Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.7, No.9, 2017

Contributions of Protected Area for Local Community Livelihood: The Case of Senkele Swayne's Hartebeest Sanctuary, South Eastern Ethiopia

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Abstract
The study on the contributions of protected area for local community livelihood was carried out in Senkele Swayne's Hartebeest sanctuary (SSHS). Primary data were collected through questionnaire, Key Informant Interview (KII), Focus Group Discussion (FGD) and direct field observation. Secondary data were collected through review of literature. Out of the 32 rural kebeles found in the Siraro district, four kebeles surrounding the sanctuary were purposively selected for the study. Primary data collection involved 151 households for questionnaire survey, 40 discussants for FGD and 12 interviewees for KII. Results of survey point out there were open access resource use and illegal activities particularly illegal hunting in the Senkele area before it's established as a Sanctuary. However, illegal hunting is very rare since the establishment of Sanctuary. It rarely happens when problem animals damage local community property or cause injury to human. The majority of sample households 41.06% were benefited a lot of resources from the sanctuary which includes fire wood, thatching the grass, grazing and collecting medicinal plants. Likewise, about 25.83% of respondents were benefited by thatching grass and grazing inside the sanctuary only. In addition, 11.92% benefited only throughout thatching grass from the area while rest few percent 3.31% privileged by collecting fire wood and livestock grazing. Currently Wildlife is facing malnutrition due to overgrazing by livestock and wildlife behavioral change is observed due to high human disturbance. Regarding to managing current destruction of the sanctuary, 27.2 % of respondents supposed that, the sanctuary could be managed through ensuring protection and conservation while 13.9%, 11.9% and 11.3% respondents stated sanctuary destruction could be managed through benefit sharing, participatory wildlife management and controlling grazing respectively. Some other 10.6% and 9.9% of the respondents said the sanctuary destruction can be managed through awareness creation and controlling illegal activities. Providing alternative means of livelihood like Ecotourism and livelihood diversification for local community is highly recommended.
Keywords: Livelihood, Local community, Senkele Swayne's Hartebeest Sanctuary, Protected area

INTRODUCTION

Background and Justification

Natural resources in developing countries are under great threat partly due to lack of alternatives and partly due to the type of livelihood of the people. By diversifying the livelihood of the people (mainly towards ecofriendly type), it is possible to minimize the pressure on natural resources. The process of development takes place in the environment, using resources, generating waste and causing other impacts; and the environment is the natural resource base that continues to provide human beings a wide range of livelihood assets and benefits (Dessalegn, 2001; Barrow, 2005). Environmental resources are the foundation of social and economic development as they are the sources of goods and services needed for poverty reduction and economic growth. Their mismanagement coupled with their underutilization has so far reduced their contribution to Ethiopia's overall development (MoFED, 2006).

In Ethiopia, overgrazing and the expansion of farming into unsuitable land caused by increasing population without increasing economic productivity are leaving the land bare: due to increasing human and livestock population pressure on arable land and forest resources, in large areas of the country, particularly on the northern and central highlands, have been exposed to loss of fertility, degradation and ecological imbalances (MoFED, 2006). According to EPA (2000), in order to ensure that future developments in Ethiopia are sustainable it is essential to integrate environmental concerns into development activities so that the inclusion of the principles of sustainable development into development endeavors is very essential.

The SSHS is among the Protected Areas in Ethiopia. The Sanctuary was established in 1976 to protect the Swayne's hartebeest (*Alcelaphus buselaphus swaynei*) (Messana and Netsereab, 1994). Mixed farming is a widely practiced livelihood strategy in the area. Subsistence agriculture and livestock production are the two main livelihood sources of the local communities. These two strategies are interlinked and depend on one another.

MATERIALS AND METHODS

Description of the Study Area

Location and Topography

The study was conducted in Senkele Swayne's Hartebeest Sanctuary, Oromia Regional State. It is located at some 53 km South of the Shashemene-Arba Minch road near the town of Aje and 320 km away from Addis Ababa. The altitude of the Sanctuary is estimated to be ranging from 2000 to 2100 masl.

The Sanctuary was established in 1976 to protect the Swayne's hartebeest (*Alcelaphus buselaphus swaynei*), a mammal endemic to the country (Messana and Netsereab, 1994). The 200 km^2 area occupied by the Hartebeest in 1972 was reduced to about 58 km^2 in 1973, and then to 36 km^2 due to settlement expansion (Messana and Netsereab, 1994).

