

Knowledge, Attitudes and perceptions of the local people towards the conservation of the Nigeria-Cameroon Chimpanzee (*Pan troglodytes ellioti*) in the Tofala Hill Wildlife Sanctuary (THWS), South West Region, Cameroon

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Abstract— Local attitudes and perceptions are important concepts toward wildlife conservation. The success of chimpanzee conservation relies on the perceptions and the willingness of the local population to contribute towards its conservation. This study evaluates the knowledge, attitude and perception of local communities towards chimpanzee conservation in the Tofala Hill Wildlife Sanctuary (THWS) in the Southwest Region of Cameroon. Structured questions based on a questionnaire (open and close ended questions), Focus group discussion and Participatory rapid Appraisal tools and techniques were used to collect information from 300 participants within the participatory age group of 20years and above from six out of 14 villages (Nkong, Bangang, Besali, Bechati, Folepi and Fossimundi) around the THWS. Fifty individuals were sampled from each village and a maximum of 2 individuals (the head of household and one other active participant) participated from each household. Collected data were stored in Microsoft excel spreadsheets 2007 after importation into XLSTAT 2007. 8. 4 statistic software for the different statistical tests. Chi-square test and Spearman correlation were conducted at 0.05 level of significance. The knowledge of interviewees on chimpanzee presence was supported by 90.33% of participants. Local knowledge on the population status of chimpanzee shows that 61% affirmed that their population is reducing primarily due to hunting and habitat loss of poor agriculture. According to 67% of interviewees, benefiting from wildlife through tourism, seed dispersion,

bush meat and medicine influenced local attitudes and perception toward chimpanzee conservation while their destructive habits through crop riding, inadequate farmland for agriculture and high income derived from the sales of chimpanzee makes 33% of the local population to change their attitude and perception toward chimpanzee conservation.

People with no formal education (62.96%) did not found chimpanzee conservation important whereas more educated people (76.76%) found chimpanzee conservation a priority.

Most respondents (57.04%) said the idea of chimpanzee conservation was not supported due to high income (15,500FCFA) generated from the sales of chimpanzee. Increasing public awareness of the benefits and values of chimpanzee conservation through media (radios, televisions and smart phones), handbills, bill boards, seminars and symposiums, and films could help mitigate the poor attitudes of the local population towards chimpanzee conservation. Instigating outreach programs to communities living in close proximity to chimpanzee and other wildlife species is often high on the agenda of conservation NGOs with the assumption that long-term change can best be achieved through accelerating change in societal attitudes towards wildlife.

Keywords— Attitude, Chimpanzee, Conservation programs, Knowledge, Perception, THWS.

I. INTRODUCTION

Studies on endangered primates have become increasingly important in recent years due to the current levels of unsustainable harvesting. It is estimated that chimpanzees are encountered at low frequencies at high hunting pressure (Mboh and Warren, 2007; Imong and Warren, 2008). The limited number of Chimpanzees persisting in many areas shows that the hunting pressure is not sustainable (Fa *et al.*, 2006). This could be attributed to poor attitudes towards the conservation of some wildlife species. For instance, Greengrass (2009) demonstrated that in south-western Nigeria, chimpanzee population size and distribution sharply declined over a decade due to poaching for bush meat.

The major focus in the conservation policy since a century ago is the establishment of protected areas which led to the denial of the rights of indigenous people, expulsion from their homelands and provoked long-term social conflicts (Dorji, 2009). A new conservation model which involves local communities and accepts their rights in the management process was adopted by IUCN (Dorji, 2009). Assessing peoples' attitudes and perceptions towards conservation stand as an important aspect in wildlife conservation. The success of Wildlife conservation depends on the local attitudes towards conservation since the local people could exploit the forest. Also, understanding factors which influence attitudes is important to enable wildlife managers to implement approaches that attract support of stakeholders and the general public. It is necessary to seek and obtain the active participation of potential stakeholders not only in the technical efficiency of a conservation technology, but also the extent of satisfying cultural, social and political considerations in the environment which can help change the attitudes of indigenous people towards wildlife existence and conservation (Nji, 2004). The attitude about the willingness to pay (WTP), an important concept in wildlife conservation, is influenced because environmental issues are a necessity and not a luxury (Hökby and Söderqvist, 2005). With respect to the decrease in ape populations, some conservation organizations are putting forward, conservation measures to ensure their long term survival. For instance, the United Nations Convention on Biological Diversity (UNCBD) calls for parties to respect, preserves, and applies knowledge and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity. The bodies aimed at helping plan conservation activities, assess the degree of threats faced by the different species and identify areas with a high priority for conservation attention. To this

