



Deutscher Tropentag 2002 Witzenhausen, October 9-11, 2002

Conference on International Agricultural Research for Development

Wildlife Co-management in Kenya: An Empirical Analysis of Landowners' Incentives for Participation.

John Mburu ^a and Regina Birner ^b

Institute of Rural Development, University of Goettingen, Waldweg 26, D-37073, Goettingen, Germany.

^a Email: jmburu1@gwdg.de

^b Email: rbirner@gwdg.de

Abstract

Collaborative management (in short co-management) has increasingly become important because it seeks to create negotiated agreements between state and local communities (other stakeholder groups may also be included) and, therefore, offers a possibility to overcome conflicts over natural resource exploitation. However, achieving successful co-management is confronted with many challenges, one of the most pressing being achievement of effective participation of the landowners or resource users in the management process. Moreover, it has remained unclear as to what kinds of incentives would motivate landowners to become stakeholders of co-management arrangements in nature conservation and maintain their participation throughout the process.

Taking two wildlife conservancies in Kenya as an example, this paper analyses the kinds of incentives that make landowners participate in collaborative management arrangements. The fieldwork for the results presented in this paper was conducted in the wildlife dispersal areas of Shimba Hills National Reserve and Amboseli National Park in Kenya, where a total of 136 households, based on two stratified random samples, were interviewed.

To assess the economic incentive for participation, a financial benefit-cost analysis is performed. For both study areas, this analysis shows that investing in wildlife conservation is not financially viable to the landowners. In order to study other incentives, a two-stage least squares econometric model is applied. The results show that--under conditions where cash benefits are fairly distributed to the landowners--receiving benefits from nature conservation is a strong incentive for participation. Landowners are also motivated to participate because their involvement in the co-management arrangements enables them to protect their own property rights, reduce losses from other economic activities (e.g. livestock farming), safeguard human life, and derive non-cash benefits from infrastructural developments by the state and conservation non-governmental organisations.

Key words: wildlife conservation, biodiversity management, co-management, benefit-cost analysis, incentives for participation.

1. Introduction

The failure of both the state-based and community-based models of managing wildlife and other natural resources to successfully fulfil goals of conservation and meet the socio-economic needs of the local communities is regarded as the impetus for the evolution of collaborative management (in short co-management) (Kiss, 1999). The co-management approach (also sometimes referred to as joint management, multi-stakeholder management, or management in partnership) has increasingly become important because it seeks to create negotiated agreements

between the protected areas' managers and local resource users and, therefore, offers a possibility to overcome conflicting interests over resource exploitation (Borrini-Feyerabend et al, 2000). However, achieving successful co-management is confronted with many challenges, one of the most pressing being achievement of effective participation of the landowners or resource users in the management process. Moreover, it has remained unclear as to what kinds of incentives would motivate landowners to become stakeholders of co-management arrangements in nature conservation and maintain their participation through out the process.

This paper focuses on wildlife co-management in Kenya. The country has 26 National Parks, 28 National Reserves and one Sanctuary, occupying 8% of the total territory and harbouring about 25% of total wildlife populations (Watson 1999:1). Tourism activities from non-consumptive utilisation of wildlife in the country contribute about 70% of the total earnings from tourism sector (Emerton, 1997:2) which amounts to an estimated US\$ 248 million per annum as consumer surplus (Moran (1994:680). In an attempt to curb biodiversity loss and increase cash benefits to the local communities whose land houses 75% of the wildlife, the Government, through the Kenya Wildlife Service (KWS), embarked on the implementation of wildlife partnerships or co-management projects in 1992. However, as documented by Mungatana (1999:15, 34) co-management and other community wildlife programs have failed to achieve their objectives because local communities lack adequate incentives for participation. Moreover, not much attention has been paid to detailed empirical analysis of the co-management's benefits and costs of the participating landowners in order to assess their economic incentives.

Against this background, this paper takes two wildlife conservancies as an example and analyses the kinds of incentives that make landowners participate in collaborative management arrangements in Kenya. A financial analysis from the perspective of landowners is performed in order to assess the economic incentive for participation. Further, the paper uses a two stage least squares econometric model to assess the importance of a wide range of non-monetary incentives arising from landowners' organisational and socio-economic characteristics.