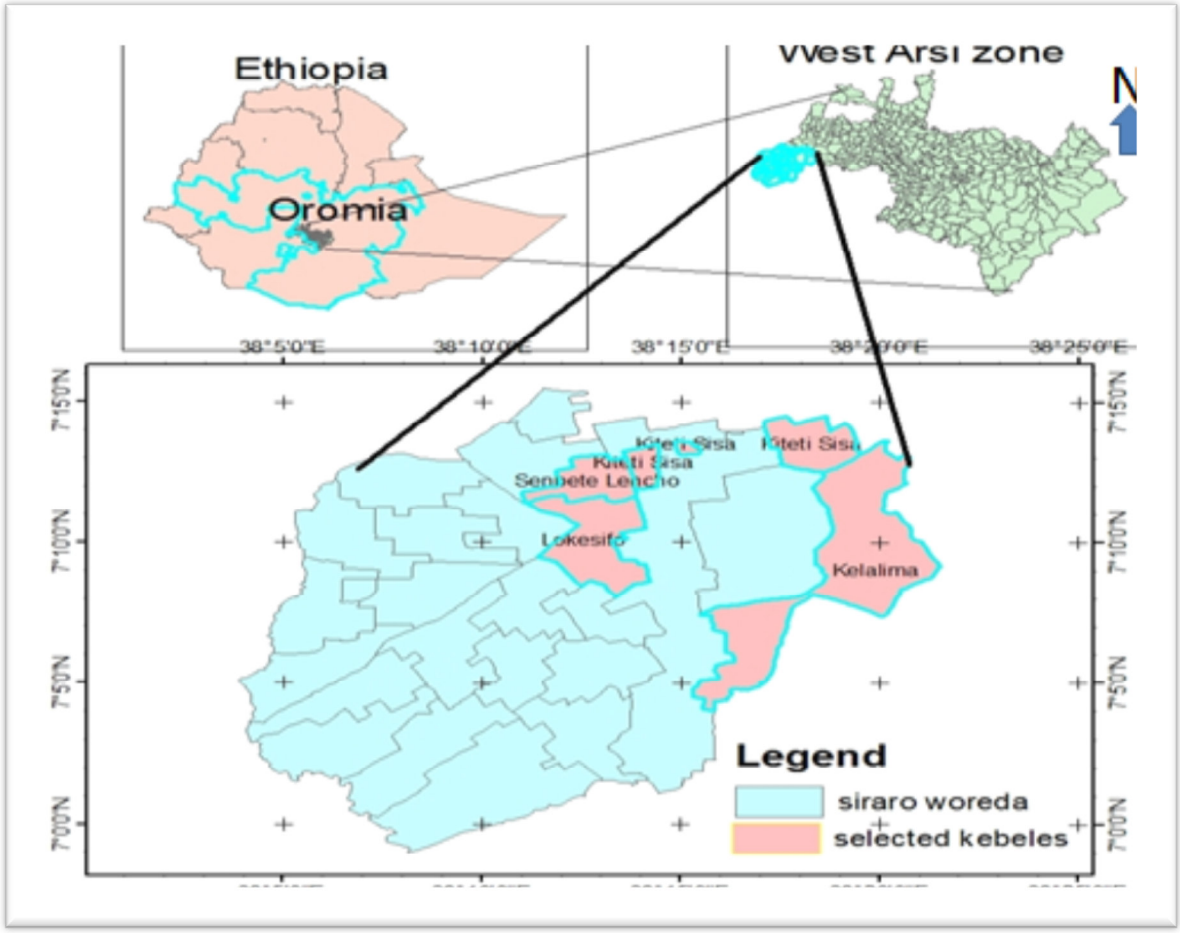

Figure 1: Map of Senkele Swayne's Hartebeest Sanctuary

Climate

The average annual rainfall at Senkele is 1,116 mm. It has a moderately bimodal pattern of rainfall typical of the 'Woinadega' agro-ecological zone of Ethiopia (1700-2700 m altitude; 600- 1200 mm annual rainfall). The three-month dry season, from November to January, is followed by the 'Belg' rains, in March-April, and the 'Kremt' rains, from June to September.

The mean monthly temperature is relatively constant throughout the year but diurnal variations can be considerable. Monthly maximum temperatures range between 26^{0}C in the dry and early wet seasons and 21^{0}C in the late wet season. Monthly minimum temperature is the lowest during the dry season, falling to 8-9^{0}C on some occasions, and rising to their maximum values of 14-15^{0}C between March and May (kumsa, 2006). Predictably, the relative humidity follows the rainfall pattern.

Monthly minimum values increase from 30-40% in the dry season to 50- 60% in the wet season. Mean maximum values fluctuate slightly around 80%. During the dry season, cloud cover is at a minimum and wind speeds are at their annual maximum contributing to the high levels of evapo-tranispiration associated with tropical climate patterns (kumsa, 2006)

Vegetation
The described vegetation communities at Senkele based on the height of grass are Pennisetum Grassland type , Mixed Grassland and the vegetation in the Sanctuary is best described as montane savanna and comprises various habitat associations such as savanna woodland, natural grassland (with fewer tree and shrubs) and, in the valleys, rich shrub land (Birdlife International, 2003).

Wild animals
In addition to the Swayne's Hartebeest, other wild animals that occur in the Sanctuary were Bohor Reedbuck *(Redunca redunca)*, Warthog (*Phacocoerus aethiopicus*), Greater kudu (*Tragelaphus strepsiceros*) and Oribi (*Ourebia ourebi*). Among the primates, vervet monkeys (*Cercopithecus aethiops*) can be seen in a restricted forest area. Crested porcupine (*Hystrix cristata*), Aardvark (*Orycteropus afer*) and Abyssinian hare (*Lepus habessinicus*) are also observed. Spotted hyenas (*Crocuta crocuta*) were very rare, probably numbering less than 10, and have never been observed in packs of more than three animals (Hunting Technical Service, 1976).

