farming and introduction of wildlife.

These findings lead to two main conclusions. The first one is that the government can enhance conservation efforts by incorporating the members of the community. This can be done through formation and supporting of community forest committee which a forester should be in attendance, community environmental committee among others. Second, the government needs to carry out more education to inform the community about the conservation measures being undertaken. Invite community participation in design and execution of strategies. This will help the community keep tabs on the progress of conservation activities. Finally, this study evaluated the results of chi-square which showed that the calculated value (177.2) was higher than the table value (9.49) thereby adopting the alterative hypothesis that there is a link between community perception and conservation strategies in Chepalungu Forest. It is, therefore, concluded that for conservation plans to succeed, the views of the local community should be considered and more so be fully involved in the process of conservation in order for them to feel a touch of ownership and sustain conservation.

Since the local community is willing to take part in forest conservation, the public should be educated on the need to conserve the forest for both consumptive and non-consumptive benefits, diversify conservation programmes and involve them through the present administrative structures and social formations forest association community.

Recommendations for Further Research

The study recommends that other studies should replicate on:

1.Ways of involving the public in forest conservation, participatory forest management for sustainable forest use.

REFERENCES

[1]. Achieng, A. (1997*). Anthropogenic impact on the population of reprisglandulosa, an endangered tree species in Muguga South forest reserve, Kenya.*The unpublished master‟s thesis.KenyattaUniversity.

[2]. Areole, O. (1991). The Ecology of natural resources in Nigeria: Nigeria: University of Ibadan.

[3]. Bennun, L. A., Craft, S. A. (1992). Conservation of bio-diversity in Africa. Nairobi. National Museums of Kenya.

[4]. BCIDP, (2013). Bomet County Integrated Development Plan (2013-2017). Nairobi. Government printer.

[5]. BCIDP, (2012). Bomet County Integrated Development Plan (2012-2017). Nairobi. Government printer

[6]. BDDP, (2002).Bomet District Development Plan 2002-2008. Ministry of Planning and National Development. Nairobi. Government Printer.

[7]. BDDP, (1996).Bomet District Development Plan 1997-2001. Ministry of Planning and National Development. Nairobi. Government Printer.

[8]. BDDP, (1993).Bomet District Development Plan 1993-1996. Ministry of Planning and National Development. Nairobi. Government Printer.

[9]. CBS, (2004).Economic Survey.Ministry of Planning and National Development, Nairobi.

[10]. Hugget, R. J. (2004). Fundamentals of biogeography: London: Routledge.

[11]. Huxley, J. (1931). Conservation for the 21st century. Cambridge University Press: London.

[12]. Kimani, J. (2011). Sustainable forest management and enforcement strategies in Kenya. Nairobi: Government Printer.

[13]. Khalil, R. (1996). Forest, Deforestation and Human Health.Joypet Printers Ltd. Nairobi

[14]. KNBS, (2010).Kenya Population and Housing Census 2009. Nairobi. ISBN.

[15]. Kwena, Z. A. (2000). "*Towards the use of integrated approach inconservation of Nairobi river basin".*Unpublished Master‟sthesis.Kenyatta University.

[16]. Lomolino, M. Brown, J. H. (2006). Island Biogeography. Sunderland, Massachusetts. Sinauer Associates.Inc.

[17]. Ludeki, J. V. Wamukoya, G. M. &Walubengo, D. (2006). Environmental management in Kenya: A framework for sustainable Forest Management in Kenya. Understanding the new forest policyand forest Act 2005. Nairobi. ISBN.

[18]. MacArthur, R. H and Wilson, E. O. (1967).The theory of island biogeography. Princeton University Press and Oxford.

[19]. Magurran, E. A. (1988). Ecological diversity and measurement: London:Room Hel

[20]. Maina, D. A. (2002).*Potential for on-farm Approach in conservation ofindigenous trees among small-holder farms of Murang'a District.*Unpublished Master‟s thesis.Kenyatta University.

[21]. Mathu, W. (2007). Kenya Wildlife Service Forest Law Enforcement and Governance in Kenya: A paper prepared for the East African Community, led regional process in the framework of the ministerial declaration, Yaoundé, Cameroon Oct 16 2003 on the Africa Forest Law Enforcement and Governance (AFLEG).

[22]. Matiru, V. (2010). Forest cover and forest reservation in Kenya: policy and practice. Nairobi: KFS.

[23]. Mbwesa, J. K. (2006). Introduction to management research. Nairobi: Basic Modern Management Consultants.
[24]. Meffe, K. G. and Carroll, C.R. (1997).Principal of conservation biology. Sinauer associates, Inc.
[25]. Miller, R. Maltby, (2009). SPSS for social sciences. London, Palgrave Macmillan
[26]. Mugenda O. M. and Mugenda A. G. (1999). Research Methods. Nairobi. ACTS press.
[27]. Mworia, G. A. (2008).*Status value and management of indigenous plant of upper Imenti forest reserve, Meru District Kenya.* Unpublishedmaster‟s thesis. Kenyatta University
[28]. Muthoni, K. F, (2012). *Socio-economic factors influencing household wetlandresource use and conservation on Ngaciuma sub-catchment upper Tana, Kenya*. Unpublished master‟s thesis. Kenyatta University.
[29]. Mutiso, M. N. Luwesi, C. N. Kinuthia, M. (2011).Climate change ,pro-poor schemes and water inequality: strengths and weakness of Kauti irrigation water users, association, Kenya
[30]. Newton, C.A. (2007). Forest ecology and conservation: A handbook of techniques. Oxford: Oxford University Press.
[31]. Oeba, V. O. (2011). *Modeling determination of forest cover and carbonsequestration in central Kenya: an application of some statistical model.*Unpublished master‟s thesis. KenyattaUniversity
[32]. Ogutu, Z. A. (1991). "*Human disturbance and vegetation dynamics in theNarok district of Kenya".*Unpublished PhD thesis, Universityof Edinburgh.
[33]. Orodho, J. A. (2008). Techniques of writing research proposal and reports in educational and social sciences. Nairobi: KanezjaHp enterprises Nairobi.
[34]. Osula, M. A (2010).*The impact of culture on wetland conservation in NyandoDistrict, Kenya.*Unpublished master‟s thesis. KenyattaUniversity
[35]. Oyugi, J. O. & Brown J. S. (2008). Effects of human disturbance on composition and structure of Brachystegia woodland in ArabukoSokoke Forest, Kenya.African Journal of Ecology.
[36]. Pearl, M. & Western, D. (1989).Conservation for the 21st century. New York.
[37]. Pullin, S. A. (2002).Conservation Biology Cambridge: University Press. Conservation for the 2I st Centaury. New York: Oxford University Press.