2. Study Areas and Methodology

2.1 Study areas

The primary data analysed in this study was collected from the landowners (at the household level) of two community sanctuaries: Kimana Community Wildlife Sanctuary (hereafter referred to as Kimana sanctuary) and Golini-Mwaluganje Community Wildlife Sanctuary (hereafter referred to as GM sanctuary). The Kimana sanctuary is an isolated swampy area (6,000 ha) located in the dispersal areas of the Amboseli National Park, while the GM sanctuary is a 10 km long corridor (3,600 ha) between two state managed protected areas (Shimba Hills National Reserve and Mwaluganje Forest Reserve). Agro-ecologically, Kimana sanctuary is located in a semi arid area with 150-200 mm of rainfall per year while GM, which is located in an area with arable farming potential receives about 900-1000 mm of rainfall per year (Jaetzold & Schmidt, 1983). Thus, while landowners in Kimana are mainly semi-nomadic pastoralists who have co-existed with wildlife for decades, those in GM are mainly subsistence farmers, who in the 1990s were forced by elephants to abandon their farms.

The current tourism attraction capacity in Kimana is supported by a diversity of wildlife that includes elephants, giraffes, lions, leopards, zebras, wildebeests, etc. In GM, elephants, which are at a higher density than in Kimana, are the only group of wildlife that attract tourists in this sanctuary. Legally, the Kimana sanctuary is a group ranch's property, while the GM sanctuary is a shareholder company. The sanctuaries have a membership of 843 and 127 landowners respectively. While land in Kimana is privately owned by group ranch members, that of GM is privately owned by individuals.

2.2 Management arrangements

Besides the landowners, other stakeholders of Kimana sanctuary include the KWS, the Africa Safari Club (ASC) and the Amboseli/Tsavo Group Ranches Association. In GM, the other stakeholders comprise of the KWS, the Forest Department, the Local County Council, the Local Town Council, the Travellers Group of Hotels (a private agency) and the Eden Wildlife Trust (an NGO). In the established co-management arrangements of both sanctuaries, KWS remains the custodian of wildlife while the landowners have the rights to derive cash and non-cash benefits from the presence of wildlife in their land, either through eco-tourism or conservation-based enterprises. In Kimana, the sanctuary was managed up to until March 2000 by a local management committee (appointed by the Group ranch committee). It could therefore be classified as an ‘delegated’ type of co-management. The sanctuary was since then leased to the African Safari Club (ASC). Under these current management arrangements, only few members of the Group ranch committee are directly involved in collecting lease fees and solving grazing disputes between ASC and the landowners. The type of co-management that emerged after the lease can still be considered as ‘delegated’, but one that is characterized by less involvement of the local landowners and increased integration of the private sector. The GM sanctuary has all the time been managed by a management board, which consists of five elected landowners’ representatives, the six permanent ex-officio members mentioned above and two nominated Cliff Area owners¹. Since in decision making landowners, state agencies and other stakeholders cooperate together as equal partners, this kind of co-management is classified as ‘cooperative’.

2.3 Data collection

To structure the collection of the costs’ data, the process of establishing the sanctuaries was divided into the investment (ex ante) and the operational (ex post) phases. The investment phase in Kimana lasted from 1995-1996, and in GM from 1992-1995. For the investment phase, data were collected for the total transaction and production costs arising in this phase. The operational phase, however, was too long a period for the respondents to recall all the information for the entire phase. For the GM sanctuary, data collected for this latter stage was confined to the activities of the current year. However for Kimana, data for two operational periods was collected: the year preceding the lease to African Safari Club (denoted as Kimana BL) and the current year (denoted as Kimana AL). Assuming that ex post costs do not change considerably between the years, these costs of the current year are regarded as the average annual costs of the ex post stage.

Data on household characteristics, time and expenses of landowners’ participation, perceptions of the co-management arrangements, interests, production costs incurred by landowners (e.g. guarding costs), etc was collected through in-depth interviews based on a detailed semi-structured questionnaire. A stratified random sample of members and non-members of the two sanctuaries was drawn. The sampling frame for the members were the sanctuary registers while non-members were selected randomly through a random walk. A total of 136 landowners (70 and 66 from Kimana and GM sanctuary respectively) were interviewed.

To convert landowners’ time of participation in meetings into monetary expenses, the opportunity cost of participating in wildlife activities (i. e., the local wage rate) was multiplied with the recorded time spans. Since the total population of the members and non-members in both study areas is known, the total costs of participation were extrapolated from the costs of the proportions of landowners that had participated.

¹ Cliff Area landowners are the owners of the picturesque Cliff Area. They include some rich Kenyans, Europeans and Arabs. Unlike the ancestral landowners who would like to have wildlife fenced off their farms, their main interest is conservation of wildlife and investing in eco-tourism.