Human settlement and land use system
In the Senkele plains, the dominant land users up to 1940 time were the pastoralists. Subsequently, the influx of new elites following the Italian war (1936-1941), led to the development of mechanized farming in the area. In the late 1960s, areas of pasture in the area were increasingly brought under the cultivation and the pressure on remaining pasture was intensified (Messana and Bereket, 1994). Crop production is the main activity followed by livestock rearing. The principal crops of the area are maize (*Zea mays*) and potato (*Solanum tuberosum*) but in limited areas, haricot beans (*Phaseolus vugaris*) were also observed. Greater number of livestock in particular characterizes Siraro Woreda and the study area. Before 1990, the number of settlers in and around the border of the Sanctuary was very few. After 1991, people started to show resistance against EWCO through a variety of action such as occupation of the territory, livestock grazing and fire wood collection in the Sanctuary (Nishizaki, 2004).

Research Methodology
The major activities of the study were started by conducting a reconnaissance survey in and around SSHS from December 2014 to January 2015 time frame. After a reconnaissance was done, sampling design for household survey and other concerned stakeholders were undertaken and finally, sample size determination was made.

Study population
The researcher was selected Siraro woreda kebeles surrounding SSHS as population of the study. There are three target groups selected to collect the required information for this study. The first group is respondents for household survey from surrounding four target kebeles including Loke Sifo, Senbete Lencho, Kela Lalima, and Kite Tesisa. The second group is from community representatives living in and around the sanctuary for Focus Group Discussion (FGD). The third group is Aba Geda and experts from concerned offices at Siraro woreda including Cultural and tourism office, Agriculture office, Land and Environmental protection office, Small and micro enterprise and SSHS for key informant interview.

Sample size determination and sampling procedure
The households Kebele who were part of the study were purposefully selected from Siraro wereda specific area of Senkele Swayne's hartebeest sanctuary. Four Kebeles surrounding the sanctuary were purposefully selected for the study due to the fact that those Kebeles are surrounding the sanctuary and they have high degree of interaction with the sanctuary. The four Kebeles were Loke Sifo, Senbete lencho, Kela Lalima, and Kite Tesisa. Accordingly, each has a total household of 1588, 1200, 1064, and 924 respectively. Sample size was determined by considering the following parameters. by considering margin of error (8%) and by using the following formula:

$n = N/ [1+N (e)^2]$…….. ((Israel, 1992)

Where; N = the total population that will be studied=4776
n = the required sample size
e = the precision level which is = (8%)
Where Confidence Level is 95% at P = ± 5 (maximum variability)

$n = N/ [1+N (e)^2]$

$n = 4776/ [1+4776(0.08)^2]$

$n = 151$

To get the distributions of sample size across each urban kebeles we calculate by using formula:

$n' = n(N'/N)$

$n' = 151(1588/4776)$

n'= 50……..

So the distributions of sample size across the urban kebeles are 50, 38, 34 and 29 correspondingly. Based on the name list of member households in each urban kebeles households were selected using random sampling technique.

