

Full Length Research Paper

Benefits and access to natural resources influence conservation perceptions and relationship between local people and other stakeholders: The case of Serengeti ecosystem, Tanzania

Iddi M. Mfunda^{1,2*}, Tomas Holmern¹ and Eivin Røskaft¹

¹Department of Biology, Norwegian University of Science and Technology (NTNU), Realfagbygget, N-7491 Trondheim, Norway.

²Ministry of Natural Resources and Tourism, P. O. Box 9372, Dar es Salaam, Tanzania.

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Tanzania, like other countries in Africa has adopted collaborative management as one of its conservation and rural development strategies. However, resource use conflicts have been resurfacing among resource stakeholders. This study was carried out to review relationships between local people and government conservation institutions, district councils, and the private investors in Western and Eastern Serengeti. It is based on the questionnaire survey of households in villages surrounding Serengeti National Park. The findings showed a positive relationship towards Community Based Conservation outreach schemes, a mixture of positive and negative relationships towards the national park and private investors, and a positive relationship towards district councils. The results further suggest that, local people's perceptions and relationship to stakeholders relied on benefits and access to natural resources. The variables type of CBC and the number of livestock had most support in the models, whereas the variable education had less support in explaining local peoples' perception and relationship, but that the pattern depended upon the type of stakeholder. We recommend that government and private investors improve access to benefits and provide good link between wildlife and benefits, widen the coverage of CBC outreach schemes, strengthen education and awareness programs, design mechanism to coordinate the ecosystem, and develop guidelines for participatory management. Adherence to good governance practices would make wildlife conservation a successful endeavour.

Key words: Benefits, community based conservation, conflicts, stakeholders, Serengeti, Tanzania.

INTRODUCTION

Community-Based Conservation (CBC) is a new conservation and rural development approach and has been widely adopted in Sub-Sahara Africa, and rests on devolution and decentralization of conservation strategies (Kiss, 1990). CBC is an alternative to the traditional

fences-and-fines approach (Hackel, 1999; Songorwa, 1999), and aims to involve local people in the planning and management, and the sharing of benefits from conservation (Gillingham and Lee, 1999; IIED, 1994). The success of this new approach to conservation rests on the well designed economic instruments, natural resources-based policies, and legislative development (Balint, 2006; Jones and Murphree, 2001; Virtanen, 2003). The initial impression of CBC implementation shows limited achievements (Balint and Mashinya, 2005;

*Corresponding author. E-mail: mfu_nda@yahoo.co.uk.
Tel: +255 754 28 58 68.

Hackel, 1999). Inadequate participation in decision making is among the key limitations, and have repercussions for shaping local people's attitudes towards natural resources (Agrawal and Gibson, 1999; Gillingham and Lee, 1999). As a result, there have been disagreements and disputes over access to, and control over natural resources between local people and other natural resources beneficiaries.

In Tanzania, the Serengeti National Park was before its establishment in 1951 occupied by Maasai pastoralists and Ikoma hunter-gatherers, who were excluded from their traditional use of natural resources when it was gazetted (Kideghesho et al., 2007; Neumann, 1998). Another factor that accentuates conflicts with protected areas is human population growth and high immigration rate to villages closer to protected areas (Fratkin, 1997; Kaltenborn et al., 2008; Kiringe et al., 2007). Local people's perceptions of conflicts are different from other stakeholders' viewpoint. They view protected areas as essence of resource-use conflicts (Bonner, 1993; Neumann, 1998). The understanding of local people's perceptions on the relationship with government conservation institutions, district councils and private investors is necessary because of their positive and negative influences to conservation.

Africa has extensive experience of CBC outreach activities, where Zimbabwe's Communal Area Management Programme for Indigenous Resources (CAMPFIRE) is well-known (Hackel, 1999; Murphree, 1993). In Tanzania, the Serengeti Regional Conservation Project (SRCP) and Community Conservation Services (CCS) of Tanzania National Parks were among the first projects to involve local people in wildlife management (Barrow, 1996; Mbano et al., 1995).

Recently, Tanzania has also introduced Wildlife Management Areas (WMA), where local people have more control over wildlife on village lands (URT, 1998). The WMAs are expected to enhance participatory management, strengthen local governance of natural resources, and improve the levels of benefits from conservation. Despite some degree of success, most programs and projects have failed to achieve participatory decisions, become independently sustainable beyond development partner's support and effectively link participation to benefits from wildlife (Gillingham and Lee, 1999; Holmern et al., 2002). Hence, resource use conflicts continue to persist between local people and other stakeholders over conservation and human development goals and values (Hackel, 1999; IIED, 1994).

In this study, we examine local people's perceptions towards government conservation institutions, district councils, and private investors in the West and East of Serengeti National Park. Our specific objectives were to: explore local people involvement in conservation and their relationship with the identified stakeholders, determine the factors influencing local people relationship with the identified stakeholders, and give conclusions and

recommendations to improve local people perceptions and relationship towards conservation and stakeholders. Under conclusions and recommendations, the paper considers emerging issues for discussion and enhancement of community based conservation.