3 Data Analysis and Discussion of Results

3.1 An Overview of Landowners' Characteristics

Table 1 provides a summary of some of the important characteristics or variables of the households in the study areas, which are also used in the regression analysis. The households of Kimana incurred less transaction costs than those of GM due to differences in the organisational capacity of the landowners. The members of Kimana sanctuary belong to one ethnic group (Maasai), which constitutes of 71.5% of the total households in the area. The landowners are organized in a large and stable organization (the Kimana Group Ranch), which has a well-established power structure. The Kimana non-members, which do not participate regularly in the sanctuary activities as the members, belong to other ethnic groups.

Table 1: Characteristics of sample landowners

Variable	Meaning	Kimana (n=70)		GM (n=66)	
		Mean	Std dev	Mean	Std dev
TOT_TC	Total cost (Ksh./household head) of landowners in both stages of the co-management process.	1331.69	1871.26	1483.20	1214.73
AGE	Age of the household head in years	45.09	14.58	49.82	13.42
SQAGE	Quadratic specification for age	2242.20	1428.33	2659.27	1389.91
HEADMALE	Dummy variable =1 if the household is male headed and =0 if female headed	0.91	0.28	0.89	0.31
CH_15HHTOT	Ratio of children below 15 years old to the total household size	0.72	1.01	0.36	0.26
MWA_GOLI	GM: dummy variable=1 if the household is located in Mwaluganje and =0 if Mwaluganje	-	-	0.48	0.50
EDULEVEL	Level of education of the household head in years	4.39	4.41	4.65	4.79
TENURE	Dummy variable =1 if the household has land with a title deed, otherwise=0	0.63	0.49	0.74	0.44
TOTLIV_U	Total livestock units of the household	20.19	36.63	2.31	6.19
RELIGION	Kimana: dummy variable =1 if the household belong to protestant and catholic and = 0 if traditional religion	0.83	0.38	-	-
LOGRONOS	The number of local groups (e.g. women groups) in which the household is an active member	0.66	0.81	0.14	0.49
CLAN	Kimana: dummy variable =1 if the household belongs to Ilmolelian clan (biggest clan), otherwise=0; GM: =1 if Mukinamboza and Mukinangandi clans (two biggest clans), otherwise=0	0.37	0.49	0.38	0.49
ETHNIC	GM: dummy variable =1 if the household belong to Digo (largest tribe), otherwise =0	-	-	0.68	0.47
TOTLOSS	Annual total loss (in Ksh.) incurred by the household as a result of wildlife attacks.	1165.45	2426.51	619.08	964.15
FARMCUL	Cultivated area of land in acres	3.13	6.06	3.97	4.04
KWSREL	Dummy variable=1 if the relationship with the conservation state agency is perceived as good and =0 if bad	0.84	0.37	0.59	0.49
BENEFIT	Dummy variable = 1 if the household has benefited from wildlife in any way including receiving cash from the sanctuaries, otherwise=0	0.29	0.46	0.71	0.46

Source: authors

Both members and non-members of GM sanctuary consist of two small groups (Golini and Mwaluganje) which are geographically separated from one another by a river (River Pemba). In both Golini and Mwaluganje, there are several ethnic groups (or races) that include Digo (68.2%), Duruma (24.2%), Giriama (3.0%), Arabs (1.5%), and Kamba (1.5%). The two groups, which are heterogeneous due to different economic interests and socio-economic characteristics, were established at the beginning of the co-management process. As a resource management group, the GM landowners do not have an established power structure. Members and non-members of this sanctuary showed no significance difference in their participation (Mburu, 2002). The average cultivated area is lower in Kimana, leaving larger uncultivated areas, which are not only important for livestock grazing but also provide habitats for the wildlife. In both areas, descriptive analysis indicates that the proportion of uncultivated land is positively correlated to the crop and livestock losses. However, this correlation is significant at 1% level in Kimana but not in GM (Mburu, 2002). Abundance of livestock and horticultural crops production in some irrigated pockets have the effect that Kimana experiences higher losses (in terms of monetary value) from wildlife as these activities have a higher market value than the rainfed crops of GM. The higher affiliation to local groups in Kimana can be attributed to the efforts of the migrants to build social capital among themselves but not with the native Maasai. Due to wildlife presence in the uncultivated areas, livestock keeping, which is the major wealth determinant in both study areas, is a more important farming enterprise in Kimana than in GM (compare figures in Table 1).