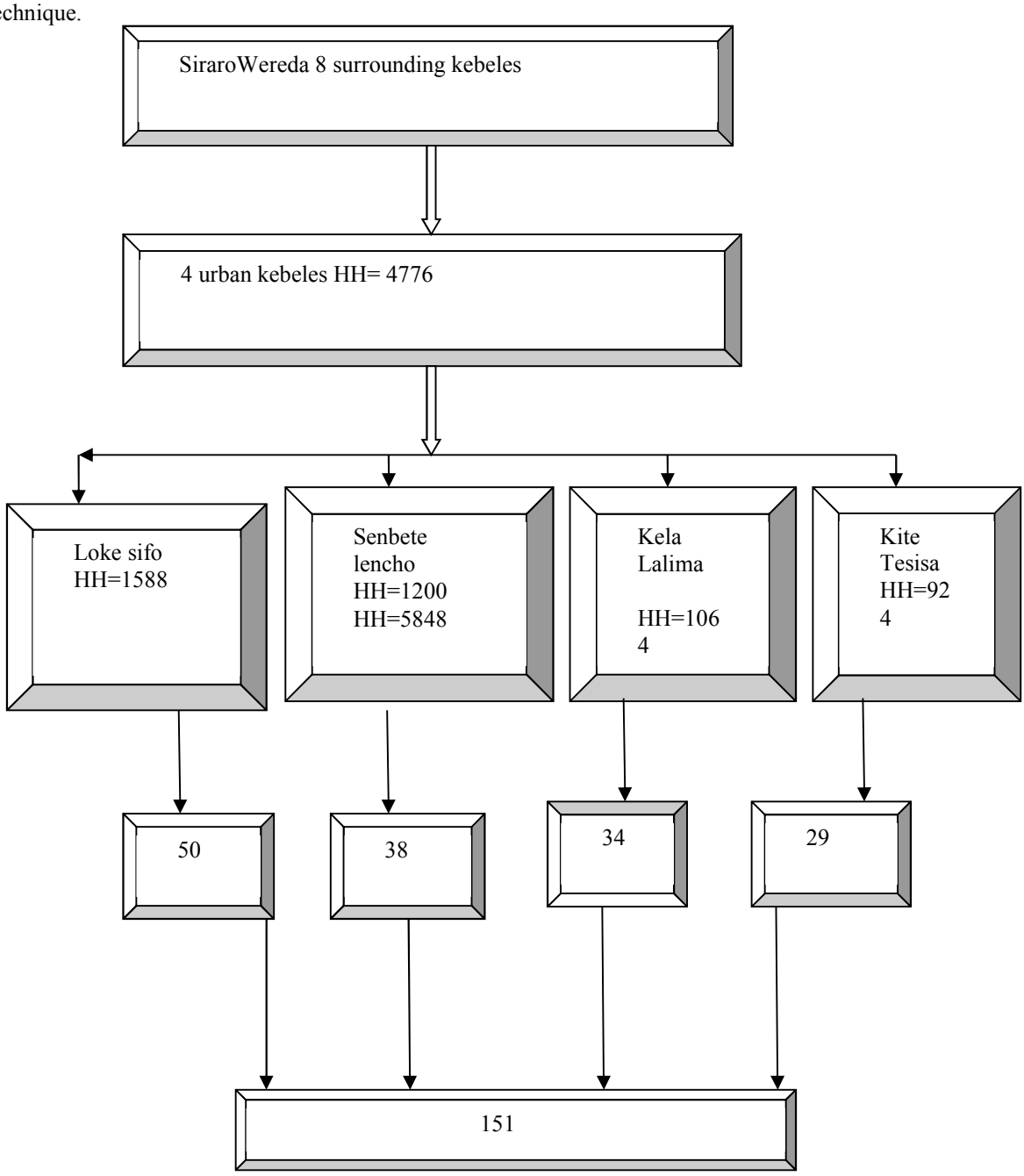

Figure 2: Diagrammatic presentation of the details of the sampling procedure

Data Sources and Data collection tools

Both primary and secondary data were used in the study. Primary data was collected through household survey, key informant interviews, focus group discussions, and direct observation. Secondary data were collected from published and unpublished materials sources.

Structured Questionnaire

Questionnaire consisting of both open and closed ended questions was used to obtain information from the selected samples of 151 households selected from four kebeles. The questionnaire surveys were used to generate quantitative data on household background information, socioeconomic condition, and attitude of local community toward the Sanctuary, resource use and human activities in and around Sanctuary.

The questionnaire was translated into Afaan Oromoo before administration. The actual questionnaire survey was preceded by a pilot testing using five questionnaires in two of the kebeles (Bitana Kubi and Jarti Bokole) which were not to be sampled. Based on the feedback obtained adjustments were made in the questionnaire. The data collection was carried out with the help of the scouts of the Sanctuary. Before the commencement of data collection, training was given to the enumerators on how to fill out the questionnaires and on how to approach sensitive questions related to illegal activities. To gain people's confidence, the purpose of the study was clearly presented to the respondents. The questionnaire was alternating male and female respondents and different age groups as much as possible.

Key Informant Interview

For the purpose of this study, semi-structured questionnaires were delivered. Key informants were selected to respond to the questionnaires. They were selected from different offices of the woreda depending on their relevance in terms of experience the issues of concern raised in the study. The offices from which key informants were selected include Culture and Tourism office, Agriculture office, Land and Environmental Protection office, Small and Micro Enterprise, SSHS and [1]Aba Gada. Accordingly, a total of 12 Key interviewers (two Aba Gada, and two experts from each the offices mentioned above) were selected for the interview.

Focus Group Discussion (FGD)

Focus group discussion (FGD) is the most important data collection tool to generate the qualitative information on the issue. The FGD involved 40 Households (Hhs), at the rate of 10 Hhs per kebele. The discussants were community representatives, religious leaders', women, local elders and landless young groups resident in the kebeles.

Direct Observation

Field observation is another method applied to shed more light on the status of issues under investigation in the study area. It was also used to verify information and compare responses gathered from other data collection tools. In the current study, during field observation, the study site was visited and photos of the site and notes were taken on local peoples and livestock activities in the sanctuary, socioeconomic characteristics of local people, natural resources particularly wildlife and its habitat management practices in the area, the conservation practices, etc. Thus, the researcher opinion on his visit of the study area was included in the analysis.

Secondary Data Collection

The use of secondary sources plays a major role in the field work research, especially at the study area. In an effort to make this research more valid, creditable and applicable secondary sources which are important to the study were reviewed. For this purpose, both published and unpublished sources were investigated systematically especially books, web pages, policy directives, reports, project papers, annual and action plans, etc which support anthropogenic factors affecting Sanctuary were reviewed and used in the discussion.

Method of Data Analysis

The process of data analysis involves making sense out of text and image data. It involves preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data. Accordingly, data collected from house hold survey was coded and entered into Statistical Package for Social Science (SPSS). The result of analysis was interpreted and presented using descriptive statistics (frequency and percentages, etc). The researcher used data gathered through key informant interview, focus groups discussions and direct observation to strength the quantitative data.

RESULTS AND DISCUSSION

This part of the study deals with the presentation, analysis and interpretation of data collected through questionnaires, key informant interviews, focused group discussions, field observation and document analysis to address the basic research questions. The results were presented and discussed through various statistical tools simultaneously in respect to the research objectives.

