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Illegal Cultivators and Causes of Wild Fire Assessment in Kafta Sheraro National Park, Tigray, Ethiopia

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Abstract
This study was conducted in Kafta-Sheraro wereda in Northwest Tigray region of Ethiopia to identify the causes of wildfire and community attitude towards illegal cultivators and host livestock settlers. A total of 240 households were selected from 12 villages using stratified random sampling procedures. Six of the villages represented samples closer (on average 7.2 km) to the park and the other 6 villages represented samples far (average 39 km) from the park. Significant different are (X^2 = 63.5, df = 33, P = 0.0011) shown among villages. About 64.6% (n=155) of the respondents out of the total villages attributed the cause of wildfire to illegal arable land grabbing. From all the factors, distance to the park, year of resided in the area and level of education differed significantly (P<0.5) on the identification of illegal cultivators. 66.6% of respondents closer to the park attributed illegal cultivators for illegal settlers. This may probably due to the observation of illegal action nearby their surroundings. In conclusion, the un-proper land use by host settlers as well as legal settlers maximizes the level of habitat disturbance due to illegal cultivation with high number of livestock crossing the park. Most of illegal actions undertaken in the parks are by illegal settler, in some cases also landless peoples from the area participating too. Local leaders of the park are less responsible due to lack of well developed rules to manage the vast wildlife areas. It is possible to recommend enhancement of local prosperity, bringing community in to discussion for increasing and encouraging the anti-illegal team, improving the extension services and training in awareness creation and participation of local people in conservation, area design, planning, implementation and evaluation. Wildlife laws should be reviewed and, where appropriate, reformed to ensure adequate protection to park. In this regard, range states are encouraged to ensure that laws are not confusing or self contradictory and that adequate penalties should given for illegal cultivators.
Keywords: Community attitude; Illegal cultivators; Villages; Wildfire;

Introduction and Background

Ethiopia has a total population of over 65 million with 3% annual growth rate and a density of more than 90 persons per km^2 (CSA, 2001). Most people (88%) live in the highlands (above 1500 m) that constitute 43% area of the country. The country's ecological setting is quite diversified in altitude, climatic and ecological features. Ethiopia had 40% forest coverage before the last three to four decades. Unfortunately, to date forest areas have dropped to 2.7% (2.7 million hectares), of which only about half of this is natural forest, and the decrease is at an alarming and furious rate (Tedla and Lemma, 1998).

Ethiopia's many national parks enable the visitor to enjoy the country's scenery and its wildlife, conserved in natural habitats, and offer opportunities for travel adventure unparalleled in Africa. Among the parks, Kafta Sheraro National Park (KSNP) is a newly established park in Ethiopia found in the Tigray region which has great wildlife resources. Preliminary wildlife inventory of the park indicates that 318 African elephants *(Loxodonta africana),* 500 Greater kudu *(Tragelaphus stoep sicores),* 50 Red Fronted gazelle *(Gazella rufi fronts),* 60 Orbi *(Ourebia ourebia),* 1000 Anubis Baboon *(Papio anubis),* 180 Common Bushbuck *(Tragelaphus imberbis),* 40 Warthog *(Phacochoerus africanus),* 500 Grey duiker *(Sylvicapra grimmia),* 141 Soemmerings *(Gazella soemmeringi),* 50 Ground squirrel *(Xerus rutilus)* (KSNPCL, 2008).

Since the park delineated as a park, many problems are shown among them forest wildfire is a very serious problem in the park, destroying thousands of hectares of rangeland each year. It is difficult to say that there is place on the park which is not fired, almost all part of the park is burned. It is also not a onetime happening rather it burns year to year stay for long time with burning. It usually appeared in November and March during the dry season. A bout 20,000ha of the park was destroyed with fire started by unknown sources (WARDO, 2006, as cited in Teshale, 2007). This is highly damaging the wildlife habitats from time to time. Therefore, the study will finds key causes of wild fire in the park and helps to mitigate the causes from grass roots.

Objectives

General Objective

The overall objective of the study is to contribute to the scientific bases for improved management of the wildlife habitats and mitigate causes of wildfire in the park.

Specific Objectives

- To identify the causes of wild fire in kafta sheraro national park
- To assess community attitude towards illegal cultivators and host livestock in the kafta sheraro national park.

MATERIALS AND METHODS

Description of the study area

Kafta-Sheraro National Park (KSNP), which was recognized as a Park in 2007 (Letter, No: 13/37/82/611) is situated in the northwest of Ethiopia between 13° 50' and 14° 23' N and 36° 31' and 37° 29' E. It is bordered by Eritrea in the North and it is presumed to have an estimated total area of 6000 km^2. In addition to estimated area coverage of KSNP, the estimated area coverage in Gash-Setit, Eritrea is 5,275km^2 (Blanck *et al.* 2003). KSNP is located 600 km northwest of Mekelle the capital city of Tigray and is one of a few areas in the region which is relatively not densely populated and with relatively better natural vegetation cover compare to other part of the region. It stretches from Ruwassa River in the south to Tekeze River in the north from Welkait wereda in the east. The Park is home to many ungulates, predators and other wild animal species.

