CONSERVATION AND DEVELOPMENT OPTIONS EXISTING ON ULUGURU MOUNTAINS, TANZANIA

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ABSTRACT

Effective management of projects on Uluguru Mountains requires that both development and conservation options are weighed and that opportunities and challenges are considered. This study identified various conservation and development options existing on Uluguru Mountains and assessed the perceptions of the local communities toward conservation and development projects. Data were collected using questionnaire for household survey, checklists for focus group discussions and key informants. A random sample of 100 households representing 10% of all households in the study area was picked from Nyandira, Tchenzema and Kibuko villages. Data were analyzed using content analysis and descriptive statistics. Results show that, tree planting, agroforestry and terracing are major conservation options while agriculture, schools and dispensaries are the major development options that exist in the study area. Accordingly, most projects in the study area are integrating conservation and development though with little achievements. Hence, understanding and addressing these conservation and development options is of high significance in limiting biodiversity loss and improving livelihood of local communities on Uluguru Mountains. The study recommends that conservation options should be designed in ways that deliver direct and short term benefits that will motivate communities to practice them and improve their livelihoods. Moreover agriculture being the major development option to local communities on Uluguru Mountains, should integrate conservation options such as agroforestry and terracing to limit land degradation and deforestation.

Keywords: Uluguru Mountains, Conservation and development options, Local communities.

INTRODUCTION

Conservation on the Uluguru Mountains first started during the German colonial period, when several forest reserves were established for the protection of water supply and to slow down soil erosion (World Bank 1992). Uluguru Mountains have continued to play an extremely important role at the local, national and global levels as they support livelihoods of millions of people through material supply and indirect benefits such as ecosystem services (Lalika 2006). Moreover Uluguru Mountains play a key role in agriculture, which is the backbone of the country's economy (URT 2002).

Due to the Mountains' importance a number of conservation projects have been implemented by various organizations such as Uluguru Mountains Agricultural Development Project (UMADEP), Uluguru Land Usage Scheme (ULUS), Uluguru Mountains Biodiversity Conservation Project (UMBCP) and others. These projects aimed to improve local communities' livelihoods and conserve biodiversity on the Uluguru Mountains but there is little empirical evidence about their effectiveness (Burgess *et al.* 2008).

Choices between conservation and development always entail trading-off one land use option over the other and choices among different interests have to be faced continuously (Dahlberg and Burlando

2009). Choices between conservation and development are hard to make since each has different outcomes to human well-being and ecosystem as well (McShane 2006).

On Uluguru Mountains especially in Tchenzema ward there are existing conflicts between local communities and village leaders on the achievements of conservation and development projects and this has created mistrust. A study conducted by UMADEP (2001) revealed that the villagers complained about their leaders not being fully responsible in the development and conservation projects implemented in the area (UMADEP 2001). But the reason for the complaints was not clearly stated. Burgess *et al.* (2008) observed that there are differences in stakeholders' interests on Uluguru Mountains and this has led to contradictions in terms of achievements of conservation and development goals.

The imbalance in terms of achievement of conservation and development projects in Uluguru Mountains calls for conservation and development initiatives to think on the effective measures which can limit biodiversity loss in Uluguru Mountains and also improve livelihood to the local communities. The conformity between conservation and development options cannot be reached if benefits, costs and hard choices between conservation and development are not explored and negotiated honestly (Hirsch *et al.,* 2010). Therefore, this study was conducted on Uluguru Mountains to identify various conservation and development options existing on Uluguru Mountains and assesses the perceptions of local communities toward conservation and development projects. The findings can be used for proper management of conservation and development projects.

MATERIALS AND METHODS

Description of the Area

The study was conducted in three villages on Uluguru Mountains, which are part of the Eastern Arc Mountains (Burgess *et al.* 2008). Specifically the study was conducted in Nyandira, Tchenzema and Kibuko villages all located in Tchenzema ward, Mvomero district, Morogoro region. Tchenzema ward is located on the southwestern slopes of Uluguru Mountains with elevation ranging between 900 m and 2700 m a.s.l. The area is located between 37° 0' and 37° 38' East longitude and 7° 00' and 7° 11' South latitude.