General Characteristics of Sample Households

This section focuses on the analysis of the demographic characteristics of the respondents. Accordingly, data on the respondent's background information such as; sex, age, marital status, Number of wives, family size, Number of children, income and academic background of the respondents were collected. The purpose of

[1] Aba Gada is a community leader in Gada system of Oromo society

presenting demographic profile is to offer further insight into contribution of SSHS for local community livelihood and socio-economic characteristics of local community. Besides it serves as the background and point of reference to the interpretation of the data. The percentage distributions of these variables were presented below accordingly.

Demographic Characteristics of Sample Households

Table 4: Demographic Characteristics of Sample Households

Variables		No. of respondents	Percent
Sex	Male	120	79.5
	Female	31	20.5
Age Category			
	20-30	43	28.5
	30-40	64	42.4
	40-50	30	19.9
	Above 50	14	9.3
Academic background			
University/College		2	1.3
High school (9-12)		8	5.3
Elementary (1-8)		50	33.1
Writing and reading (informal education)		35	23.2
Un educated		56	37.1
Total number of HH		151	100

The result shown in the above (table: 1) indicate, the sex composition of the respondents shows about 79.5% of the respondents are male while 20.5% are female.

Concerning to age structure as shown from (table, 1) the respondents were represented from all age group which helps to gather good data perception and view from all age group in a proportional way. However, the majority of respondents were represented from the age group of 30-40 years which accounts 42.4%, whereas the respondents in the age group of 20-30 years account about 28.5%. Comparatively the rest of the sample households between 40-50 years old and above 50 account about 19.9% and 9.3% respectively. The data reveal that on the average the households are from middle age group category, which could play significant role in conservation of sanctuary in the study area.

Education is a basic parameter for any development activity particularly for conservation of natural resources and livelihood improvement. It makes people well informed about the costs and benefits of conservation and improves their benefits.

Educated people can also understand and adopt new practices and technologies which can help to upgrade the conservation of Natural resources by filtering the obstacles and hindrances of the sector. In line with this; educational status of respondents were assessed. Accordingly, survey result in educational background of the sample respondents reveal the greater proportion of the respondents which is 37.1 % are not educated (can't read and write). Likewise, 23.2 % of the sample population was reported as they do not attend formal education; it was reported that they can read and write only. Whereas about 33.1% were attend elementary school while only few 1.3% sample households attend University/College level.

Distribution of Marital Status, Number of wives and Family Size of Sample Households

As table below indicated, the majority of sample households 131 (86.8%) are married. In difference, the percentages of sample households who have never been married were very low 4.6%. Whereas the rest of sample households account about 6.0% and 2.6% for divorced and widowed respectively. With respect to family size per household, as it is depicted in table 3 below about 46.4% of the sample households have 6 up to 10 family size whereas only about 2.6% household have above 20 family members. From the survey result, it was also possible to find out about 25.2% of the sample households have been living in polygamy. Hence they have married two or more wives. This in turn implies as the family size increases, the dependency ratio on families land hold will be high. According to CSA (2007) the dependency ratio of Siraro woreda population is about 1.09.

Majority of the respondents 90.7 were farmers while only 5.3% and 4.0% were merchants and students respectively. Additionally households who account their job under students were early married and dependent on families' income for livelihood.

Table 5: Marital Status and Family Size of Sample HHs

Variables	No. of respondents	Percent (%)
Marital Status		
Single	7	4.6
Married	131	86.8
Widowed	4	2.6
Divorced	9	6
Number of Wives		
One	74	49
Two	38	25.2
Three	8	5.3
Above three	1	0.7
Family Size		
0-5	39	25.8
6-10	70	46.4
11-20	30	19.9
Above 20	4	2.6
Job of respondents		
Farmers	137	90.7
Merchants	8	5.3
Students	6	4.0
Total number of HHs	151	100

Resource use in Senkele Swayne's Hartebeest Sanctuary

Access of Senkele area resources before it's established as a Sanctuary

The respondents were asked about the condition of the Senkele area resources use before it's established as a sanctuary. Thus it is indicated in Fig. 3 below about 35.76% of the respondents supposed there was deforestation and poaching. Similarly, 35.10% of respondents believed as there was open access resource use in Senkele area before establishment as Sanctuary. Additionally, about 11.26% of respondents reported there was overgrazing without control. The remaining 7.95% and 9.93% told that the resources use was regulated by Aba Geda and all illegal activities conducts including deforestation, poaching and overgrazing respectively. Generally, result of survey point out there was open access resource use in the Senkele area before it's established as a sanctuary.