3.2 Econometric Analysis

Due to the potential simultaneity bias that would arise due to the inclusion of an endogenous BENEFIT variable (see Table 1) in an OLS regression, a variant of the “treatment effect model” (Green 1998) is applied. This model overcomes the problem of coming up with inconsistent estimates if OLS is used when one of the right-sided variables exhibits endogeneity. It is specified as:

$$y = \alpha_1 + \beta_1 x + \delta_1 z + E_1 \quad (1)$$

$$z^* = \alpha_2 + \beta_2 v + E_2 \quad (2)$$

$$z = 1 \text{ if } z^* \geq 0 \text{ and } z = 0, \text{ if otherwise.}$$

In this case, y , the magnitude of landowners’ total participation costs (in both ex ante and ex post stages) is a function of the exogenous variables represented by x and the endogenous variable z (α is a constant; β and δ are the estimated regression coefficients and E_1 and E_2 represent errors). The model is estimated through a two-stage least squares (2SLS) model, using as the instrumental variable for z , the probit maximum likelihood estimates from equation (2). The model is run separately for each sanctuary (see results in Table 2).

Determinants of landowners’ level of participation

The model results are shown in Table 2. The analysis considers the level of transaction costs as a measure of the level of participation. For brevity, the discussion in this section concentrates only on some key variables which act as incentives for landowners' participation.

AGE and EDULEVEL are human capital indicators that are important in facilitating negotiations, bargaining and conflicts resolutions in the co-management process. These variables are both significant (at 10% and 1% probability levels for age and education respectively) and have positive signs in Kimana. However, in GM both coefficients of the variables are not significant and have a negative sign. As expected, the level of human capital is a strong incentive for participation in Kimana because the social set-up there, unlike that of GM landowners, acknowledges the leading role of village or clan elders and the educated in the governance of community activities, enforcing norms and resolving conflicts.

In both research areas, total number of livestock units (TOTLIV_U) is a key incentive for participation. Though not significant, the factor has the expected positive sign in both sanctuaries as it enables the landowners to cater for the travel and incident expenses during participation in meetings.

The number of local groups in which landowners are active members (LOGRONOS) is a measure of social capital, which is expected to have a positive influence on participation. This factor is a strong motivation for participation in GM but not in Kimana where the Maasai pastoralists enjoy other incentives, e.g., affiliation to one ethnic group.

Table 2: Determinants of drawing of benefits and magnitude of landowners transaction costs

Explanatory Variables	Kimana (n=70)		GM (n=66)	
	Deriving Benefits	Level of transaction costs (TOT_TC)	Deriving Benefits	Level of transaction costs (TOT_TC)
Constant	-4.9953**	-4724.6943**	-1.6203	-277.8695
AGE	0.1185	160.8802*	-0.0208	-2.6328
SQAGE	-0.0008	-1.4673*	0.0003	-0.1083
HEADMALE	-	256.8716	-1.7950*	620.6303
CH_15HHTOT	0.3301	-	-0.0863	-
MWA_GOLI	-	-	2.0318***	-
EDULEVEL	0.09210*	210.9874***	0.2325***	-31.1500
TENURE	0.3829	1520.4463**	1.6397*	299.5383
TOTLIV_U	0.01247*	4.6133	0.4805	35.5701
RELIGION	-	535.1820	-	-
LOGRONOS	-	-320.3448	-0.3270	703.2637***
CLAN	0.7852*	922.9459*	-1.6786**	616.1883*
ETHNIC	-	-	0.0610	-429.6426
TOTLOSS	-	-0.1218	-	0.2981**
FARMCUL	-0.07054	-	0.3806**	-
KWSREL	-0.5433	-	0.5430	-
BENEFIT	-	-993.9177	-	1552.3518***
Adjusted R ²	0.149	0.329	0.20	0.395

*, ** and *** : significant at 10%, 5% and 1% respectively

Kimana: log likelihood = -29.47, Chi-square = 19.04, Significance level =0.0248

GM : log likelihood = -20.93, Chi-square = 36.6, Significance level =0.00046

Source: own research

Landowners with more security of TENURE would be more motivated to participate and thus incur higher transaction costs. The positive and significant (at 5% probability level) coefficient of TENURE variable in Kimana supports this hypothesis. Though not significant, the variable is also positively linked to the level of participation in GM.

In both sanctuaries, it is postulated that the BENEFIT variable acts as a major incentive for participation. In GM, the coefficient of this variable is positive and significant at 1% probability level. The robust results of this factor implies that the benefits arising from GM, and particularly cash, are a big source of motivation for the landowners to incur costs while participating. This result supports the argument found in the literature that landowners will be more willing to invest their resources in wildlife conservation if they derive cash benefits (IIED, 1994). But on the other hand, Kimana result does not support this hypothesis. This unexpected result can be explained from the fact that cash benefits of Kimana are not equally distributed to the landowners. Thus the non-benefiting members participate more than the benefiting ones as they try to secure cash and other benefits that are withheld and unequally distributed by the Group Ranch committee.