Data Collection

A questionnaire survey was administered to heads of households. Open-ended and close-ended questions were used to gain in depth information on related conservation and development options existing in the study area. Specific variables included in the questionnaire survey were types of conservation and development options existing on Uluguru Mountains, reasons for choosing conservation and development options, perceptions of local communities towards conservation and developments projects and ways of managing conservation and development options. Simple random sampling was employed to obtain a sample population whereby households were selected randomly from the village register. The total number of households in the three villages was 1 008 from which 100 households were surveyed (Table 1). Participatory rural appraisal (PRA) techniques used to collect the information were pair-wise ranking, wealth ranking, resource mapping and focus group discussions which included 10-15 people, including both males and females. A checklist of questions for key informants was employed for conservation and development officers as well.

Table 1: Distribution of households in surveyed villages

Village	Total number of households	Number of sampled households	Sampling intensity (%)
Nyandira	405	40	10
Tchenzema	303	30	10
Kibuko	300	30	10
Total	1008	100	10

Data Analysis

The data from questionnaire survey were coded, assigned variables and analyzed by using Statistical Package for Social Sciences (SPSS Version 12). Quantitative information was subjected to descriptive statistics, which provided information on measure of central tendencies such as frequencies, percentages and cross tabulation.

RESULTS AND DISCUSSION

Choices between Conservation and Development Options

Table 2 shows results of the choices between conservation and development options. Respondents were asked to choose one of four choices: conservation, development, conservation and development or none. Overall, results show that 14% of the respondents chose conservation, 59% chose development, 27% chose both options and no one chose the none option. Findings from personal observation revealed that the choices relied on the performance of and need for conservation and development projects to the local communities and these were the reasons for the small percentage of development option in Kibuko village. This implies the villages had development projects that have either performed poorly or did not meet their direct and sometimes urgent needs. In Table 2 it can be observed that 67.9% of the respondents in Tchenzema chose the development option over conservation (14.3%). This corresponds with findings from focus group discussion that village where the villagers claimed that they needed a dispensary because the existing one was not in good condition. To them development was of higher priority over conservation. In Kibuko village the choice of both options was high (36.7%) compared to Nyandira (26.2%) and Tchenzema (17.9%). This could be because both conservation and development options were highly needed by the residents in Kibuko village.

Table 2: Choices between conservation and development as per responses

Options	Nyandira (n=40)	Tchenzema (n=30)	Kibuko (n= 30)	Total (n=100)
Conservation	5 (11.9)	4 (14.3)	5 (16.7)	14 (14)
Development	26 (61.9)	19 (67.9)	14 (46.7)	59 (59)
Both options	11 (26.2)	5 (17.9)	11 (36.7)	27 (27)
None	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Development options

Results show that majority of respondents 93.3%, 73.3% and 62.5% in Tchenzema, Kibuko and Nyandira respectively chose agriculture as the major development option and statistically significant at ($p \leq 0.05$) (Table 3). Agriculture was of highest priority because it is the major economic activity in the area. This corresponds with findings by Lalika (2006) who found that 83.2% of respondents on Uluguru Mountains were engaged in farming activities. Although crop production is the major source of income for the residents, the quantity of yields has been reported to be low because the land is less productive

(UMADEP 2001). Furthermore discussions with key informants cited poor farming techniques, use of inorganic fertilizers and location of farms to be the causes of land degradation and soil infertility. This has forced people to clear more land to increase crop yield. Conversely findings from personal observation show that most of the farms were located along rivers, near the forest edge and on mountain slopes. Studies have shown that clearing of forest land for agriculture results into global warming, loss of wildlife habitats, environmental degradation and pollution. All these costs are incurred both locally and globally. Biodiversity conservation tends to be traded-off for agricultural production because people have no knowledge of other development options, which are both environmentally friendly and can serve their needs as agriculture does. Moreover, how much conserved land should be sacrificed so as to provide sufficient agricultural options is still ambiguous (Bouma and Huitema, 2010).

