

Stakeholders' diverging interests and emerging resource use conflicts in apiculture in West Usambara Mountains, Tanzania

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Abstract

A study was conducted in West Usambara Mountains, Tanzania to assess stakeholders diverging interests and emerging resource use conflicts in apiculture with respect to natural resource management (NRM) by local communities. The study aimed at generating knowledge base for effective governance of NRM by farmers from which lessons could be drawn for guiding appropriate NRM. Participatory Rural Appraisal (PRA) tools including focused group discussion, questionnaire survey and participant observation were used for data collection from 98 respondents randomly selected. Data collected were analysed using descriptive and inferential statistical analyses. Results show that majority of individual small scale farmers (73%) were driven by social economic interests than NRM. On the other hand, farmers' groups (10%) showed high interest in both economic and conservation of natural resources followed by faith based organisations (FBOs) (7%). Stakeholders' diverging interests in apiculture were significantly influenced by educational level ($p=0.010$); household size ($p=0.006$); marital status ($p=0.011$) and major economic activities ($p=0.029$). The most prevalent conflicts in the study area were between farmers practising apiculture and fellow farmers (74%) followed by neighbours (16%). The study demonstrated that for small scale farmers to engage in NRM, economic interest is vital. Recommendations on areas of further intervention are given.

Key words: diverging interests, resource use conflicts, apiculture, Usambara Mountains, Tanzania.

Introduction

Farming in the mountainous areas of East Africa is the major source of income for the majority of households both for income generation and subsistence. However, with increasing population and land scarcity, of recent there has been an increase in farming on fragile lands including the valley bottoms and wetlands. Bush fires are common in villages surrounding the mountainous areas of East Africa. The main sources of bush fires are land preparation, hunters, firewood collection and honey gatherers (Kimaro *et al.*, 2010).

Over the past decades, increased population and stakeholders' divergent interests have put excessive pressure on natural resources (NRs) leading to over exploitation, degradation and resource use conflicts. Degradation of NRs has contributed to progressive decline in resource productivity. For effective conservation of NRs, the link between rural livelihoods and natural resource management is of fundamental importance to national prospects for economic growth and poverty reduction. Natural resource management, in turn, is principally a function of environmental governance. However, stakeholders diverging interests, perceptions and the emerging conflicts are key challenges that need to be addressed if the situation of land degradation is to be reversed. This study was conducted to provide critical analysis of stakeholders' divergent interests with respect to apiculture at local level in order to generate knowledge base for effective governance of NRM by farmers and to draw lessons for guiding conservation of NRs efforts in hot spot areas.



Materials and methods

Description of the study area

The study was conducted in West Usambara Mountains (4° 24' and 5° 00' S and 38° 10' - 38° 36' E) in three agroecological zones, covering about 184 km². The surveyed zones include warm dry (Mwangoi village), cold dry (Lukozi and Malindi villages), and cold humid comprising the villages of Migambo and Lushoto suburbs. These areas are potential for production of honey and other bee's products due to their favourable climatic conditions and presence of various vegetations (fruits plants and natural vegetations) which are best forages for honey bees (Msita *et al.*, 2010).

Data collection

The study employed a cross sectional design which allows data to be collected at one point in time from a selected sample of respondents using standard survey techniques including household questionnaire survey, focused group discussions, participant observation and key informants. Purposive sampling procedure was applied where the study area was stratified into three agro-ecological zones as indicated in Table 1. The sampling frames were the lists of beekeepers and non beekeepers respectively in each zone. The beekeepers that belonged to groups were randomly sampled from the group lists while individuals practicing apiculture were randomly sampled from a separately prepared list. Non - beekeepers were selected at random from a list of farmers that are not involved in beekeeping. A total of 98 respondents were interviewed using questionnaires to obtain primary data of the study area.

Table 1: Household sampling

S/N	Zone	No. of households	Population	Sample size
1	Cold Humid (Lushoto suburbs/ Migambo)	4781	23236	36
2	Cold and dry (Lukozi/Malindi)	3133	14100	32
3	Warm dry (Mwangoi)	1086	4890	30
Total		9000	42226	98

Both male and female households were eligible for interview. The data collected included, socio-economic data of households, identification of stakeholders and their interests, major economic activities undertaken by households, type and nature of resource use conflicts, and socio-economic factors (age, household size, level of education, marital status, duration of residence in the area, level of interest in apiculture and land size).

