



Community Involvement in Conservation and its Implication on Poverty Alleviation

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ABSTRACT

Community involvement is a participatory approach to natural resource conservation that catalyses a win-win situation in conservation by enhancing biodiversity conservation and improving local livelihoods. This study was done in and around Bonjoge National Reserve in Kenya. The Reserve has diverse wildlife some of which escape to neighbouring farmlands destroying property. This has accelerated outright hostility and resentment among local residents, human-wildlife conflicts and poverty due to wildlife destructions. The study assessed the role of local community involvement in alleviating poverty through sustainable natural resource management. Data was collected from a sample of 250 residents living within 1 km from the reserve boundary using questionnaires, focus group discussions, field observations, and interviews. To facilitate selection of respondents, the study area was divided into three strata in relation to their location to the reserve namely the Eastern (Kaptumek), Western (Pemja) and Northern (Kipsartuk) guided by existing administrative boundaries. Data was analyzed using descriptive statistics, chi-square goodness of fit, chi square test of association and independent t-test. There was a significant difference between the views of local residents involved in conservation and those not involved ($\chi^2=18.496$, $df=1$, $p<0.005$). Incidences of poverty amongst those not involved were more prevalent and higher than those involved in conservation. The difference in prevalence was statistically significant ($\chi^2=21.121$, $df=1$, $p<0.005$) and a significant association between community involvement and poverty ($\chi^2=5.792$, $df=1$, $p=0.016$). Individuals involvement in conservation increased access to natural resources benefits ($t=2.179$, $df=248$, $P=0.03$). It was concluded that Community involvement in conservation has the capacity to alleviate poverty and it is not inevitable to dissociate local communities from conservation. Hence efforts should be geared towards ways of promoting their participation in conservation. Further investigations on the effect of community involvement in areas adjacent to other protected areas in Kenya should be done to compare with the foregoing results on Bonjoge National Reserve.

Keywords: Community involvement, Natural resources, conservation, poverty, multidimensional poverty index,

INTRODUCTION

This paper is a contribution to the ongoing paradoxical debate on the link between poverty, sustainable natural resource management and the delicate balance between poverty eradication and environmental degradation. Roe 2010, views poverty as a multi-dimensional process, encompassing material deprivation, and lack of access to other basic needs like education, health, nutrition and food security. It has increasingly become evident that there exists a relationship between accelerated exploitation of environmental resources and poverty (Heady, 2000; Neumayer, 2005). Heady (2000) argued that there are important links between natural resource management and poverty since many poor people, particularly in developing countries, rely on natural resources for their livelihood, and these people are very vulnerable to any deterioration in the resources.



Despite the significant amount of literature on community participation and natural resource conservation, there is little understanding of the potential and role community involvement can play in enhancing local livelihood standards and poverty alleviation. Local communities have lived with natural resources and the link between natural resource management and poverty alleviation is tied to a holistic community engagement.

Community conservation aims at enhancing sustainability of natural resources by linking their maintenance with poverty alleviation. Community involvement in natural resource conservation is a people-oriented approach to conservation that is increasingly handing over the responsibility for natural resource management to communities. To meet poverty reduction objectives, local community need to be involved in conservation since natural resources provide essentials necessary for human survival (Salafsky and Wollenberg, 2000), especially to the poor who are more dependent on natural resources and are the most susceptible to the conservation costs (Franks, 2008).

Against this background, it can be argued that community involvement in conservation of natural resources is essential for sustainability of natural resources and poverty alleviation. Hence, the main aim of this study was to assess how local community involvement in natural resource conservation and management can alleviate poverty among communities living around Bonjoge National Reserve.

METHODOLOGY

Study Area

The study was undertaken in and around Bonjoge National Reserve located in Nandi County, Kenya. Bonjoge National Reserve (BNR) covers an area of 21.4 km² and located between longitude 34° 48'07.92" E and 34°51.31"E and latitude 0° 00'23.58"N and 0°01'33.53"S. Its altitude is between 1230m and 1715m above sea level. The Reserve is best accessed through the Kaptumek entrance because it offers the added advantage of a visit to Nandi Rock. The other entrances include Kajulu (14 km from Kisumu city) and Kesengei (10 km south of Serem market) (Figure 1).