extend, the problem of wildlife threat by local perception is still a severe case in most protected areas.

The Tofala Hill Wildlife Sanctuary within the Lebialem-Mone forest corridor is one of the most important biodiversity hotspots of global importance with high levels of species richness and endemism across the forest area (Nkemnyi *et al.*, 2012). However, sustainable forest management practices are scanty in the area and have led to a serious threat to biodiversity, most especially to chimpanzees in this forest area (Etiendem *et al.*, 2011; Dunn *et al.*, 2014). A number of recent studies have examined the issue of local perceptions towards conservation and development (Fiagbomeh and Bürger-Armdt, 2010). It has generally been found that costs associated with conservation (such as wildlife damaging crops) have negative effects on local attitudes while benefits from conservation (such as game meat) may have some positive effects. In line with this, income needs of household are argued to be one of the major threats to wildlife conservation in the Lebialem highland (Nkemnyi *et al.*, 2016). It has been noted that local knowledge, attitude and perceptions of local communities are influenced by factors like awareness of protected areas existence, the education level, services and local people benefits from conservation related projects (Vodouhe *et al.*, 2010; Gandiwa *et al.*, 2014). The understanding of these factors is important to improve the relationship between local communities and protected areas. This will enhance peoples' awareness about wildlife conservation in and around the THWS. Poor attitude and perception of the local communities towards wildlife conservation is a serious threat to chimpanzee population in protected areas. Due to the recurring nature of conflict between conservation and local communities, it is important that conservationists better understand local opinions with respect to species and protected areas. Therefore, an investigation of the opinions and outlook of the local communities is critical to assess the protected area, prepare a management plan and propose better possible conservation strategies of the THWS. A few studies have assessed local perception towards wildlife in the THWS but specific emphases on the most endangered Nigeria-Cameroon chimpanzee (*Pan troglodytes ellioti*) are scanty. The present study therefore sets to evaluate the knowledge, attitude and perception of the local population towards the conservation of the chimpanzee in the THWS. Specifically, it evaluates indigenous knowledge toward chimpanzee conservation; assess the impact of educational levels on chimpanzee conservation; identifies the factors influencing bush meat exploitation and wildlife

conservation, and lay dawn improved measures to mitigate chimpanzee conservation in and out of the THWS.

II. MATERIALS AND METHODS

2.1 Location of the Tofala Hill Wildlife Sanctuary

The Tofala Hill Wildlife Sanctuary (THWS) formerly known as the Bechati-Fossimondi-Besali Forest (BFBF) is located between latitude 5° 37' to 5° 42' N and longitudes 9° 53' to 9° 58' E (Fig. 1). The THWS in the Lebialem-Mone forest corridor within the Lebialem division in the Southwest region of Cameroon got its full protection on September 29, 2014. The forest is bordered by Banyang-mbo Wildlife Sanctuary (BMWS) to the south west and has a surface area of over 8000ha, making up to

about 100 km² of land. It lies 40 kilometers (25 miles) away from the nearest Cross River Gorilla locality in Mone River Forest Reserve in Cameroon. The forest is surrounded by 14 villages (Nkong, Bangang, Besali, Bechati, Agong, Folepi, Banti, Fonengeh, Bamumbu, Igumbo, Fossimondi, Fossimock'Mbi, Fonjumetaw and Fossongu). The area is characterized by an undulated landscape from Bechati (200m) in the lower altitudes to Fossimondi (1800m) in the higher altitudes, with a chain of peaks notably the Tofala Hill (866m) (Fig. 1). It is also characterized by a Semi-evergreen tropical broadleaf forest which dominates the lower altitudes (International Tropical Timber Organization, 2006).