METHODOLOGY

Study area

The study was conducted from January to December 2008 in Western and Eastern comprising Bunda, Serengeti, and Ngorongoro Districts (Figure 1). The selection of the districts was purposive to capture synergy created by the Serengeti Ecosystem; Serengeti National Park (SNP) (c. 14 763 km²), Ngorongoro Conservation Area (NCA) (c. 8 300 km²), Ikorongo Game Reserve (c. 563 km²) and Grumeti Game Reserve (c. 416 km²), Loliondo Game Controlled Area (c. 4 000 km²), Ikona Wildlife Management Area (c. 242 km²), and human community. The ecosystem contains large and varied wildlife populations, plays a crucial role in conservation, the economy, and provides vital ecosystem services to local people. The human population of the study area is multi-ethnic, consisting of more than twenty different ethnic groups, with Maasai, Ikoma, Sukuma, Ikizu, Natta, and Taturu being the significant majority. The three districts had a human population of 565 315 people with a national annual growth rate of 2.9% respectively (URT, 2002a). The economy of the area is based on subsistence agriculture with agro-pastoralism and pastoralism being the main livelihoods. The declining cattle productivity has caused Maasai to supplement herding with subsistence farming (Homewood, 1992).

The Serengeti Ecosystem is world renown for its high conservation value and consists of two Biosphere Reserves and World Heritage Sites (Serengeti National Park and Ngorongoro Conservation Area). The Ecosystem has several stakeholders including government conservation institutions (Wildlife Division involving SRCP, Game Reserves, national park, and conservation area authority), district councils, local people, and Non-Governmental Organizations. These wildlife management areas are managed by Wildlife Conservation Act of 1974, National Park Ordinance Cap.283 (Amended in 2002), and Ngorongoro Conservation Area Authority Ordinance Cap. 284 (Amended in 2002). The Wildlife Policy of Tanzania addresses biodiversity conservation, participatory management, and the sharing of benefits from conservation (URT, 1998).

The establishment of tourism in villages has introduced private investors as a new force in wildlife management. In Western Serengeti, a large investment has concessions of private land in Nyakitono, Ikorongo-Grumeti Game Reserve, and Ikona WMA (Honey, 2008). The Eastern Serengeti has three large investments: the first has a concession of Loliondo Game Controlled Area as a tourist hunting block; the second has a concession of a village land in Ololosokwan; and the third has a sublease of private land in Soitsambu, and plans to develop campsites, tourist hotels and lodges, game driving and walking trails, and cultural "bomas". There are also several medium and small investments to both areas. The presence of investments in villages is appreciated as a healthy situation for the economy of the villages as well as Tanzania, but also has created competitions for land and natural resources between local people and private investors. Local people see wildlife as an important resource for their livelihoods, while investors depend on tourism for financial gains. Several studies point to the fact that there are differences between stakeholders' goals and what is happening on the ground (Baldus and Cauldwell, 2004; Honey, 2008).