Bonjoge National Reserve and its surroundings receives high rainfall of between 1,600mm and 2000mm per annum which makes it an ideal place for natural resources to flourish. The Southern half of the study area is affected by the Lake Victoria basin's atmospheric conditions receiving as high as 2,000mm per annum. The long rains start in early March and continue up to end of June while short rains start in mid- September and end in November. Rarely is there a month without some rainfall. The dry spell is usually experienced from end of December to mid-March. Due to the reliability of the rainfall in the entire county, Nandi has a high potential to produce not only various wildlife habitats but also diverse land uses that are more economically promising than the 'conservation without benefits'.

Bonjoge National Reserve was a fertile area of great biodiversity, with rivers, swathed in riverine woodland, flowing down to the Victoria Lake Basin. However, in recent times, it has been characterized by exploitation and depletion of its natural resources due to lack of a more gainful and participatory approach to conservation. Here is a consensus, though widely arguable, that poverty is the major cause of environmental degradation (Duraiappah, 1996).

Poverty exacerbates environment degradation (UNDP, 1990) and environmental problems exhibit a spatial correlation with poverty (Aggrey *et al.*, 2010). Therefore, poverty could pose

a threat to conservation of natural resources in the area as local residents have adopted other land uses that may not be compatible with conservation to alleviate poverty.