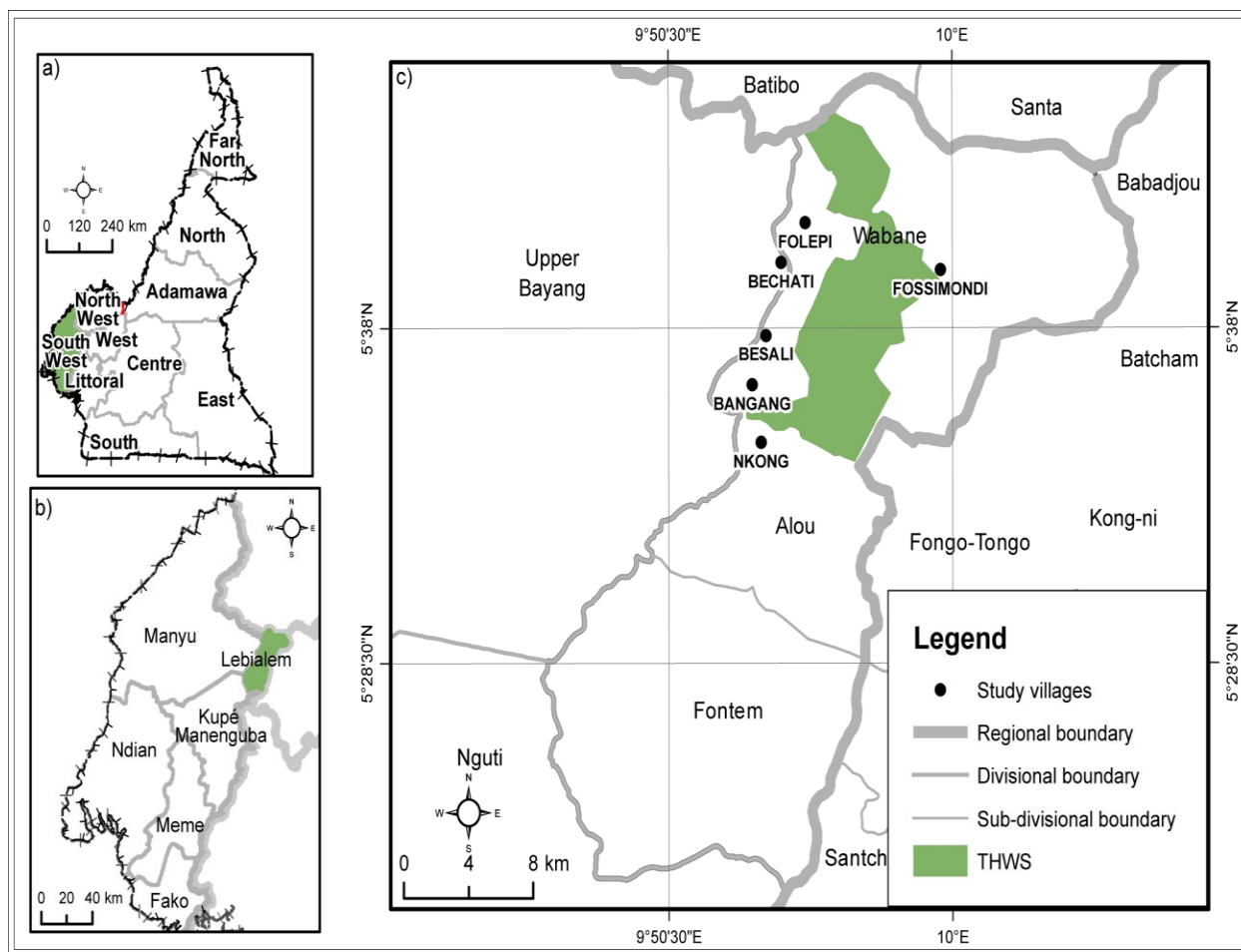


Fig.1: Location of South West Region, Lebialem Division, study villages and THWS area within Cameroon, (adapted from the administrative map of Cameroon, ERuDeF and ACF, 2011)