Data collection procedure

In order to reveal information on the causes of wildfire and community attitude towards illegal settlers and host livestock; both structured and semi-structured questionnaires were designed. The questions were prepared in such away that farmers could provide information that was most recent and easy to recall. For this survey a stratified random sampling technique was used. From the study area 12 villages were selected based on the distances to the park. Six villages located near to the park which are the communities have easy access were selected. The other 6 villages were relatively far from the park. Twenty farmers were picked randomly from each village, with a total sample size of 240 respondents. Before the actual survey was undertaken, a preliminary survey was carried out on randomly selected farmers from each village to generate information that was used to the questionnaire preparation for the formal survey. This was supported by group and key informant discussions and observations. Secondary data from the bureau of Agriculture and Rural development Office of the wereda and other stakeholders were collected.

Data management and analysis

Results from the survey and relevant secondary data were organized, summarized and analyzed based on six independent variables such as; villages, sex, distance to the park, land type, number of years resided and level of education having different levels on each. The data obtained from the survey were collected and structured using Microsoft Excel 2003 before it was subjected to the distribution, fit Y by X, analysis procedures of JMP Version 5 (Business group of SAS). Chi-square test was used for analyzing the relationship and level of significance of the difference data categories. The data was presented using tables. Means and percentage values of various parameters were compared across the study areas.

RESULTS AND DISCUSSION

Causes of Wild fire in KSNP

The respondents mentioned different causes of firing inside the park, and this causes varied among the sampled villages (X^2 = 63.5, df = 33, P = 0.0011). About 64.6% (n=155) of the respondents out of the total villages attributed the cause of wildfire to illegal arable land grabbing (encroachment) within the park. About 15.4% (n = 37) of the respondents attributed the cause to illegal charcoal making, and about 10.8% (n=26) of the respondents related the use of fire to tracking enemies and rebel groups, as burned areas can be visible from distance. About 9.2% (n=22) of the respondents felt that the cause for the existence of frequent wildfire inside the park to the use of smoke to harvest honey in the wild (Table 1).

In Ethiopia, the annual loss of high forest area is estimated between 150,000 to 200,000 ha, a rate which would in the coming 7-10 years change the remaining high forests in to in accessible scattered patches (FSS, 2005). Among the most developing forest fires, the incident that occurred in 2000 in Bale, Borena, East Harerge, North Omo zones are believed to have been started by individuals and destroyed an estimated 155,966 ha of forestland (Seyoum and Abebe, 2002, as cited in Teshale, 2007). Forest fires affect not only the timber and non-timber forest products, but also all forms of wildlife therein and deprive us of the much needed ecosystem services. Besides, this would also have a serious impact on the seeds stored in the soil. For instance, the 2000 fire incident in Ethiopia accounted for the loss of nearly 90% of the seed bank (Seyoum and Abebe, 2002) as cited in Teshale, 2007).

From all factors perceive of respondents about the wildfire is influenced only by sex (Table 2). Higher respondents of male and female were attributed the causes of wildfire to arable land grabbing followed by illegal charcoal making, smoke to harvest honey in the wild and tracking enemies and rebel groups. This was also in

agreement with Teshale (2007) reported that for search and expansion of agricultural land. Compared to male and female respondents, higher percentage of male respondents 75.7% (n = 106) attributed the cause of wildfire to illegal arable land grabbing (encroachment) within the park than female respondents 49% (n=49). This probably due to female respondents' information on illegal arable land grabbing is less than male respondents. The attributes causes of wildfire perceived to illegal arable land grabbing was higher (P=0.0003) in males than females.

Community attitude towards illegal cultivators and host livestock

The 12 sample villages had significantly different attitude (P<0.0001) between the illegal cultivators in KSNP (Table 3). High 90% of respondents from Edris followed by 85% Adebay, 75% Wuhdet, 65% Tekeze, 65% Adiaser, 60% Giyts and 60% Mykuhli attributed for 'Wefrizemet' (Peoples settle illegally in the area). This probably due to the high number of 'wefrizemet' and low opportunity to relocate cultivation land, as a result they cultivate illegally in the vast conserved wildlife area. This result is correlated with the finding of Teshale (2007) who reported that wefrizemet in the wildlife reserve area started in 1999 in area of Bersasa and Egume with not more than 30 households of newly married youngster, but the tabia administration halted this by giving the youngsters cultivable land owned by the deported Eritrean from Adigoshu tabia. Wefrizemet started again anew and extensively started 2004 in the core area of the park where the wild Animals, land, deface and wonder through out the year exacerbated. BoKHARD (2006) reported as many wefrizemet cultivated inside of the park. Whereas 50% of respondents in Mykuhli attributed illegal cultivators for resettles and 25% also indigenous settles. This is also supported by Teshale (2007) underline that on the average of illegal cultivation in the park some of the resettles (legal resettles) are involved.