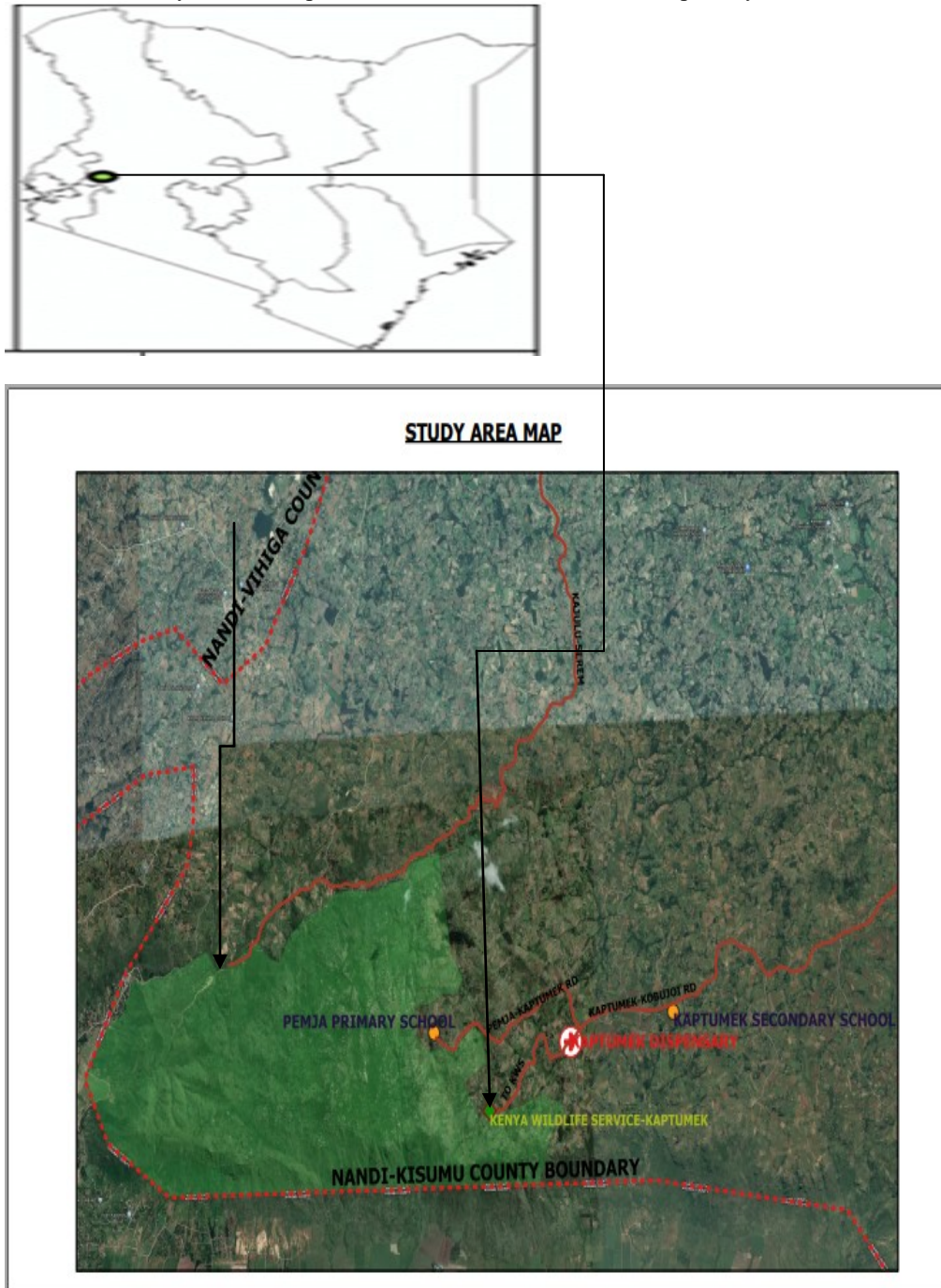


Figure 1. Map of study area



Materials and Methods

The study sampled 250 households from among the local residents living adjacent to Bonjoge National Reserve. The study area was divided into three strata based on existing administrative boundaries and in relation to their location to the Reserve namely: Eastern, Western, and Northern. Sample sizes in the three strata were proportionally selected. Households and their respective respondents were selected using systematic random sampling where every fifth household was chosen and the respondent (household head or the eldest representative) therein issued with a questionnaire to fill, as the researcher observed and noted dimensions of poverty using indicators such as sanitation, shelter conditions, availability of electricity and ownership of some essential commodities.

Simultaneously, the respondent gave the account of children schooling and family members who completed years of schooling, which was capped at 12 years. An observation schedule was dully filled and a multidimensional poverty index (MPI) was used to obtain the weighted score for each individual. Each respondent's MPI was assumed to be the average household MPI. The MPI has ten indicators: two for education, two for health and six for living standards. The health dimension uses nutrition (deprived if there is nutritional information or is malnourished) and child mortality (deprived if a child has died in the family) as indicators. The living standards component has six indicators namely; access to clean drinking water, access to improved sanitation, the use of clean cooking fuel, access to electricity and flooring material. The MPI uses two indicators that complement each other within the education dimension: one looks at completed years of schooling of household members, while the other at whether children are attending school (Santos and Alkire, 2011).

The MPI measures poverty by capturing severe deprivations that each person faces at the same time with respect to education, health and living standards at the individual level. If someone is deprived in a third or more of the ten (weighted) indicators, the index identifies them as 'MPI Poor', (Alkire and Santos, 2010). The indicators for health are nutrition and Child Mortality; Education, (years in school and number of children of school age not attending school; Living Standards was measured using the type of cooking fuel, conditions of the sanitary facility, time spent to and from water points, availability of electricity, shelter state such as the flooring conditions and ownership of assets such as television radio or mobile. MPI the three dimensions are equally weighted, so that each of them receives a 1/3 weight. The indicators within each dimension are also equally weighted. Thus, each indicator within the health and education dimension receives a 1/6 weight and each indicator within the living standards dimension receives a 1/18 weight ($1/3 \div 6$), (Alkire and Santos, 2010; Alkire and Roche, 2012) as shown in the formula below.

Weighted score, $C_i = \sum ((\text{indicators weights}(w_i)) \times (100\% \text{ or } 0\% \text{ depending either deprived or not deprived respectively}))$.

The mean weighted score for those involved and not involved in conservation of natural resources was then compared using the t-test to ascertain if there was a significant difference between the two groups.



RESULTS AND DISCUSSION

From the results, majority of the respondents were male (51%) and aged between 26-50 years (66.4%) while those above 50 years accounted for 10.8%. There was a significantly higher proportion ($\chi^2=135.424$, $df=1$, $p<0.005$) of those with below tertiary education (86.8%) than those with above tertiary education (13.2%). The level of formal education amongst the respondents was therefore alarmingly low. This literacy level (59.2%) was below Kenya's literacy level of 78 % in 2015 (UNESCO, 2015). Table 1 gives a summary of findings on respondents' socio-demographic characteristics.