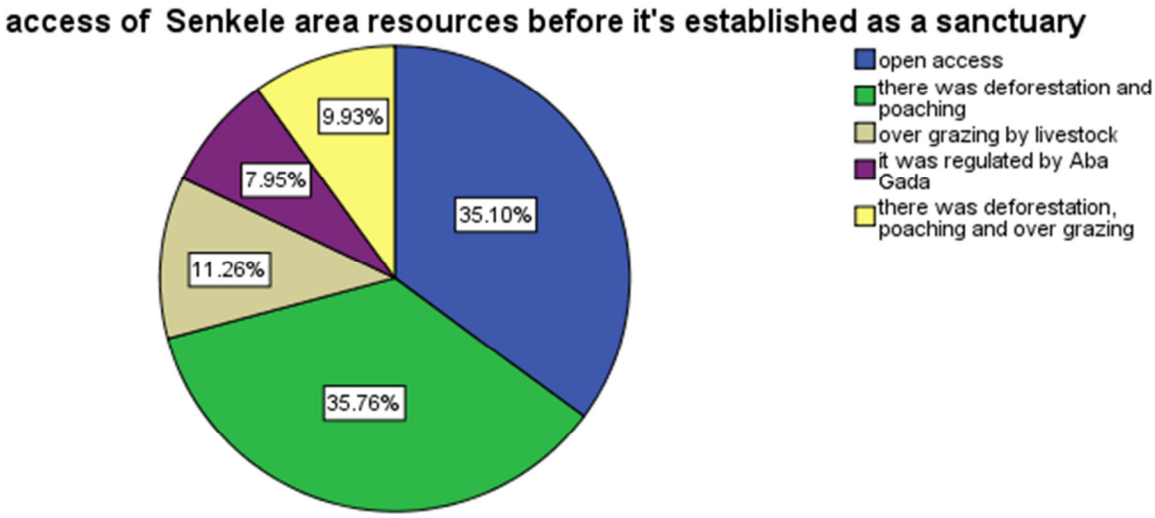

Figure 3: Access of Senkele area resource before it's established as a sanctuary

In addition, as the central idea from Aba Geda, many years ago there was the system of land lord and at that time the area was owned by grazmash Mi'eso Nure and the area was used as grazing land by land lord and other local people under his control and poaching of Swayne hartebeest and other animals was common during that period. Generally, the area was used by local community.

The restrictions put in the place after the area were demarcated as Swayne's Hartebeest Sanctuary

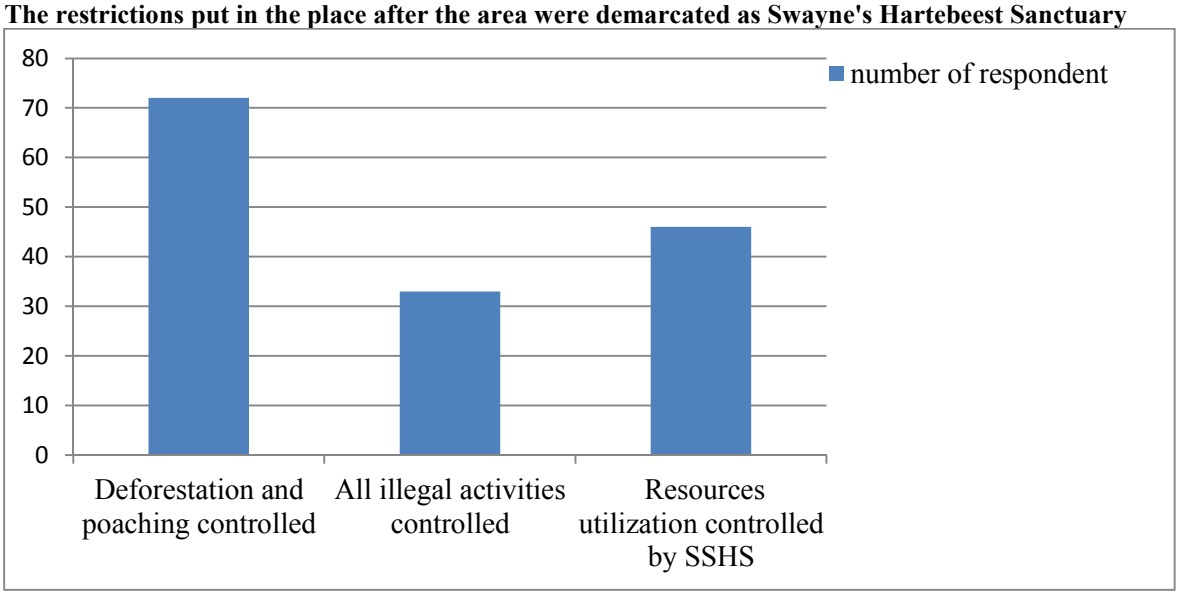

Figure 4: The restrictions put in the place after the area were demarcated as Swayne's Hartebeest Sanctuary

As shown from (Fig.4) above, the majority of sample households 47.7% reported after the Senkele area was demarcated as a sanctuary deforestation and illegal hunting were controlled. The remaining 30.5% and 21.9% told that the resource utilization was regulated by SSHBS and all illegal activities are controlled respectively. Information from Key informant interview reveals that illegal hunting is very rare since the establishment of Sactuary. It rarely happens when problem animals damage local community property or cause injury to human.

Resources respondents benefit from the sanctuary

Based on the information displayed in (Fig.5), the majority of sample households 41.06% were told to be benefited a lot of resources from the sanctuary which includes fire wood, thatching the grass, grazing their livestock and collecting medicinal plants. Likewise, about 25.83% of respondents from selected sample responded as they benefited by thatching grass and grazing their livestock inside the sanctuary. In addition, 11.92% of them benefited throughout thatching grass from the area while rest few percent 3.31% privileged by collecting fire wood and livestock grazing.