From all the factors, distance to the park, year of resided in the area and level of education differed significantly (P<0.5) on the identification of illegal cultivators (Table 4). 66.6% of respondents closer to the park attributed illegal cultivators for wefrizemet. This may probably due to the observation of illegal action nearby their surroundings. The 61% of respondents who resided 6 up to 10 years in the area attributed for wefrizemet. 78.3 % of respondents who completed high school identified wefrizemet as illegal cultivators. What ever the degree of respondents on the illegal cultivators differed, the study suggested as the deferent peoples participate in illegal cultivation. This probably due to the poor responsibility of some leaders and lack of well developed rules to manage the vast wildlife areas. This is supported by Teshale (2007) reported 220 farmers in Edris tabia were found illegally cultivating with in the park. These are peoples who come from the highland part of Kafta(Adi-hirdi tabia) with a permission letter signed by the Adi-hirdi tabia administrator to cultivate in the park.

According to Teshale (2007) currently 4000 households are cultivating land in the park. This also a big question for the continuity of different wildlife mammals including elephants. In addition to illegal cultivation of land, immigration of livestock to the park for grazing has tremendously increased after resettlement scheme in the past years and is exerting additional pressure on the resource of the area. This supported by BoKHARD (2006) reported that thousands of livestock also make their way in to the park from the neighbouring highlands and other weredas of the region across the Tekeze River. Teshale (2007) also estimated about 50,000 – 80,000 livestock, mainly encompass of cattle, camels, goats immigrated in to the area.

In the area immigration of livestock during the rainy season was mainly limited to resettles families from their original villages. After time being, the resettles started to make business out of it by hosting livestock of people outside the area and receiving service fees either in cash or in kind at different rates depending on the length of stay of the animal. This also leads to fail the park as the results of participating resettles through supporting the illegal way of wefrizemet.

Fig.1: Wildlife habitat clearance for encroachment

Conclusions

The ongoing cultivation of wildlife habitats with increasing risk of conflicts of interest with human co-habitance is high, and the occurrence of wildfires. The un-proper land use by host settlers as well as legal settlers

maximizes the level of habitat disturbance due to illegal cultivation with high number of livestock crossing to the park. Immigration of livestock from the highland areas of the region to the park during the rainy season is common to find better feed resources. Most of illegal actions undertaken in the parks are by illegal settler, in some cases also landless peoples from the area participating too. Local leaders of the park are less responsible due to lack of well developed rules to manage the vast wildlife areas.

Recommendations

The federal and regional government should pay attention to the park in the enhancement of local prosperity, to generates supplementary income and expands job opportunities as well as acting as a tool for the conservation of the natural environment. In addition to this, the local administration urgently should re-allocate farmers that had legal arable land inside the park.

Wildlife management authorities should encourage to ensure that protected areas with elephants receive adequate patrolling, and that law enforcement staff are well housed, equipped, well trained and led, and adequately remunerated. Improve the extension services and training in awareness creation and knowledge development of the local community on the importance of the park and ownership mentality, and the participation in design, planning, implementation and evaluation should be encouraged.

Conservation activities should be integrated by improving horizontal and vertical linkages of all stakeholder institutions involved in the utilization, conservation, development and research activities of biological resources. Laws, regulations and directives should be revisited to redress the shortcomings. Moreover, comprehensive forest and land use policies should be developed. Wildlife laws should be reviewed and, where appropriate, reformed to ensure adequate protection to park. In this regard, range states are encouraged to ensure that laws are not confusing or self contradictory and that adequate penalties should given for illegal cultivators.

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Table 1: Perceived causes for wildfire inside KSNP

Villages	Encroachment	Charcoal making	Haney bee harvest	Identify enemy	Test		
	N (%)	N (%)	N (%)	N (%)	DF	X^2-value	P-value
Adebay*	15(75)	2(10)	2(10)	1(5)	33	63.5	0.0011
Mytemen	18(90)	2(10)	0(0.0)	0(0.0)			
Tekeze	13(65)	0(0.0)	2(10)	5(25)			
Mykuhli	9(45)	8(40)	0(0.0)	3(15)			
Edris*	14(70)	4(20)	0(0.0)	2(10)			
Wuhdet*	11(55)	3(15)	4(20)	2(10)			
Adigoshu*	12(60)	3(15)	3(15)	2(10)			
Adiaser*	14(70)	1(5)	3(15)	2(10)			
Aditsetser*	9(45)	3(15)	4(20)	4(20)			
Rawyan	12(60)	5(25)	0(0.0)	3(15)			
Giyts	10(50)	4(20)	4(20)	2(10)			
Mykeyh	18(90)	2(10)	0(0.0)	0(0.0)			
Total	155(64.6)	37(15.4)	22(9.2)	26(10.8)			