Table 1: Respondents' socio-demographic characteristics

No.	Variable	Response	Frequency	Percentage
1.	Age (in years)	18-25	57	22.8
		26-35	79	31.6
		36-50	87	34.8
		Above 50	27	10.8
2.	Gender	Male	123	49.2
		Female	127	50.8
		Did not attend school	35	14.0
3.	Education	Primary	132	52.8
		Secondary	50	20.0
		College	30	12.0
		University	3	1.2
4.	Marital status	Single	74	29.6
		Married	160	64.0
		Widowed	13	5.2
		Separated/divorced	3	1.2

Respondents were asked if they had been involved or participate in community projects, are employed in the reserve, and have access to non-timber products, awareness creation and conservation education. More than half of the respondents (64%, $n=250$) had not been involved in conservation of natural resources in Bonjoge National Reserve as compared to 36% who were involved. These results are in tandem with those in other studies in Kenya and Africa (Kipkeu *et al.*, 2014; Andre *et al.*, 2009). From the results it was evident that, there was a significant difference between those involved in conservation and those not involved ($\chi^2=18.496$, $df=1$, $p<0.005$) (Figure 2).

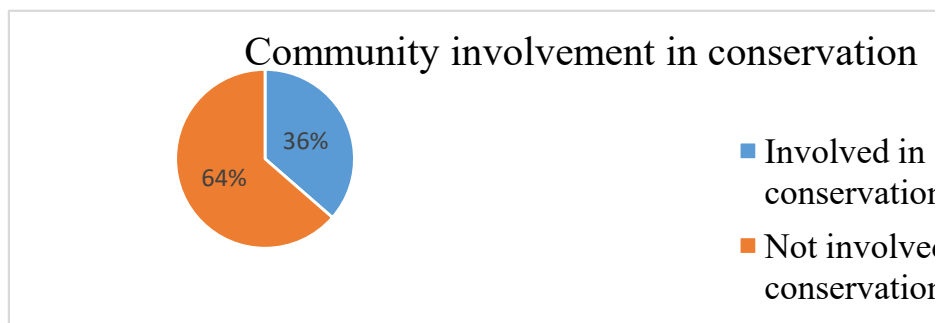


Figure 2: Respondents' involvement in natural resource conservation
Role of community involvement in alleviating poverty



Majority of the respondents (75%) agreed that involvement in conservation plays a significant role in alleviating poverty, 12% disagreed and 13% were undecided. It is evident that there is a significantly higher proportion of respondents who agreed as compared to those who disagreed with the statement that involvement in conservation of natural resource alleviates poverty ($\chi^2=78.140$, $df=2$, $p<0.005$). Community involvement enhances sustainable natural resource management thus increasing awareness about wise resource use, which in turn minimizes poverty by enhancing sustainable livelihoods, health improvement and better access to education. More people become aware of the economic implication of conservation in poverty alleviation. Those who are not involved will be pessimistic to conservation efforts (Petersen, 2003; Shackleton *et al.*, 2002) (Figure 3)

Further analysis revealed that the cross tabulation between local community involvement and weighted score (indicator of poverty) showed a significant association ($n=250$, $\chi^2=5.792$, $df=1$, $p=0.016$).