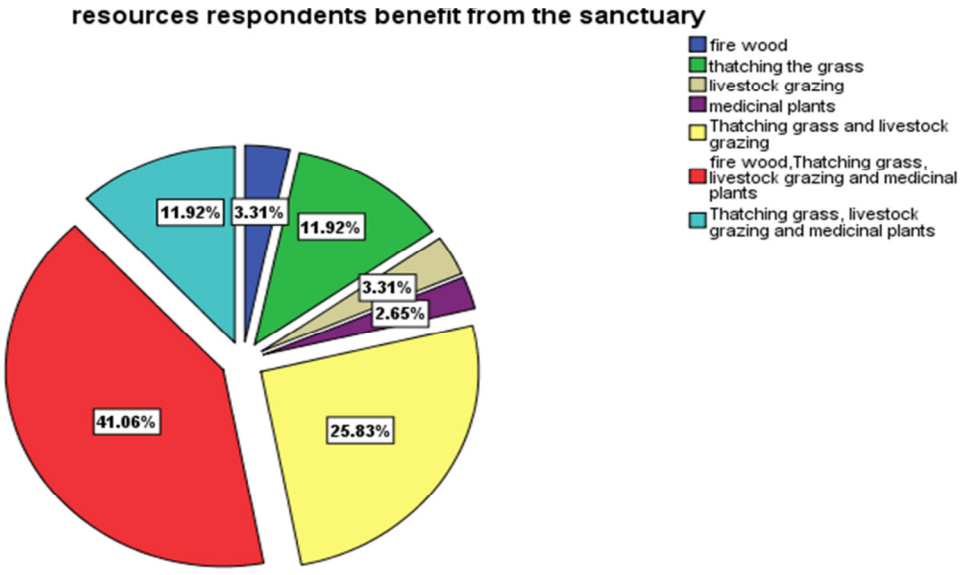

Figure 5: Resources respondents benefit from the sanctuary

According to central idea from key informant interview local community gets a several benefits from the sanctuary. Most important benefits local community currently get from sanctuary are grazing by livestock (majority's benefit), cultural and aesthetic value, thatching the grass, medicinal plants and fire wood collection etc

Effect of resource use in the Senkele Swayne's Hartebeest Sanctuary and its Management option

The use of the resources from the sanctuary as cause of destruction

Table 3 below illustrate the majority of the respondents (78.8%) confirm the use of resources from the sanctuary causes destruction while only about 21.2% of respondents respond in reverse. Likewise, about 27.8% households confirmed that the use of resources from the sanctuary was further cause depletion of wildlife in the sanctuary. Moreover, respondents point out that the use of resources from the sanctuary influence the degradation of vegetations, depletion of wildlife and climate change.

Table 3: Use of resources from the sanctuary cause destruction

Variables	No. of respondents	Percent (%)
Yes	119	78.8
No	32	21.2
Total No HHs	151	100
Destruction of the sanctuary		
Degradation of sanctuary	14	9.3
Depletion of wildlife	42	27.8
Climate change	1	.7
All of the above	61	40.4
Others	1	.7
Total No HHs	119	78.8

In addition to this as per key informant interview idea wildlife are facing malnutrition due to overgrazing by livestock and wildlife behavioral change is observed due to high disturbance. According to Boyd et al. (1999); Fox et al. (2002), increased livestock numbers resulted in resource competition between livestock and wild animals.

Way of managing the destruction of the sanctuary

As shown in Fig. 6, about 27.2 % of respondents supposed that, the sanctuary could be managed through ensuring protection and conservation while13.9%, 11.9% and 11.3% respondents stated sanctuary destruction could be managed through benefit sharing, participatory wildlife management and controlling grazing respectively. Some other 10.6% and 9.9% of the respondents said the sanctuary destruction can be managed through awareness creation and controlling illegal activities