2.2 Description of the Tofala Hill Wildlife Sanctuary

Two seasons (rainy and dry) are commonly observed in the area. The rainy season last from mid-march to the end of October with August being the wettest month while the dry season begins from early November and ends

in mid-march with February being the driest. Annual rainfall ranges from 3438 to 5429mm with a mean of 4526mm (Nchenji, 2005). The climate is characterized at high altitudes by low temperatures, low rainfalls, high relative humidity and mountains often covered in clouds

and at low altitudes by moderate temperatures, low rainfalls, low relative humidity and mountains relatively clear. Daily temperatures vary between 20°C and 35°C, and an annual temperature range of between 21°C and 26°C with the peak in March. The topography is undulating and characterized by elevated, prominent mountainous terrain, with altitude ranging from lowland Bechati, Besali, (570m) and 72m (Nkong) through 1470m (Alongkong) to about 2200m at Fossimondi. The area is an important watershed with many fast flowing forest streams that are tributaries to the Manyu River. Also, the area is a major watershed that supplies Mezam in the North West, Mifi, Mbamedjin dam and Mbouda in the West and Fontem, Tinto and Mamfe in the Southwest. Humid volcanic soils with average fertility are found in the higher altitudes around Fossimondi and sandy-loam to reddish alluvial soils with the lowest fertility around Bechati, in the lower altitudes. There is tropical forest vegetation in the lower parts from the villages of Nkong, Bangang through Besali to Bechati, woodland in the middle part around the villages Talung, Alongkong, Nchingang and Banteng and the tropical savannah vegetation at the higher altitudes of M'ock Leteh to Magha. However, its altitudinal range of 130m to 2500 m gives rise to two broad vegetation types; the lowland forest and the sub-montane forest (Oates *et al.*, 2007). The area is a biodiversity hotspot harbouring over 400 plant species, 42 of which are threatened. It also harbours two great apes with one critically endangered Cross River gorilla (*Gorilla gorilla delhi*) and the most endangered subspecies of the African chimpanzees (*Pan Troglodytes ellioti*), several species of monkeys, 8 globally threatened bird species and 03 endemic species of amphibians (Ekinde and Khumbah, 2006; Nkembi *et al.*, 2006; IUCN, 2009). The human population of the sanctuary area is estimated to be 7,000 inhabitants (Nkembi *et al.*, 2006). Agricultural activity is the primary activity practised in the area though people are also involved in other activities (hunting fishing and local craft making) for livelihood.

2.3 Data Collection

Structured questionnaire with both opened and closed questions (de Vaus, 1996), Focus group discussion and a Participatory Rapid Appraisal tools and techniques was used to collect information through interviews with the local population in the six out of the 14 villages (Nkong, Bangang, Besali, Bechati, Folepi and Fossimondi) adjacent to the forest block. A combination of methods reduces the inherent limitations of each one approach (Moreno-Black, 1978). Four random starting points were selected in each of the six villages and every household was visited where a maximum of two individuals (at least the household head