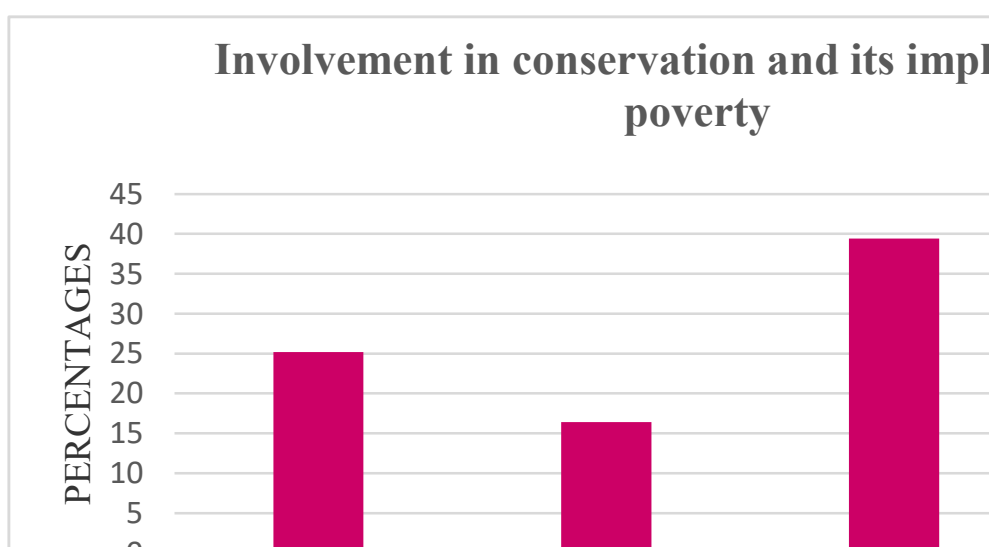


Figure 3: Relationship between community involvement and poverty status

Cross tabulation between local community involvement and weighted score (indicator of poverty) showed significant association ($n=250$, $\chi^2=5.792$, $df=1$, $p=0.016$)

Results of the t-test analysis between the weighted scores (means) for those involved and not involved in conservation showed a statistically significant difference ($t=2.179$, $df=248$, $p=0.03$) implying that community based conservation had positive implications on employment opportunities and access to nature's goods and services that act as substitutes to the expensive non-nature based products. Natural resource conservation within and around BNR provides employment opportunities in areas of tour guiding, field research assistants, researchers, security, maintenance of infrastructure, running establishments in the reserve such as curio shops and traditional dances and associated cultural tourism. All these activities provide income-generating benefits for local people and also support development of remote areas through the provision of infrastructural developments.



Community involvement in conservation necessitates poverty reduction since it gives a compromised access to nature's goods and services that include non-timber forests products such as edible fungi, fruits as well as fuel wood. These study findings are in tandem with those of Chambers and Conway (1992). Increasing both sustainability and livelihoods as net effects of generating income contributes to community development Kiss (2004), and a decline in these natural resources could result in food insecurity as in the case cited by Davenport *et al.* (2012) where coral reef fisheries decline due to climatic and anthropogenic activities led to a significant consequence on food security.

Community participation in natural resource conservation contributes significantly to augmenting health through access to medicinal products from the forest, air purification hence mitigating airborne diseases as well as sustaining a supply of clean water to households. Wild fruits and medicinal plants have been noted for their high nutritious value (Mahapatra *et al.*, 2012; Shackleton and Shackleton (2010). Consequently, a conservation geared to curb climate change drastically lowers incidences of skin diseases and cancerous causing factors. Thus, good health results in non-deprivation in health and hence this reduces poverty.

When conservation is integrated in primary and secondary education, it makes learning enjoyable and interesting thereby minimizing incidences of school dropouts. An increase in education level results in low multi-dimensional poverty and thus poverty reduction (Aref, 2011; Awan *et al.*, 2011; Wedgwood, 2007).

CONCLUSION AND RECOMMENDATIONS

Conclusion

A holistic approach to and sustainable natural resource conservation is achievable through community involvement in conservation. Community involvement in natural resource conservation has the capacity of enhancing biodiversity conservation as well as alleviating poverty among local communities. Although it is inevitable to dissociate local community in conservation, success in natural resources most of which traverse community and privateslands is through involvement of the local community as it has capacity to alleviate poverty which extirpates natural resource degradation.

Recommendations

Since poverty contributes to natural resource degradation, conservation efforts should be geared towards promoting local community involvement in conservation by enhancing education, strengthening local institutions, and enhancing access to nature's goods and services.

Increased conservation awareness campaigns to enhance sound conservation and create healthy ecosystems should be used to promote health by attaching conservation to health.

Natural resource custodians should be empowered to nurture positive perceptions and mitigate the possible determinants of negative perceptions in order to improve community involvement in conservation.