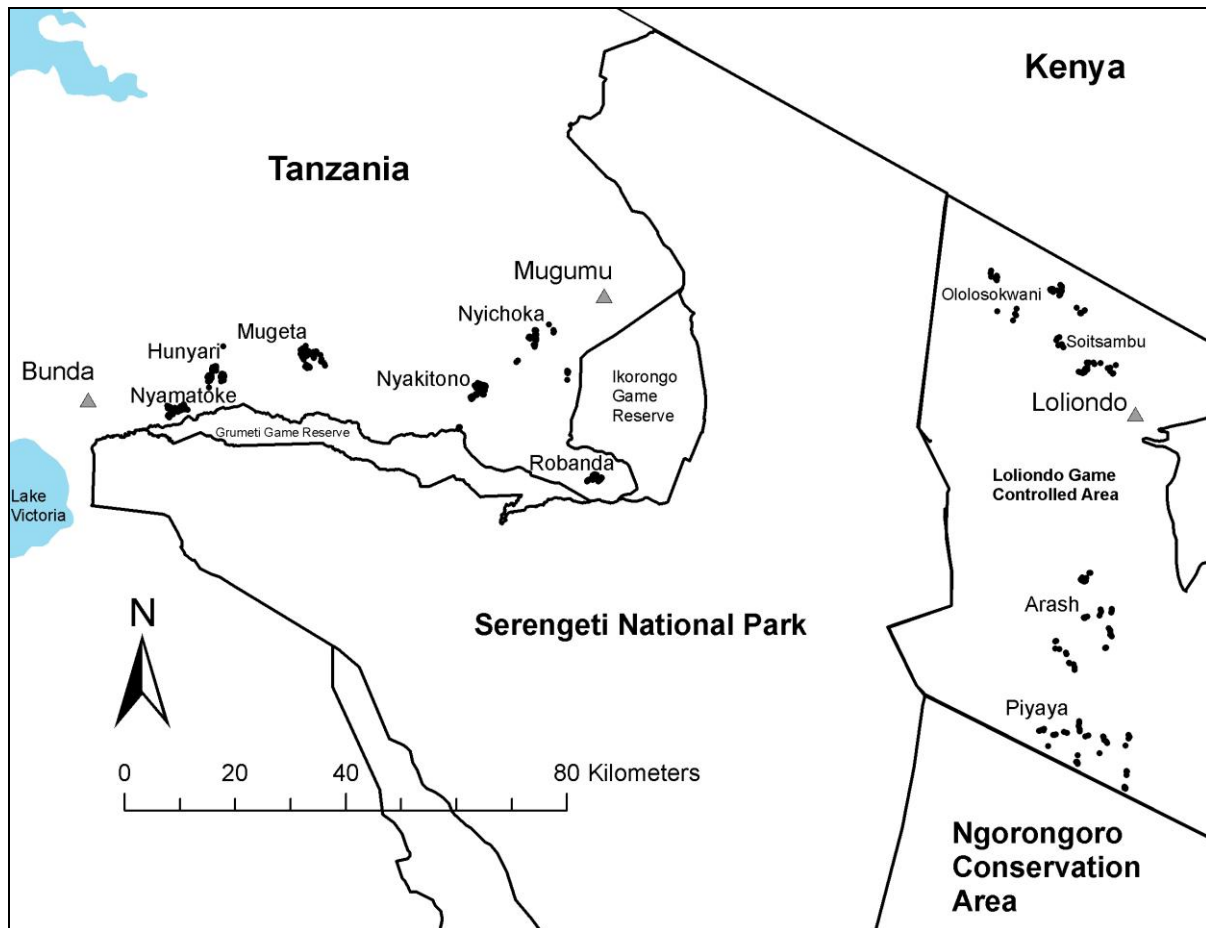


Figure 1. The study area showing the location of Serengeti 668 National Park; the Western Serengeti comprising Serengeti and Bunda Districts, Eastern Serengeti comprising Ngorongoro District. District headquarters are shown as grey triangles. The ten villages and the surveyed households are marked with black dots.

Data collection

The data were obtained through a questionnaire survey in ten villages, three from each district (Figure 1). Interviews were carried out to households randomly selected from village lists, with either head of household ($n = 477$), or wives of household heads, or resident adult (≥ 20 years) as representative of household. The survey questionnaire included open and fixed questions and covered: background information (age, ethnicity, migration, education, household size, and composition); and household socio-economic characteristics and activities. The head of households were asked about their perceptions to the government conservation institutions, district councils, and private investors, which in turn rated existing relationships (negative or positive) with reference to neighbouring protected areas and the tourism investments within village areas. The following research questions were addressed:

- (1) What was the household relationship with government conservation institutions, district councils, and the private investors?
- (2) What were the reasons for the perceived positive or negative relationship?
- (3) What benefits household received from conservation through the stakeholders?
- (4) What things household liked and disliked about the government conservation institutions, district councils, and private investors?

The results were applied in examining various dimensions of respondents' knowledge and experience towards relationships. During the interview we paid attention to gender proportions; males (55.3%) and females (44.7%); age of respondents; 20 to 86 years with a mean age of 46 years ($SD = 14.2$, $N = 477$). The study villages were categorized into CBC and community-based tourism (CBT) in order to capture the outreach activities of SRCP, NGOs, and the private investors (Table 1). In Western Serengeti, SRCP was involved in community hunting and income generating activities as incentives from participatory management. The CBT described a variety of activities that supported socio-economic development and conservation in community areas. It involved cultural "bomas", campsites, curio shops, and cultural activities.

In Eastern Serengeti, CBT was facilitated by the private investors and NGOs. The CCS as an outreach approach of Tanzania National Park encompassed social oriented projects such as schools, health, and provision of water to villages neighbouring Serengeti National Park in Western and Eastern Serengeti. The SRCP, CCS, and the private investors CBC outreach types had an objective to bridge the social gap between protected areas and tourism investments and the surrounding local people by improving relationship and facilitating the sharing of benefits from conservation. We distinguished the CBC villages into CBC1 and CBC2 in order to take into account the presence of private investors and CBT, and the merely CBC villages (Tables 1 and 3).

Table 1. The socio-economic conditions of villages; the mean age and sex ratio, main tribes, mean household size, education and economic activities (N = sample size), CCS and Districts Councils operates in all study villages: *) referred as CBC₁ and ***) referred as CBC₂ villages in the text, **) Presence of investors but not CBT activities, ****) Villages within Loliondo GCA.

Village	N	Distance from protected area boundary to village centre (km)	CBC		Mean age	Mean HH size \pm SD (individual)	Education (%)		Economic activity (%)	
							No education	Education	Employed	Agriculture
Robanda*	50	4	CBC	CBT	42 \pm 1.8	7.08 \pm 5.5	10.0	90.0	14.2	85.8
Nyakitono**	60	8	CBC		47 \pm 2.0	6.20 \pm 2.3	23.3	76.7	17.0	83.0
Nyichoka*	49	8	CBC	CBT	41 \pm 1.8	6.67 \pm 3.5	10.2	89.8	14.9	85.1
Nyamatoke***	51	2.5	CBC		53 \pm 2.1	9.14 \pm 3.8	29.4	70.6	6.4	93.6
Hunyari***	50	6	CBC		46 \pm 1.7	11.14 \pm 6.5	14.0	86.0	12.1	87.9
Mugeta***	50	12	CBC		47 \pm 1.8	9.76 \pm 4.9	30.0	70.0	16.3	86.7
Ololosokwani****	16	11		CBT	40 \pm 3.2	10.75 \pm 5.3	43.8	56.2	4.3	95.7
Arash****	49	27		CBT	47 \pm 1.9	13.47 \pm 8.6	53.1	46.9	7.1	92.9
Piyaya****	51	6.5		CBT	49 \pm 1.9	20.67 \pm 14.1	51.0	49.0	4.3	95.7
Soitsambu****	51	21		CBT	47 \pm 2.1	17.63 \pm 10.4	47.1	52.9	3.5	96.5

To capture wealth holdings as a measurement of poverty we constructed Wealth Index using tangible wealth holdings for households interviewed (Smith and Sender, 1990). A system of wealth categories: poor (destitute) (≤ 0.49) and rich (≥ 0.50) was constructed based on distribution of possession scores, and we weighted the possession score according to maximum score possible (max = 21) (Table 2). We as well considered livestock ownership as a sign of wealth and investment.