Table 3: Major development projects existing in the study area

Development projects	Nyandira	Tchenzema	Kibuko	Statistical significance
Agriculture	25 (62.5)	28 (93.3)	22 (73.3)	0.045*
Dispensary	16 (40)	21 (70)	22 (73.3)	0.11
Schools	16 (40)	6 (20)	6 (20)	0.397
Others	23 (57.5)	5 (16.6)	2 (6.6)	0.668

*Statistically significant ≈ at 5%

Dispensary and schools were the other development options chosen by respondents in Tchenzema and Kibuko. School was the third option chosen by all three villages together. Variation and differences in the development options above could be caused by differences in interests and necessity of a particular option in a particular village. Dispensaries were more important in Kibuko and Tchenzema because the residents were experiencing health service problem. Other development options mentioned were market, road construction, chicken and dairy goat project. These options received higher responses in Nyandira village (Table 3) compared with the other two villages. The reason for this, as reported in the focus group discussion, was because Tchenzema and Kibuko had poor participation in those development options.

Conservation options

Tree planting

Trade-offs arises even between conservation options. Majority of respondents chose tree planting over the other conservation options. The results show that 100%, 95.3% and 77.1% chose tree planting in Nyandira, Tchenzema and Kibuko respectively. These results correspond with the results by Batulaine (2007) who found that about 70% of his respondents in Bunduki and Maguruwe villages were aware of tree planting as the major conservation option. Personal observation showed that despite the fact that many respondents chose tree planting, few households had planted trees on their farms. This is in spite of the awareness and knowledge, which have been given by NGOs such as UMADEP, CARE International and government institutions. Findings from focus group discussion revealed that on Uluguru Mountains, tree planting has been given more priority by many governmental and non-governmental institutions for biodiversity conservation and for local communities' wellbeing. CARE International and UMADEP were reported to be among the NGOs which have been promoting tree planting in the study villages. However, the local communities have neglected this practice claiming that it has no direct benefit to their lives. This statement was supported by one

respondent who said that, *"I could only plant trees if they bring quick benefit, but it is better to plant Vegetables which I know take only a few months than fruits or timber which take years till harvesting period*." These findings correspond with key informants who pointed that most of the local communities do not choose to plant trees in spite of the awareness because it does not give direct benefit to them.

Furthermore the villagers pointed out land scarcity as the reason for them not to plant trees. Therefore, the conservation community should put more effort in conducting awareness creation sessions on the importance of trees and tree planting options through agroforestry to minimize land requirements for planting trees only. Also, the types of trees planted should be able to produce short-term and direct benefits to the local communities. Planted trees can bring many benefits to the local communities such as charcoal, building poles, timber, firewood and medicines and reduce pressure on the forest reserves. But, changing local communities' perceptions and interests requires efforts and agreements (Mitinje, 2004).