Since education can empower communities and foster greater efforts to alleviating poverty, conservation education should be integrated into education systems particularly at primary and secondary levels to increase student's knowledge, interest, and skills to enable them to play a proactive role in conservation.



Further research on the role of indigenous knowledge in conservation and avenues through which learning institutions can contribute to conservation

REFERENCES

- Aggrey, N., Wambugu, S., Karugia, J., and Wanga, E. (2010). An investigation of the poverty-environmental degradation nexus: a case study of Katonga basin in Uganda. *Research Journal of Environmental and Soil Sciences*, 2(2), 82-88.
- Alkire, S., and Santos, M. E. (2010). Acute multidimensional poverty: A new index for developing countries. *United Nations Development Programme Human Development Report Office Background Paper*, (2010/11).
- Alkire, S., Conconi, A., and Roche, J. M. (2012). Multidimensional Poverty Index 2012: Brief Methodological Note and Results. University of Oxford, Department of International Development, Oxford Poverty and Human Development Initiative, Oxford, UK.
- Andre, Degeorges and Reilly, Brian. (2009). The Realities of Community Based Natural Resource Management and Biodiversity Conservation in Sub-Saharan Africa. *Sustainability*. 1. 10.3390/su1030734.
- Aref, A. (2011). Perceived impact of education on poverty reduction in rural areas of Iran. *Life Science Journal*, 8(2), 498-501.
- Awan, M. S., Malik, N., Sarwar, H. and Waqas, M. (2011). Impact of education on poverty reduction.
- Chambers, R., and Conway, G. (1992). Sustainable rural livelihoods: practical concepts for the 21st century. Institute of Development Studies (UK).
- Duraiappah, A. K. (1996). Poverty and environmental degradation: a literature review and analysis (No. 8). IIED.
- Franks, P. (2008) Promoting equity in the management of protected areas: new evidence of the need for action. CARE International, Nairobi, Kenya.
- Kipkeu, M. L., Mwangi, S. W., and Njogu, J. (2014). Community participation in wildlife conservation in Amboseli Ecosystem, Kenya. *Journal of Environmental Science, Toxicology and Food Technology*, 8(4), 68-75.
- Kiss, A. (2004). Is community-based ecotourism a good use of biodiversity conservation funds? *Trends in Ecology & Evolution*, 19(5), 232-237.
- Mahapatra, A. K., Mishra, S., Basak, U. C., and Panda, P. C. (2012). Nutrient analysis of some selected wild edible fruits of deciduous forests of India: an explorative study towards non-conventional bio-nutrition. *Adv J Food Sci Technol*, 4(1), 15-21.
- Petersen, P. E. (2003). The World Oral Health Report 2003: continuous improvement of oral health in the 21st century—the approach of the WHO Global Oral Health Programme. *Community Dentistry and oral epidemiology*, 31, 3-24.
- Roe, D. (2010). Linking biodiversity conservation and poverty alleviation: a state of knowledge review. *CBD Technical Series*, (55).
- Salafsky, N., and Wollenberg, E. (2000). Linking livelihoods and conservation: a conceptual framework and scale for assessing the integration of human needs and biodiversity. *World Development*, 28(8), 1421-1438.
- Santos, M. E., and Alkire, S. (2011). Training material for producing national human development reports. *MPI: Construction and analysis*. Oxford: Oxford Poverty and Human Development Initiative. Google Scholar.
- Shackleton, C. M., and Shackleton, S. E. (2000). Direct use values of secondary resources harvested from communal savannas in the Bushbuckridge low veld, South Africa. *Journal of Tropical Forest Products*, 6(1), 28-47.
- Shackleton, S., Campbell, B., Wollenberg, E., & Edmunds, D. (2002). Devolution and community-based natural resource management: Creating space for local people to participate and benefit. *Natural resource perspectives*, 76(1), 1-6.
- UNDP Evaluation Resource Centre (1990). Evaluation of UNDP contribution to environmental management for poverty reduction: The poverty-environment nexus.
- UNESCO (2015). Teachers and educational quality: monitoring global needs for 2015 (Vol. 253). UNESCO Institute for Statistics.
- Wedgwood, R. (2007). Education and poverty reduction in Tanzania. *International Journal of Educational Development*, 27(4), 383-396.