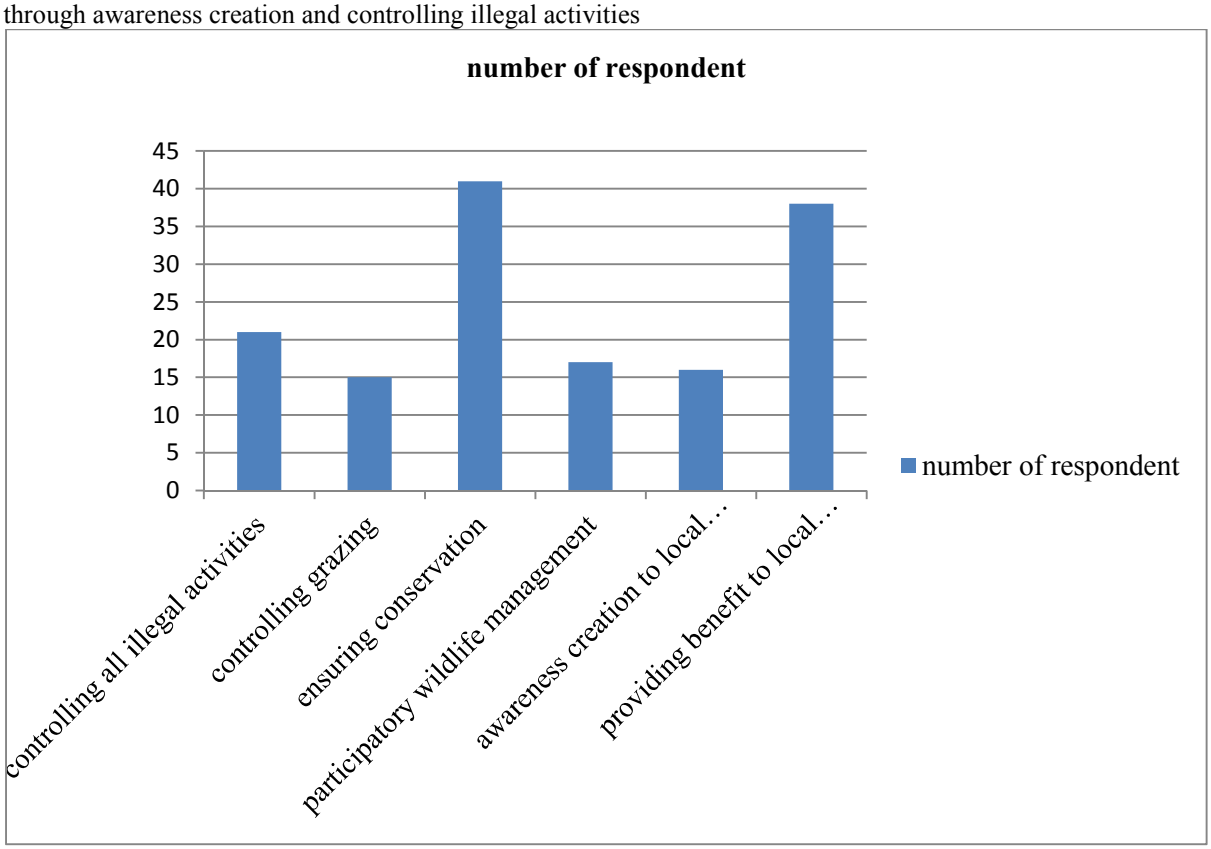

Figure 5: way of managing the destruction of the sanctuary

FGD discussant stated that destruction of sanctuary is reducing by creating employment opportunity for

local people. This is done by participating them in tourism by forming association which provide various good and services to tourist. Some of these associations are Horse rent association, darartu association (sell honey to tourists), Guri kombolcha association (thatch grass for sale and house building), Abdi rabi association (patrolling and punishing illegal activities inside the sanctuary), SSHS culture and tourism association (sell handcraft to tourists). All association encompasses both sex groups. All the associations generate income from corresponding activities and save their capital. According to (LWAG 2002), In Namibia and Zimbabwe, community-based wildlife management practices have brought significant employment and income-generating opportunities, empowerment, and governance impacts to some remote communities through wildlife tourism. Moreover the idea stated by key informant interview reveal threats to the sanctuary is currently reducing by awareness creation, participating local community in decision making and profiting local communities.

According to De Boer and Baquete (1998), Participation of local communities in the planning and management of natural resources is widely considered as a means of sustaining protected areas. Moreover, according to Craven, Wardoyo and Lewis et al. (1993), involving local people in conservation, management and policy making of protected areas gives them a sense of ownership. Sound management plans require community participation, which in turn requires governments to gain community trust. Community trust can only be obtained when there is concrete evidence that the protected area could be benefit local residents.

5. CONCLUSION AND RECOMMENDATION

The study on the contributions of Senkele Swayne's Hartebeest sanctuary (SSHS) for local community livelihood revealed the greater proportions of population around SSHS are uneducated (can't read and write). As education is a basic parameters for any development particularly conservation of natural resources, uneducated communities around SSHS are imposing great challenge to conservation of SSHS. Early marriage and polygamy is common practices in the study area. Most households have married more than two wives and there is high family size per households in the study area. Thus the Government should educate Local community to bring behavioral and attitudinal change to reduce destruction of sanctuary and traditions which is affecting the community such as polygamy and early marriage. Besides Encouraging local community to adopt and use family planning is vital to reduce population growth rate, dependence ratio and hence dependency on natural resources reduced. The major source of income for livelihood of local community in senkele area is farming with a mixture of crop cultivation and livestock rearing. Moreover local community gets high annual share from livestock. Providing alternative means of livelihood like Ecotourism and livelihood diversification for local community is highly recommended.

Majority of local community owned one hectare crop land which is scarce relative to family size and local communities have no grazing land. Thus sanctuary is the only grazing land for local residents. It is urgent need to train local community to reduce livestock quantity and enhance its quality and introduction of animals forage extension is equally important.

Household survey indicates majority of local community depend on sanctuary for livelihood particularly for grazing. Before establishment as sanctuary, senkele area was open access in which deforestation and illegal hunting was common. After establishment of sanctuary deforestation and illegal hunting is controlled and resource utilization is regulated by SSHS. Currently access to the sanctuary is medium and local people mainly extract benefits like fire wood, grass for house construction and grazing and medicinal plan from sanctuary. The size of sanctuary is shrinking primarily due to settlement and agricultural expansion. Majority of local community is interested to alter the sanctuary into grazing and agricultural land if there were no restriction. Buffer zone of the sanctuary is densely populated. Most households live very close (<1km) to the sanctuary. This aggravates resource use from sanctuary and causing destruction to the sanctuary. There is a need to solve local community problem such as lack of grazing land, clean water, mobile network and infrastructure development. Some sanctuary staff gets promise which they can't fulfils to community. So, this should be improved and injustice in providing benefit to local community should also be improved.

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