Statistical analyses

The socio-economic factors: areas (Western and Eastern Serengeti), CBC and CBT outreach activities, gender, education (educated and uneducated), number of livestock, and wealth (Wealth Index), age (in years), and benefits from conservation were examined as independent variables. In analysis, we grouped primary and secondary education because of low sample size of secondary education. We also grouped Nyakitono village into CBC1 because it was a part of CBC and private investors but missed CBT component. To identify correlations, common responses were analyzed with Pearson chi-square tests using Statistical Package for Social Sciences (SPSS, 16). A linear mixed effect model with village set as random

factor was used to investigate which variables affected the perception of private and government stakeholders by local people in the study area. We selected a priori 25 candidate models, which was included in the global model the predictors: benefit (yes, no), education (educated or not educated), livestock (that is number of cattle, sheep and goats), CBC outreach activities, Wealth Index, age and gender. The CBC analysis was restricted to study villages in Western Serengeti, while for the investor analysis the study villages in both, Eastern and Western Serengeti (that is CBC1 villages) were included. The rest of the analysis included all 10 study villages (that is relationship with SNP and district councils). For the benefit variable, "not aware" responses by the respondents were coded as "no" (no benefit). None of the predictor variables were highly correlated ($r_s < 0.70$). We selected the most parsimonious model according to AICc (Akaike Information Criterion corrected for small samples) (Burnham and Anderson, 2002) and computed Akaike weights (w) to compare the relative performance of models rather than only absolute AICc value. Weights can be interpreted as the probability that a model is the best model given the data at hand and the set of models. Thus, the strength of evidence (evidence ratio) in favour of one model (M1) over another (M2) is simply the ratio of their Akaike weights (w_{M1} / w_{M2}). Because the wim values in our best models were < 0.9 ,

indicating that the other candidate models had substantial support as explanation of the relationship with stakeholders, we performed model averaging to obtain estimates and standard errors of the parameters of interest (Burnham and Anderson, 2002). This analysis was performed using R 2.10.0 Software (RDevelopmentCoreTeam, 2009).

RESULTS

Education and socio economic conditions

The villages varied in distances from the closest point of protected area boundary to village centres, ethnic composition, education and socio-economic conditions (Table 2). The Western Serengeti had significantly more educated people (80.3%) than Eastern Serengeti (50.3%) ($\chi^2 = 46.4$, $df = 1$, $n = 477$, $p < 0.001$). Most respondents reported being immigrants into their villages. When asked if immigrated, 54.2% ($n = 310$) of respondents in Western Serengeti claimed

Table 2. Items included in calculation of possession score.

Item	Description	Value	Point
Quality of houses	No house	None	-
	Poor	Low	1
	Good	Medium	2
	Very good	High	3
Livestock holdings*	No livestock	None	-
	1-20	Low	1
	21-50	Medium	2
	51-200	High	3
	201 and above	Very high	4
Household equipments	No equipment	None	-
	Cell phone	Low	1
	Radio	Low	1
	Television	Medium	2
	Bicycle	Medium	2
	Motorized transport	High	3
Land	No land	None	-
	Uncultivated land	Low	1
	Cultivated land (Acres)	Low	1
	a. 0-1	Medium	2
	b. 1-2	High	3
	c. 2-4	Very high	4
	d. 4 and above		

(*) Cows equals 4 goats/sheep where the conversion was based on market prices (cow = US \$ 100).

to have immigrated and 45.8% reported to be born there. In Eastern Serengeti, 6.0% ($n = 167$) of respondents reported to have immigrated and 94% claimed to be born in their respective villages. The high movement is observed in Western Serengeti (65%, $n = 186$) compared to Eastern Serengeti (35%). Overall, the movement of people was motivated by agriculture (40.9%), marriage (29.6%), returning home (14.5%), and grazing (8.1%). Off-farm activities such as collection and selling of natural resources products, and seasonal labour accounted for up to 5.4%.

More local people in Western Serengeti (36.8%) had an employment record than Eastern Serengeti (16.2%) ($\chi^2 = 22.1$, $df = 1$, $n = 477$, $p < 0.001$). The gender (males being more frequently employed than women; $\chi^2 = 10.4$, $df = 1$, $p < 0.001$) and education (the educated being more frequently employed than uneducated ($\chi^2 = 22.2$, $df = 1$, $p < 0.001$)) had an effect on employment. The majority were employed as casual labourers (80.9%), game scouts (13.7%), and drivers (5.3%). There was a significant difference in wealth between Western and Eastern Serengeti ($F = 21.3$, $df = 1$, $p < 0.001$).

The Wealth Index portrayed 88.5% ($n = 477$) of

households as poor living below poverty line, but not in extreme poverty (score of 0.00). The other 11.5% were identified as rich, but not above poverty line (score of 1.00).

Local people relationship with government conservation institutions, district councils, and private investors stakeholders

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Local people relationship with government conservation institutions, district councils, and private investors stakeholders

Local people and relationship with CBC

There was a significant difference between CBC1 and CBC2 villages in their relationship with CBC outreach types. Both villages had quite positive relationships with CBC (Table 3). There was no significant difference between males and females or level of education in the relationship. Respondents with few livestock ($n = 224$) had a significantly better relationship than those with many livestock ($F = 4.68$, $df = 1$, $p = 0.032$). The Wealth Index and age of respondents had no significant influence on the relationship (Wealth Index: $F = 0.3$, $df = 1$, $p = 0.565$; Age: $F = 0.2$, $df = 1$, $p = 0.658$). Respondents who received benefits from CBC had a more positive relationship than those who did not receive benefits. The respondents identified provision of income to households and villages, community hunting, support to social services, bad governance elements, and denied access to natural resources to influencing their positive relationship (Table 4).