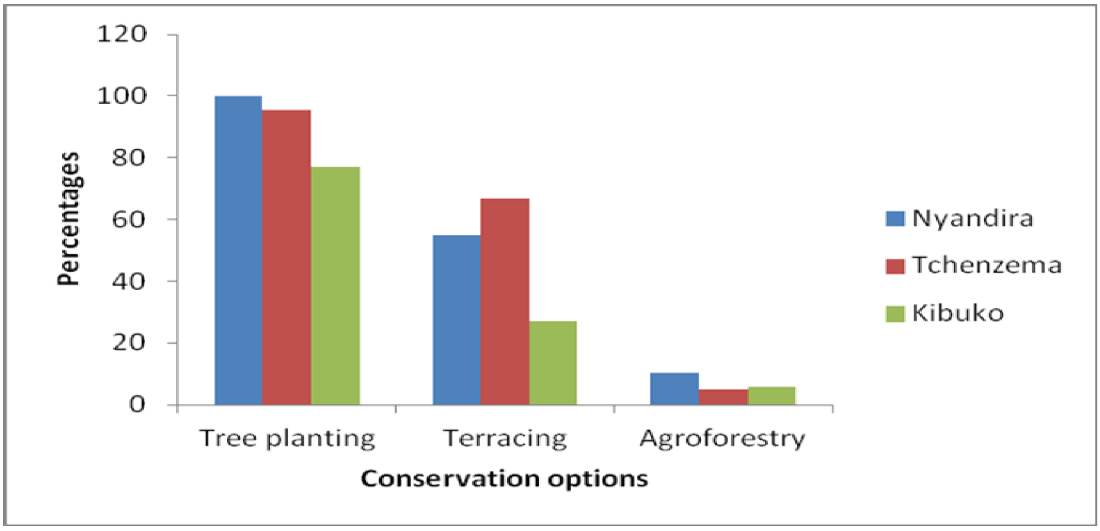

Figure 1: Conservation options in Nyandira, Tchenzema and Kibuko village

Terracing

The results in Figure 1 show that about 55.1%, 66.7% and 27.1% respondents in Nyandira, Tchenzema and Kibuko respectively mentioned terracing as the second conservation choice present in their villages. In Tchenzema village, the response was high (66.7%) compared to the other two villages. The reason for this could be that terracing was much adopted in the village.

Terracing is used by farmers on Uluguru Mountains for soil conservation since their farms are located on steep slopes. They do so to prevent soil erosion and conserve soil fertility (Kajembe *et al*., 2005).

Agroforestry

The results in Figure 1 show also that 10.2%, 4.8% and 5.9% reported agroforestry as the third conservation choice practiced in Nyandira, Tchenzema and Kibuko respectively. This does not imply that agroforestry is not considered as important by the villagers because most of the farmers are practicing it. This was only because of interests and priority from respondents about their choices among given conservation options. Agroforestry is still practiced as a solution to land degradation. As observed by the researcher, home gardens, alley cropping and mixing of trees with agricultural crops

are key agroforestry practices in the study area.

Reasons for choosing conservation, development or both option

About 65.0%, 61.3% and 44.8% of the respondents in Nyandira, Tchenzema and Kibuko villages respectively reported to had chosen development options because they got direct benefits (Table 4). The percentages in Nyandira and Tchenzema were high (65.0% and 61.3%) compared to Kibuko (44.8%). Findings from the focus group discussion in Kibuko village revealed that conflicts between village leaders and villagers on projects were the major reason causing low percentage (44.8%) in Kibuko. The villagers complained that there was no openness in the way money was spent. This raised conflicts and mistrust and caused the villagers to perceive the government as unjust. Dahlberg and Burlando (2009) observed the same in South Africa. Direct and short-term benefits accruing from development options motivate people to choose development over conservation projects. The reason for choosing conservation option was awareness and environmental protection (Table 4). Findings from focus group discussion and key informant interview show that local communities were aware of conservation benefits such as prevention of soil erosion, improving soil fertility, microclimate amelioration and maintenance of water sources.

Table 4: Reasons for choosing conservation, development or both options

Options	Reasons	Villages		
		Nyandira	Tchenzema	Kibuko
Conservation	Environmental protection	3 (7.5)	4 (14.8)	6 (20.7)
	Awareness	2 (5.0)	1 (3.7)	0 (0.0)
Development	Direct benefits	26 (65.0)	18 (61.3)	13 (44.8)
	Livelihood improvement	0 (0.0)	1 (3.7)	0 (0.0)
	Experience	2 (5.0)	1 (3.7)	0 (0.0)
Both	Important for development	11 (27.5)	4 (14.8)	10 (34.5)

Local Communities Involvement in Conservation and Development Projects

About 77.5% and 66.7% of the respondents in Nyandira and Tchenzema villages respectively stated that they were involved in conservation and development projects (Table 5). These results were significantly higher compared with 54.3% in Kibuko ($p = 0.014$). Community involvement in conservation and development projects is very crucial. Involving communities in conservation and development projects increases trust and creates a sense of ownership among community members. Moreover communities' involvement is necessary in achieving conservation and development goals (Brown 2002). If communities are denied their rights conflicts and mistrust will occur and conservation and development goals will not be achieved (Hausser *et al.,* 2009). This was revealed in Kibuko village where villagers were not fully involved in conservation and development projects. This created conflicts leading to failure of some of the projects in the village. For example, in focus group discussion, it was revealed that CARE International brought three projects to Kibuko and Bunduki villages which were beekeeping, tree planting and chicken rearing projects but the projects succeed in Bunduki and failed in Kibuko.