Data analysis

Content analysis (Singleton *et al.*, 1993) was used to analyse the information collected through verbal discussions with the key informants. The data collected through structured questionnaire was analysed using both descriptive and inferential statistical analyses carried out in Statistical Package for Social Sciences (SPSS 16.0) and Excel. Frequencies and percentages, Tables and Figures were used to summarize the data. Cross-tabulations involving Chi-Square tests were also employed in testing association between variables in the different agro-ecological zones. Inferential statistical analyses were carried out to provide an idea about whether the patterns described in the sample are likely to apply to the population from which the sample was taken. Logistic regression models were developed and used to establish the relationships between dependent and independent variables.

Results and discussion

Stakeholders interests in apiculture and NRM in the study area

Table 2 presents the list of various stakeholders and their respective interests in apiculture. The results show that the majority of small scale farmers who constitute 73% were involved in apiculture with economic focus as their primary interest. On the other hand beekeeping groups constituting 10% of the stakeholders in apiculture showed high interest in both economic and conservation of natural resources followed by faith based organizations (7%). MWAMBOA and TAMILWAI beekeeping groups in Mwangoi and Migambo villages were practising beekeeping with the central objective of conserving river banks and water sources respectively while at the same time aiming at income generation. These results were similar to those described by Woodcock (2002) in the Eastern Arc Mountains, Tanzania, who noted that stakeholders’ interests in natural resource management were influenced by economic demands, livelihood needs, institutional mandate and geographical proximity (adjacency) to the natural resources.

Table 2: Types of interests by various stakeholders in apiculture in the study area

Stakeholder	No.	(%)	Type of Interest	Nature of beekeeping	
				Traditional	Improved
Small-scale individual beekeepers	30	73	Economic (Income generation)	Traditional	Improved
Beekeeping groups Mwamboa, Tamilwai, Asali Yetu Mtumbi, Wafungaji Wanyuki	4	10	Economic (Income generation); conservation of natural resources (Conservation of catchments, water sources); food security; economic (Beehive making, harvesting gears); capacity building (ToTs)	Traditional	Improved
FBOs (Catholic and Lutheran [Irente Farm] churches	3	7	Conservation of natural forest; biodiversity conservation; economic (Income generation)	Traditional	Improved
TAFORI, SEKUCO, ASARECA and Kwemaranba Sec. School	4	10	Capacity building (ToTs); research and Development of innovative technologies; conservation of natural forest		
Beehive makers	-		Economic (income generation through beehive sells)		
Total	41	100			

TAFORI = Tanzania Forest Research Institute, SEKUCO = Sebastian Kolowe University College and ASARECA = Association for Strengthening Agricultural Research in Eastern and Central Africa

Apiculture in developing countries is commonly viewed as a pro poor income generating activity (Lietaer, 2009; FAO, 2009). This fact is attributed to its low start-up capital and labour requirements. It is apparent from this study that organizing small scale farmers into beekeeping groups tend to enhance their interests in apiculture so as to conservation of natural resources while at the same time providing sustainable alternative livelihood (Ranthore and Jain, 2005).

Factors Influencing stakeholders’ diverging interests in Apiculture in the study area

Table 3 presents the results on key factors influencing stakeholders’ diverging interests in apiculture in the study area. The results indicate that household size, level of education, marital status and major economic activities had significant ($p < 0.05$) influence on stakeholders’ diverging interests in apiculture while age, sex and ethnicity were not significant ($p > 0.05$).

Household size

The results show that household size is statistically significant and positively correlated with stakeholders' diverging interests in apiculture. The result implies that the larger the household size the higher the chances that members of the household would develop diverse interests in various livelihood strategies. This factor is thus likely to contribute positively to apiculture and hence natural resource management due to the fact that apiculture has an economic incentive (Lalika and Machangu, 2008).

Table 3: Factors influencing stakeholders' diverging interests in apiculture in the study area

Variable	B	S.E.	Wald	df	Sig.	Exp(B)
Household size	1.573	0.567	7.692	1	0.006*	4.821
Level of education	0.344	0.134	6.576	1	0.010*	1.411
Marital status	3.097	1.219	6.460	1	0.011*	22.133
Major economic activities	2.440	1.117	4.768	1	0.029*	11.471
Age	0.411	0.256	2.578	1	0.108ns	1.509
Sex	0.632	0.530	1.422	1	0.233ns	1.881
Land size	-0.183	0.175	1.091	1	0.296ns	0.833
Ethnicity	-0.964	0.669	2.079	1	0.149ns	0.381
Constant	-7.097	1.813	15.328	1	0.000*	0.001