Local people and relationship with Serengeti National Park

Overall, respondents in Western Serengeti portrayed a

Table 3. Results of bivariate analyses of relationship between Local people, CBNRM, SNP, Districts Councils and Investors in Western and Eastern Serengeti (Relationship, n = sample size, percentage, differences tested with χ^2 tests). Significant results are in bold.

Criteria		Stakeholders							
		CBC	P	SNP	P	Districts	P	Investors	P
Area	Western			Positive, 153 (84.1) Negative, 29 (15.9)	< 0.001	Positive, 97 (54.8) Negative, 80 (45.2)	NS	Positive, 94 (50.8) Negative, 91 (49.2)	NS
	Eastern			Positive, 32 (39.0) Negative, 50 (61.0)		Positive, 59 (59.6) Negative, 40 (40.4)		Positive, 51 (53.7) Negative, 44 (46.3)	
Outreach activity	CBC ₁	Positive 98 (87.5) Negative 14 (12.5)	= 0.024	Positive, 59 (74.7) Negative, 20 (25.3)	< 0.001			Positive, 75 (74.3) Negative, 26 (25.7)	< 0.001
	CBC ₂	Positive 126 (95.5) Negative 6 (4.5)		Positive, 94 (91.3) Negative, 9 (87.0)		Positive, 19 (22.6) Negative, 65 (77.4)			
	CBT			Positive, 32 (39.0) Negative, 50 (61.0)		Positive, 51 (53.7) Negative, 44 (46.3)			
Gender	Female	Positive, 99 (90.8) Negative, 10 (9.2)	NS	Positive, 70 (71.4) Negative, 28 (28.6)	NS	Positive, 65 (61.3) Negative, 41 (38.7)	NS	Positive, 63 (60.6) Negative, 41 (39.4)	= 0.024
	Male	Positive, 125 (92.6) Negative, 10 (7.4)		Positive, 115 (69.3) Negative, 51 (30.7)		Positive, 91 (53.5) Negative, 79 (46.5)		Positive, 82 (46.6) Negative, 94 (53.4)	
Education	Educated	Positive, 183 (92.4) Negative, 15 (7.6)	NS	Positive, 153 (78.5) Negative, 42 (21.5)	< 0.001	Positive, 117 (55.7) Negative, 93 (44.3)	NS	Positive, 112 (53.6) Negative, 97 (46.4)	NS
	Not educated	Positive, 41 (89.1) Negative, 5 (10.9)		Positive, 32 (46.4) Negative, 37 (53.6)		Positive, 39 (59.1) Negative, 27 (40.9)		Positive, 33 (46.5) Negative, 38 (53.5)	
Benefits	Yes	Positive, 155 (97.5) Negative, 4 (2.5)	< 0.001	Positive, 121 (88.3) Negative, 16 (11.7)	< 0.001	Positive, 89 (79.5) Negative, 23 (20.5)	< 0.001	Positive, 134 (76.1) Negative, 42 (23.9)	< 0.001
	No	Positive, 69 (81.2) Negative, 16 (18.8)		Positive, 64 (50.4) Negative, 63 (49.6)		Positive, 67 (40.9) Negative, 97 (59.1)		Positive, 11 (10.6) Negative, 93 (89.4)	

Table 4. The ranking of reasons for the perceived relationships between local people and stakeholders; percentage response frequencies to the questions relates to responses in brackets (N = sample size).

Stakeholder	N	Ranking of reasons for observed relations			
		Positive relationship	Percentage	Negative relationship	Percentage
CBC	319	Income to households and village	40.3 (110)	Bad governance – reflected in wildlife Division role to wildlife management	54.3 (25)
		Bush meat hunting in Western Serengeti	24.2 (66)	Denied access to natural resources (e.g. ban of hunting in Western Serengeti)	43.5 (20)
		Improved relations	18.7	Inadequate delivery of social and extension services	2.2 (1)
		Supporting social services	15.8 (43)		
SNP	264	Support to social services	69.2 (128)	Denied access to natural resources - Boundary disputes in Eastern Serengeti (e.g. in Ololosokwan and Soitsambu villages)	64.5
		Improved relations	30.3 (56)	Inadequate benefits from conservation, and harassment caused by grazing inside the national park	35.5
District Councils	276	Support to social services	69.2 (108)	Bad governance	84.2 (101)
		Improved relations	30.7 (48)	Denied access to natural resources (hunting in Western Serengeti, grazing in Eastern Serengeti)	12.5 (15)
				Inadequate delivery of social and extension services	3.3 (4)
Private investors	280	Income to household and village	82.8 (120)	Denied access to natural resources (e.g. ban of hunting in Western Serengeti and restrictions to grazing in Eastern Serengeti)	91.1 (123)
		Support social services	15.2 (22)	Unemployment	5.2 (7)
		Improved relations	2.1 (3)	Bad governance	3.7

positive relationship with SNP while Eastern Serengeti portrayed a negative relationship (Table 3). The CBC villages indicated a positive relationship with SNP, while CBT villages portrayed a negative relationship. Gender had no significant effect on the relationship while local people with education portrayed a more positive relationship (78.5%) compared to uneducated (53.6%). Respondents from households with few livestock had a more positive relationship with SNP (N = 185) than those with many livestock (F = 41.1, df = 1, n = 79, p < 0.001).