Table 5: Communities involvement in Conservation and Development projects

	Villages (All =100)			
Involvement	Nyandira (n=40)	Tchenzema (n=30)	Kibuko (n=30)	Significance
Involved	31 (77.5)[I]	20 (66.7)	16 (54.3)	0.014*
Not involved	9 (22.5)	10 (33.3)	14 (46.7)	0.423

*Statistically significant at 0.05

Communities Perception Toward Conservation and Development Projects

Table 6 shows perceptions of respondents on projects present in their villages. Respondents were asked to state how they viewed most of the projects under implementation in their villages whether they were purely conservation, purely development or integrated conservation and development. The majority (66%) reported that most of the projects were integrating conservation and development (Table 6). About 69.7%, 80%, and 43.6% of respondents in Nyandira, Tchenzema and Kibuko villages respectively stated that projects in their villages integrated conservation and development. However, results from focus group discussion (FGD) revealed that most of the projects had failed to achieve both conservation and development objectives. It was stated that if projects were developmental, they carried out only some conservation activities and vice versa. Therefore, relying on either conservation or development activities led the communities to perceive the projects as purely for conservation or purely for development.

Table 6: Respondents' perceptions of projects in their communities

	Villages			
Perception	**Nyandira**	**Tchenzema**	**Kibuko**	**Total**
Purely conservation	6 (15.0)	6 (20.0)	7 (23.0)	19 (19.0)
Purely development	4 (10)	1 (3.3)	2 (6.7)	7 (7)
Integrate conservation and development	28 (69.7)	24 (80.0)	13 (43.6)	60 (66.0)
Don't know	2 (5.0)	4 (13.3)	8 (26.7)	14 (14.0)

Ways of Managing Conservation and Development Options

Table 7 shows that about 78.3%, 68.8% and 56% of the respondents between 31-60 age group in Nyandira, Tchenzema and Kibuko villages respectively stated that communities should be involved in planning and decision making process as a way of managing conservation and development options. About 33.3% of the youth in Kibuko village were of the opinion that policies regarding conservation and development projects should be framed so as to address complexities present in managing them. On average the 31-60 age group stated that all three ways are desirable in managing conservation and development options.

Table 7: Ways of managing conservation and development options as perceived by respondents by age groups

	Nyandira (n=40)			Tchenzema (n=30)			Kibuko (n=30)			Average		
Responses	1	2	3	1	2	3	1	2	3	1	2	3
Involvement in planning and decision making processes	13	78.3	8.7	12.5	68.8	18.8	18.8	56	25	14.5	67.7	14.1
Conservation and development options should be made clear to community members	14.3	71.4	14.3	25	68.8	6.2	15.4	53.8	30.8	14.9	62.6	13.7
Policies regarding conservation and development should be made clear to involve complexities present in managing conservation and development projects	27.8	55.6	16.7	16.7	66.7	16.7	33.3	58.3	8.3	25.9	60.2	10.5

1= 18-30 years, 2 =31-60 years, 3= Above 60

CONCLUSION AND RECOMMENDATIONS

Conclusion

Perceptions of local communities show that, most projects being implemented on Uluguru Mountains seem to integrate conservation and development options. This study found that, major conservation options are tree planting, terracing and agroforestry; while agriculture, building of schools and dispensaries are the most important development options.

Development options are the most preferable because they often deliver direct and short-term benefits. Although some conservation options are of high value, they are not practiced by communities because they take long time to deliver benefits. Preference for conservation options is dictated by the level of environmental awareness and land degradation which threatens agricultural productivity. Hence, understanding and addressing these conservation and development options is of high significance in limiting biodiversity loss and improving livelihood of local communities on Uluguru Mountains.

Recommendations

Based on the study findings, the following recommendations are pertinent and desirable for managing conservation and development options in the study area.

i) Project implementers should strengthen community involvement in planning and decision making processes in order to reduce mistrust and conflicts towards the achievement of conservation and development goals.

ii) Conservation options should be designed in ways that deliver direct and short term benefits that will motivate communities to practice them and improve their livelihoods.

iii) Agriculture being the major development option to local communities on Uluguru Mountains, should integrate conservation options such as agroforestry and terracing to limit land degradation and deforestation.

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