3.3 Financial Analysis

A financial analysis is carried out for the landowners, as the most important stakeholder of the sanctuaries. Therefore, only the costs incurred by them and the benefits received by them are considered. The reference situation is the farmers' situation before the establishment of the sanctuary, where they had already suffered losses due to the presence of wildlife. With the installation of electrical fences in both sanctuaries there has been a reduction of the time needed for guarding the farms and crop losses. These reductions in losses and time spent for guarding are therefore considered as a benefit in the financial cost-benefit analysis, which captures the landowners' perspective. Based on the information collected from the landowners, the proportion of time saved in crop guarding is estimated to be approximately 30 percent in Kimana and 10 percent in GM. It is estimated that the crop losses are reduced by about 50 and 60 percent respectively. The annual net cash flows are discounted at a real rate of 12%, which corresponds to the 1999-2000 opportunity cost of capital in Kenya. The operating time for the sanctuaries is assumed to be 25 years.

Table 3: Financial cost-benefit analysis of the community sanctuaries (in US\$)

Size	Kimana BL 60 km ²	Kimana AL 60km ²	GM 36km ²
Production costs: Land opportunity costs ^a	17,100	17,100	0
Direct management costs	23,700	41,900	27,800
Fence maintenance	35,500	35,500	8,200
Transaction costs: Costs of participation	45,800	26,400	6,200
Total outflows	122,000	121,000	42,200
Revenue (entrance fees from tourists)	17,700	53,100	18,300
Savings on guarding costs	56,300	56,300	24,100
Savings due to reduced crop losses	25,400	25,400	8,100
Total inflows	99,400	134,800	50,500
Net benefit	-22,600	13,800	8,400
Initial capital investment	56,400	56,400	424,000
Benefit: cost ratio	0.77	1.04	0.52
Financial net present value	-207,700	45,600	-320,300

^a It is estimated that the returns of the Kimana pastoralists in the presence of wildlife are about 30% of the potential returns from pastoralism in arid and semi-arid areas (see Mwau, 1995). The GM landowners do not have such returns since they could not carry out farming in the presence of elephants at all.

The results in Table 3 show that the net present value for the local management committee arrangement (Kimana BL) is negative while that of the lease arrangement (Kimana AL) is positive. This is due to the increased revenue from tourism created by the lease management, as shown in Table 3. In the GM sanctuary, the discounted benefits cover only half of the discounted costs. When a sensitivity analysis is done, Kimana BL and GM become financially viable only after a 20% increase in savings on crop losses and a 20% increase in savings on guarding costs respectively. With the exception of land opportunity costs and landowners participation, a 25% increase or decrease of any of the other inflow and outflow categories affects the profitability of Kimana AL arrangement (Mburu and Birner, in press). Thus, this financial analysis shows none of the arrangements may be considered profitable from the landowners' perspective. Therefore the question arises as to which incentives make the landowners participate in the co-management arrangements. First and most important, is the retention of land ownership by the local community members. The landowners recognize that the creation of the sanctuaries must have rendered an enlargement of the Amboseli National Park and Shimba Hills National Reserve unnecessary, which would have implied an expropriation of their private land. Besides, the members still derive from their land some benefits that are not related to conservation and which could not be incorporated in the financial analysis. In GM, the landowners can use their title deeds for other purposes (e.g. security for a bank loan) while still enjoying the cash benefits from

the sanctuary. In Kimana, permission for controlled livestock grazing during drought periods is often granted after re-negotiating with the other stakeholders. Second, fencing, as was intended, has resulted in reduction to crop and livestock losses and guarding time in the cultivated areas outside the sanctuaries. There is also the intangible benefit of reduced human casualties caused by wildlife in both areas. Third, as a form of compensation for hosting wildlife outside the protected areas, the landowners are still entitled to non-cash benefits from infra-structural investments by KWS and conservation NGOs.

4 Conclusion

The analysis of landowners' transaction costs in this study enables one to draw conclusions on the kinds of incentives that determine individual household's level of participation in the co-management process of the two sanctuaries. Among the landowners' characteristics, key incentives for participation in the co-management process in the case study areas include deriving of benefits, their human, social and financial forms of capital, and land tenure conditions. Whereas drawing of benefits is a strong incentive for participation, in conditions where cash benefits are not fairly distributed, legitimate non-benefiting members of management organisations could also be compelled to incur costs in trying to contest for their rights.

The financial analysis showed that investing in wildlife is not financially viable to the landowners. While this may appear as a disincentive to participation, the study shows that landowners endeavour to protect their own property rights and other economic interests (e.g. farming) could be stronger sources of motivation for participation.

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