Table 2: Causes of wildfire perceived by respondents followed by different factors

Parameters	Level	1	2	3	4	Test		
		N (%)	N (%)	N (%)	N (%)	DF	X^2	P-value
Sex	Male	106(75.7)	16(11.4)	9(6.4)	9(6.4)	3	18.6	0.0003
	Female	49(49)	21(21)	13(13)	17(17)			
Land type	Owner	97(65)	24(16.1)	13(8.7)	15(10.1)	3	0.43	0.93
	Landless	58(63.7)	13(14.3)	9(9.9)	11(12.1)			
Distance	Near	74(62.1)	16(13.5)	16(13.5)	13(10.9)	3	5.69	0.127
	Far	81(66.9)	21(17.4)	6(4.7)	13(10.7)			
Year of resided	0-5	83(72.2)	14(12.2)	10(8.7)	8(6.9)	9	15.9	0.071
	6-10	48(62.3)	12(15.6)	6(7.8)	11(14.3)			
	11-15	19(48.7)	11(28.2)	5(12.8)	4(10.3)			
	>15	5(55.7)	0(0)	1(11.1)	3(33.3)			
Level of education	A	29(61.7)	19(40.4)	6(12.8)	6(12.7)	9	13.5	0.14
	B	82(63.6)	54(41.9)	11(6)	12(9.3)			
	C	28(68.3)	6(14.6)	0(0)	7(17.1)			
	D	16(69.9)	5(21.7)	1(4.4)	1(4.3)			

Note: 1= Encroachment; 2= Charcoal making; 3= To harvest wild honeybee; 4= To identify enemy. A= Illiterate; B Basic education; C= Primary school; D= High school.

Table 3: Illegal cultivators in KSNP as perceived by 12 sample villages

Villages	Wefrizemet (Guest settlers)	Resettles	Indigenous settles	No answer	Test		
	N (%)	N (%)	N (%)	N (%)	DE	X^2	P-value
Adebay*	17(85)	2(10)	1(5)	0(0)	33	111.77	<0.0001
Mytemen	3(15)	7(35)	0(0)	10(50)			
Tekeze	13(65)	3(15)	0(0)	4(20)			
Mykuhli	9(45)	10(50)	0(0)	1(5)			
Edris*	18(90)	2(10)	0(0)	0(0)			
Wuhdet*	15(75)	2(10)	3(15)	0(0)			
Adigoshu*	9(45)	8(40)	3(15)	0(0)			
Adiaser*	13(65)	6(30)	1(5)	0(0)			
Aditsetser*	8(40)	7(35)	5(25)	0(0)			
Rawyan	7(35)	7(35)	2(10)	4(20)			
Giyts	12(60)	6(30)	2(10)	0(0)			
Mykeyh	12(60)	3(15)	5(25)	0(0)			
Total	136(56.7)	63(26.2)	22(9.2)	19(7.9)			

Table 4: Illegal cultivators in KSNP as perceived by different factors

Parameters	Level	I	II	III	IV	Test		
		N (%)	N (%)	N (%)	N (%)	DF	X^2	P-value
Sex	Male	85(60.7)	34(24.3)	9(6.4)	12(8.6)	3	4.35	0.2258
	Female	51(51)	29(29)	13(13)	7(7)			
Land type	Owner	86(57.7)	41(27.5)	11(7.4)	11(7.4)	3	1.8	0.6185
	Landless	50(55)	22(24.2)	11(12.1)	8(8.8)			
Distance	Near	79(66.4)	27(22.7)	13(10.9)	0(0)	3	31.9	<.0001
	Far	57(47.1)	36(29.8)	9(7.4)	19(15.7)			
Year of resided	0-5	68(59.1)	22(19.1)	12(10.4)	13(11.3)	9	20.5	0.015
	6-10	47(61)	20(26)	5(6.5)	5(6.5)			
	11-15	17(43.6)	19(48.7)	2(5.1)	1(2.7)			
	>15	4(44.4)	2(22.2)	3(33.3)	0(0)			
Level of education	A	28(59.6)	12(25.5)	7(14.9)	0(0)	9	36.7	<.0001
	B	77(59.7)	34(26.4)	12(9.3)	6(4.6)			
	C	13(31.7)	14(34.2)	3(7.3)	11(26.8)			
	D	18(78.3)	3(13)	0(0)	2(8.7)			

Note = I = Wefrizemet, II = Resettles, III = Indigenous settle, IV = No answer: A = Illiterate, B = Basic education, C = Primary school, D = High school

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