The Wealth Index and age of respondents did not influence their relationship (Wealth Index: F = 0.1, df = 1, p = 0.751; Age: F = 0.03, df = 1, p = 0.862). The benefits from wildlife had a positive influence towards relationship.

The respondents who received benefits had a positive relationship, while those who did not receive benefits reflected a trend towards a positive relationship (Table 3). The SNP support to villages' social services, denied access to natural resources and inadequate benefits from conservation explained the existing relationship (Table 4).

Local people and relationship with districts councils

Overall, more than half of the respondents were positive in their relationship with district councils (Table 3). Neither area nor gender, and education influenced this relationship between local people and district councils. The number of livestock, Wealth Index, and age of respondents had no significant effect on the relationship (Livestock: F = 0.7, df = 1, p = 0.395; Wealth Index: F = 0.3, df = 1, p = 0.560; Age: F = 0.3, df = 1, p = 0.590).

Table 5. Predictors included in the set of best models ($\Delta \text{AICc} < 2$) explaining the perception of the relationship between local people and the four government and private conservation stakeholders in Western and Eastern Serengeti. Predictors included in models are indicated with a filled circle. The number of parameters (K) used in each model, the AICc, the ΔAICc (AIC of model-AIC of best models) and the w_{im} (normalized Akaike weights for each candidate models in the total set of 15 models) are shown at the bottom of each section. Model averaged estimates (β), unconditional standard error (SE), 95% CI and the normalized Akaike weight for each predictors (w_p) for the set of best models ($\Delta \text{AICc} < 2$) are shown as well. All models include an intercept.

[illegible]

Table 5. Contd.

4) Private investors (N=196)														
Intercept	•	•	•	•	•	•	•	•	•	•	0.773	0.1460	0.486,1.060	
Benefit	•	•	•	•	•	•	•	•	•	•	0.473	0.0731	0.329,0.617	1.00
Education		•			•					•	-0.0318	0.0499	-0.130,0.066	0.38
Livestock									•	•	0.00001	0.00002	-0.00003,0.00005	0.14
outreach activity – investors							•			•	0.0183	0.0434	-0.067,0.104	0.14
Weighted index				•	•						0.0597	0.1140	-0.163,0.283	0.22
Age			•								0.0003	0.0005	-0.00078,0.00129	0.11
Gender						•					-0.0038	0.0090	-0.022,0.014	0.08
No of parameters (K)	4	5	5	5	6	5	5	5	6	6				
AICc	185	185	186	186	186	186	186	187	187	187				
Δ AICc	0.000	0.162	0.638	0.659	0.676	1.360	1.370	1.450	1.800	1.820				
w_{im}	0.138	0.129	0.101	0.099	0.099	0.071	0.069	0.067	0.058	0.055				

The benefits from conservation had a significant effect on the relationship. The provision of social services, bad governance, and denied access to natural resources were stated as reasons for the perceived positive and negative relationships (Table 4).

Local people and relationship with private investors

Overall, there was no difference between Eastern and Western Serengeti in their relationship with investors (Table 3). The CBC1 and CBT villages indicated a better relationship towards investors, than CBC2 villages that portrayed a negative relationship. The CBC1 villages were perceived to have a more positive relationship than CBC2 villages that portrayed a negative relationship with investors (Table 3). The CBC1 and CBT villages portrayed a positive relationship, although the former had a more positive relation than the latter (Table 3). There was a significant statistical difference between gender and their relationship

with investors while education had no effect (Table 3).

The number of livestock had a significant influence on the relationship unlike for Wealth Index and age of respondents (Livestock; $F = 5.3$, $df = 1$, $n = 196$, $p = 0.023$; Wealth Index: $F = 2.1$, $df = 1$, $p = 0.153$; Age: $F = 1.3$, $df = 1$, $p = 0.253$). Respondents with more livestock portrayed a negative relationship and those with less livestock portrayed a positive relationship. There was a significant statistical difference between respondents who received benefits and those not receiving benefits (Table 3). The investors being source of income to households and villages and their support to social services explained the positive relationship. However, limiting access to natural resources was seen as among the causes for the perceived negative relationship (Table 4).

Multivariate analysis of the relationship with stakeholders

Overall, in the set of best models (Δ AICc < 2)

there was strong support of benefit having an influence on the perceived relationship between local people and stakeholders. Benefit appeared in all the best models, and had the highest w_{ip} in all the four analysis on the role of government conservation institutions, district councils, and private investors. In the analysis of relationship with CBC outreach types, local people perception was primarily positively affected if respondents receive benefits through community outreach activities particularly in Western Serengeti, and through the number of livestock owned by household. Both these variables had positive parameter estimates and did not include 0 within the 95% CI (Table 5). The effect of outreach activity was 1.96 times less likely than the variables benefit and livestock to explain the relationship, while the predictor education was 3.33 times less likely, as indicated by the ratio of the sums of w_{ip} in the models that included benefit and livestock, and the models that included community outreach activity and/or education (Table 5) (Anderson and Burnham, 2002).

Local people perception of SNP was affected by

access to benefits, education and community outreach type. Access to benefits from CCS activities of SNP had a positive influence on relationship, with a positive parameter estimate which did not include 0 within the 95% CI. However, education had a negative parameter estimate which did not include 0 within the 95% CI, where local people who had education (primary and/or secondary) portrayed a positive relationship towards SNP, than those who had no education who portrayed a negative relationship. The type of community outreach activity also influenced the relationship; CBC1 and CBC2 villages of Western Serengeti portrayed a positive relationship towards SNP. In contrast, the study villages consisting CBT and included investor activities (that is Eastern Serengeti villages) portrayed a negative relationship towards SNP.