* Significant at $p < 0.05$; Ns Not significant at $p < 0.05$

Level of education

Table 3 shows that level of education was positively correlated with stakeholders' diverging interests in apiculture and statistically significant at $p < 0.05$. Increase in the level of education of the communities has been reported in many studies to be associated with increase in the awareness of the communities' on natural resource management attributed to the development of diverse interests in livelihood activities that have positive outcome to natural resource management (Kajembe, 1994; Mbwilo, 2002). For example, Katani (1999) in his study in Mwanza District, Tanzania demonstrated that increase in level of education increases the interest and willingness of local communities to participate in natural resource management such as tree planting and contour farming.

Marital status

The results in Table 3 show that marital status of the respondents was positively correlated with stakeholders' diverging interests and was statistically significant at $p < 0.05$. The plausible explanation is that married households have larger families which call for household heads to look for more basic needs (Kessy, 1998). This in turn calls for households to explore and expand their interests in diverse livelihood activities which may include apiculture. Mayeta (2004) reported that marital status influences decision making at the household level, including the use of natural resources.

Major economic activities

The results in Table 3 show that major economic activities were positively correlated to stakeholders' diverging interests and were statistically significant at $p < 0.05$. In the study area, given the nature of major economic activities include annual cropping, vegetable production and livestock farming and apiculture and the land scarcity increased multiple interests is likely to exert pressure on natural resources including land, water and forests (Mowo *et al.*, 2002). Introduction of modern beekeeping by SUA-ASARECA project is an innovative technological intervention that is likely to influence communities' multiple interests in major economic activities towards conservation of natural resources (Kimaro *et al.*, 2010).

Types of resource use conflicts prevalent in apiculture in the study area

Resource use conflicts. Table 4 present the types of resource use conflicts prevalent in apiculture in various agroecological zones in the study area. The results show that the conflict between beekeepers and other farmers was the most prevalent accounting for 74.2 and 57.4% out of 98 respondents interviewed and 54 interviewed beekeepers, respectively.

Table 4: Types of resource use conflicts in apiculture in various agroecological zones in the study area

AEZ	Type of resource use conflicts				Total
	Beekeepers and fellow farmers	Individuals and beekeeping groups	Beekeepers and neighbors	Beekeepers and middle men	
Cold humid	7(58.3)	1(8.3)	4(33.3)	-	12(100)
Cold dry	14(93.3)	-	1(6.7)	-	15(100)
Warm dry	2(50)	1(25)	-	1(25)	4(100)
Total	23(74.2)	2(6.5)	5(16.1)	1(3.2)	31(100)

Numbers in brackets denote percentages

Other reported conflicts were between beekeepers and their neighbours (16.1%), individuals and beekeeping groups (6.5%) and individuals within the groups. The results suggest that there are more conflicts when beekeepers operate as individuals. The type and level of resource use conflicts in the study area were identified with reference to categories of stakeholders (Mbeyale, 2009). Therefore, the type of resource use conflicts fall in the category of inter micro-micro conflicts which involves people from within the same community. Resource use conflicts emerge because stakeholders have different interests for natural and cultural resources (Matthias, 2005; Sanginga *et al.*, 2007).

Conclusions and recommendations

From the study the following pertinent conclusions are made.

- The stakeholders involved in apiculture in the study area have diverse interests including natural resource conservation and livelihood mainly driven by socio- economic interests
- The study indicated that mobilizing small-scale farmers into groups would help to manage and mitigate stakeholders diverging interests in apiculture in to natural resource management
- For small-scale farmers to engage in natural resource management, economic interest is vital
- Stakeholders’ diverging interests in apiculture were significantly influenced by educational level; household size; marital status and major socio-economic activities.
- Increasing the awareness of the stakeholders including women in decision making will likely help to manage the divergent interests
- The most prevalent resource use conflicts are attributed to stakeholders different interests for natural and cultural resources largely influenced by decisions on land utilization and conservation of natural resources
- It is recommended that efforts should be directed towards promotion of apiculture as an economic incentive for sustainable natural resource management and improved crop production
- A stepped-up and focused approach for mobilization of small-scale farmers and establishment of a coordinated framework for natural resource management is strongly recommended
- The many resource use conflicts calls for a pluralistic approach that recognizes the multiple perspectives of stakeholders and the diverse interests in management of natural resource

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