For district councils the variable benefits did also have a positive parameter estimate and did not include 0 within the 95% CI. The other variables had much less support, where gender was only included in a single model (models were $\Delta AICc < 2$) and was 3.7 times less likely than benefit to explain the relationship with district councils. The perception of private investors was primarily influenced by benefits, where the variable had a positive estimate which did not include 0 within the 95% CI. The parameter estimate for the predictor education was negative, but included 0 within the 95% CI, and was 2.6 times less likely to influence the relationship with private investors than the acknowledgement of receiving benefits. The other variables had much less support, where weighted index was 4.54 times less likely and outreach activity and livestock were 7.14 times less likely than benefit to explain the relationship with private investors around SNP.

DISCUSSION

Education and socio-economic conditions

The results indicate variations in education level between Western and Eastern Serengeti. This pattern is associated by this study with the differences in livelihoods between the two areas. In terms of Wealth Index, the Eastern Serengeti had slightly more poor households (94.6%, $n = 477$) compared to Western Serengeti (84.2%). In Africa, the factors attributing to poverty include low productivity of lands and labour, and low levels of government support to most needs (Hackel, 1999). In this study, we identified agriculture, grazing and off-farm activities to influence the immigrants into villages closer to protected areas.

Our findings support other studies that reported the movement of people in Western Serengeti to be motivated by socio-economic opportunities, social services, and natural resources utilization (Kauzeni and Kiwasila, 1994). Basically, the establishment of SNP and

Ngorongoro Conservation Area, and villagization had a significant influence to the movement of people in the Serengeti Ecosystem (Bonner, 1993; Brockington, 2008). In Eastern Serengeti, the movement of people was less observed because of the interrelation between different Maasai sub-groups and their wide area coverage.

Relationship between local people, government conservation institutions, district councils, and private investors

Local people and relationship with CBC

The results show that the positive relationship towards CBC was explained by the CBC outreach types which existed in Western and Eastern Serengeti (that is CBC1, CBC2, CBT, and Tables 1 and 3). In Western Serengeti, CBC outreach types (CBC1, CBC2, CBT) were associated with the presence of SRCP, while in Eastern Serengeti, the existence of CBT was associated with the presence of NGOs and the private investors. Essentially, SRCP served as a platform for participatory management and was a means towards self financing of social services (Table 4). In Zambia, Wainwright and Wehremeyer (1998) appreciated the responsibilities of communities in creating and maintaining their own infrastructures and the control of the commercialization of wildlife in the Lupande Game Management Area. The project was appreciated for improving relationship between local people and government conservation institutions, facilitating sustainable use of natural resources, improving social services, and conservation education (Bryceson et al., 2005).

In Eastern Serengeti, the important aspect under CBT was the component of participation that provided benefits and decision-making power to local people. This synergy created incentives to conserve natural resources on which income generation depends. The CBT is viewed in this study as a starter for CBC in Eastern Serengeti. From the multivariate analysis, we recognized the importance of benefits from different types of CBC outreach activities in shaping relationships towards stakeholders.

Local people and relationship with Serengeti National Park

The results suggest the positive relationship in Western Serengeti, to CBC villages (that is CBC1, CBC2), the educated, and those respondents who admitted to receive benefits through CCS outreach scheme of SNP. The support to social services was appreciated and seen as a sign of improved relations (Table 4). The depicted negative relationship was more prevalent in Eastern Serengeti, to uneducated, and households with more livestock (Table 3). As documented in other studies, the differences in livelihoods between the Western and

Eastern Serengeti, the history of SNP and land-use administration explains the local people mixed feelings about SNP (Kaltenborn Nyahongo et al., 2008; Neumann 1998). The reported denied access to natural resources was associated to this study with the boundary disputes between SNP and some Eastern Serengeti villages (for example Ololosokwan and Soitsambu). People with many livestock considered restrictions over access to grazing and harassments in terms of arrests, fines, and sometimes being jailed for grazing inside national park, as a reflection of negative relationship (Table 4). Other similar studies identified boundary conflicts, inadequate benefits, and harassment in terms of punishment from the national park personnel to cause negative relationships (Gadd, 2005; Kaltenborn et al., 2008).

Local people and relationship with district councils

The results suggest existence of positive but not so strong relationship between local people and the district councils. The positive relationship is associated with the provision of social services and extension services including education and health care that were perceived as benefits. The bad governance and denial of access to natural resources were reported to both areas (Table 4). Issues that were pinpointed by the respondents as elements of bad governance included lack of transparencies and inadequate involvement in decision making. The dimensions of good governance include transparency and accountability, access to information, rule of law, bureaucratic efficiency, and control of corruption (Balint, 2006; Brockington, 2008). In this study, we identified the decision by Serengeti district council to ban community hunting, and instead sell the hunting quota to the investor without the consensus of local people as an example of denying the right to access natural resources (Bryceson et al., 2005). The concern by local people illustrates that if decisions were not consultative, they may under certain circumstances favour powerful stakeholders, and cannot be understood and justified by weakest stakeholders. The need to hunt is inherent in local culture for some ethnic groups, as it was the case in Western Serengeti (Kaltenborn et al., 2005; Wainwright and Wehrmeyer, 1998).

Although Eastern Serengeti enjoyed resident hunting without interference by the district council, the respondents preferred CBT because: tourist hunting and any other wildlife-based tourism activities are restricted within a hunting block (URT, 2002b); the compatibility of CBT and pastoral grazing activities; and the drive from private investors benefitting from wildlife-based tourism on community lands (Nelson, 2004). The designation of game controlled areas and open areas as hunting blocks, restricted local people and small-medium private investors to benefit from natural resources in other forms (URT, 1974, 2002b). In the Game Controlled Areas people are not restricted by law to enter, graze their livestock

and even cultivation or having settlements; and most of the GCAs, and open areas falls within village lands. As a result, respondents expressed concerns of being denied their access to natural resources (Table 4).

Local people and relationship with private investors

The results suggest a mix of positive and negative relationship between local people and private investors. It is further shown that the relationship is influenced by benefits, education, type of CBC outreach scheme (CBC1, CBC2 and CBT), number of livestock and Wealth Index. The investors support to social services such as water, education, and health creates a positive relationship to local people and was appreciated by CBC1 and CBT villages. The portrayed negative relationship is connected to curtailed benefits as portrayed by CBC2 villages, uneducated, and those who reported not to receive benefits from private investors. In this study, we associated local people negative perception to private investors with the restrictions over access to natural resources. According to other researches, CBC in Western Serengeti is challenged by threat from private investors, inadequate transparency, inadequate involvement of district councils, and inefficiency (Bryceson et al., 2005; Holmern et al., 2002). In this study, land administration, as a component of natural resources, is cautiously pinpointed to influence relationship. There is a worry that tourism investments in villages block other land uses and does not adequately benefit the local people apart from being squeezed from their original lands (Fratkin, 1997).

The wildlife conservation regulations requires trophy hunting firm to contribute towards anti-poaching operations in their concession areas (URT, 2002b). Inadequate capacities of government conservation institutions (that is Wildlife Division, GR, and GCA) may allow private investors to perform anti-poaching activities without adequate supervision, hence possibilities for mistreatment due to inadequate professionalism. Such situations may in turn, raise concerns that would have been resolved had the work been done with close supervision of government conservation. Further, regulator's dependence to investors may in certain circumstances undermine good governance and open doors for irregularities. In some cases investors collaborates with local people and share benefits from conservation. However, their perceived negative relationship overshadowed local people appreciation to investments in social services, especially to those areas with meagre benefits from conservation (e.g. CBC2 villages).

CONCLUSIONS AND RECOMMENDATIONS

The findings from this study show an overall positive relationship between local people and government

conservation institutions, district councils, and private investors. The results further suggest that, local people perceptions and relationship to other stakeholders relied heavily on their access to benefits from conservation. The income to households and villages and the access to natural resources are the two aspects of benefit sharing. The findings further show that education, number of livestock, and type of CBC outreach scheme were significant variables influencing local people perceptions and relationships with stakeholders. As results indicate, the benefit was a key determinant of perceptions and relationships between local people and government conservation institutions, district councils, and private investors. The study appreciates the role of education in shaping perceptions and relationships among stakeholders. But, there must be a good connection between benefits received, wildlife conservation, and the involved stakeholders. The uneducated respondents portrayed negative perception towards SNP and private investors – probably because they relied more on natural resources and had few possibilities in adjusting to resource restrictions and problems in accessing benefits from community outreach activities. From the findings, we concluded that people with many livestock had negative perceptions to Serengeti National Park and the private investors due to restrictions over access to grazing and harassments. From the findings, bad governance practices have emerged as an issue of concern by local people (Table 4). The concern may emanate from the natural resources management itself, private investments in villages, weak land-use administration, and tourism management that according to the views of this study were not adequately coordinated. The denied access to natural resources (e.g. wildlife hunting, in Western Serengeti), lack of transparency on natural resources management and land-use issues and inadequate participation in decision making justified the concerns by local people. They translated the boundary disputes or where private investors' monopolised land and access to natural resource events into resource-use conflicts and consequently existence of negative relationship. However this variable was outside the scope of this study, suggesting more research on natural resources governance. From the study findings, we recommend that the importance of benefits from conservation necessitates the wide coverage of CBC outreach activities. Livestock keepers, uneducated, and other groups of people (e.g. CBC2 villages) need to be covered in terms of benefits and access to sustainable use of natural resources. Also there is a need for government conservation institutions (e.g. SRCP and SNP) and the private investors to inform better of the connection between wildlife conservation and benefits from conservation through community outreach programmes such as CCS and the classical CBC practiced in Western Serengeti. The consideration should also be made to sustainable use and participatory decision making.

Tourism investment in villages is a recent development

in the Serengeti Ecosystem and very little is known about the dynamics, it brings to conservation, economic growth, and people livelihoods. This component however, was not part of this study, hence needing more attention in terms of research.

The Serengeti ecosystem is big and complex in size, stakeholders, and motivations. This study proposes the coordination system to build strong alliances for sustainable management. Good communication network always serve as a melting pot where all stakeholders' interests are discussed and practical recommendations and actions deliberated. Similarly, the development of the guidelines to facilitate stakeholders' participation is necessary to create harmony, address conservation and livelihoods. Guidelines lessen regulating tasks as all stakeholders would be adhering to regulatory instruments and governance principles. Capacity building and investment in social services at village and district levels are crucial in order to manage stakeholders' interests. The conflicts forced local people to believe wildlife is an enemy and threatens their survival. In cognisance of new development in the wildlife sector of Tanzania, including the recent enacted Wildlife Act (2008) and the revised wildlife policy (2008), this study recommends reviewing CBC concept to determine the new direction and make it more responsive and accommodate the changes that are currently taking place in the Serengeti Ecosystem.

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