inclusive) within the participatory age group of ≥ 20 yrs was sampled. Both male and female respondents were selected for interview based on their willingness to participate. Interviews were conducted in pidgin. For participants who did not understand pidgin, questions were translated into their local dialects by our field assistant who was an indigene of the area. Sampling was done in early mornings from 7:30am to 9:00am and in late evenings from 5:30pm to 7:30pm, West African time (GMT + 01:00) which represent periods at which the local populations are most available. After a series of demographic questions (sex, age, education, occupation, marital status, household size), respondents were asked about their knowledge of chimpanzee and their opinion toward chimpanzee conservation. These questions were posed as statements to which respondents were asked to agree, disagree, select among a list or give their opinion. Farmers, hunters, business men, civil servants, students, as well as Chiefs, notables and elderly people participated. Interviews were conducted individually and simultaneously per household. To facilitate this process, photographs of species previously recorded as bush meat in the vicinity (Fa *et al.*, 2006) and in the surrounding forest (Ekinde and Khumbah, 2006; Nkembi *et al.*, 2006) were presented to interviewee on laminated sheets while species absent from these sheets were identified using description and common names. A total of 300 questionnaires were administered in the six villages and participation was random irrespective of their levels of education and occupation.

2.4 Data Analysis

Collected data were stored in the Microsoft excel spread sheet 2007 after which they were imported into the XLSTAT 2007. 8. 4 statistical software for the different statistical tests. The knowledge of chimpanzee in the different villages, the opinion of the local population toward chimpanzee conservation and the effects of levels of education on conservation were analyzed using the chi-square test. Spearman correlation was used to understand the trend between the number of people who have seen chimpanzee with time. Participants' opinion for the yes/no responses was represented as 0 and 1 while all data were tested at 0.05 level of significance.

III. RESULTS AND DISCUSSION

3.1 Socio-Economic Characteristics of Participants

Most interviewees (82.67%) out of the 300 participants were males while 17.33% were females (Fig. 2).

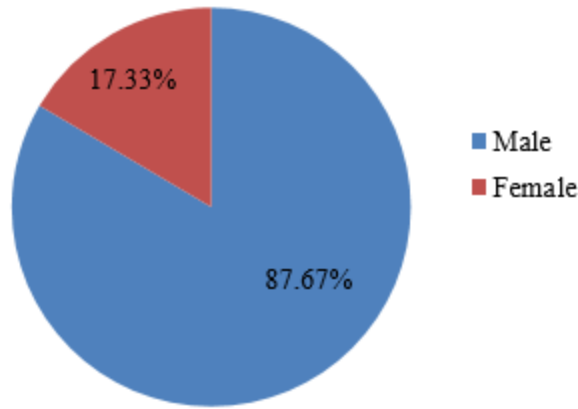


Fig.2: Percentage distribution of participants according to gender

Respondents were distributed into three main age group of youths (20-40years) (53.33%), elderly (41-60years) (37.33%) and the old (>60years) (9.33%). The bulk of respondents were in the active age group of 20 to 40 years which suggests that this is the age group most involved in the exploitation of natural resources. Household size ranges from 1-3 individuals (43%), 4-6 individuals (32.33%), 7-9 individuals (20.67%) to ≥ 10 individuals (4%). The predominance of male respondents could be attributed to the fact that women were not easily accessible due to fear,

religious restrictions and the notion that they have poor knowledge on chimpanzee. Few respondents had no formal education (18%), while 16% had attained basic education, 30% and 29.67% had attained secondary education (O/L and A/L respectively) and 6.33% had attained higher education. Farming was the predominant activity according to 81% of the participants followed by business (13%), hunting (3.67%), and teaching (1.67%) while logging was the least (0.67%).

3.2 Local Knowledge on the Existence of Pan troglodyte ellioti in the THWS

A majority of the interviewees (90.33%) know and have seen chimpanzees while only 9.67% did not know and have never seen chimpanzees within the THWS area. The number of participants who know and have seen chimpanzee either alive or dead did not differ significantly ($\chi^2 = 5.2297, P = 0.389$) in the different villages. However, most participants have seen chimpanzees in Bechati (22.67%) and Besali (18%). Other primate species such as *Gorilla gorilla delhi* and the monkey (*Cercopithecus nictitans*) were identified to be present in the THWS. The number of participants who have seen chimpanzee in recent years is shown in figure 3.

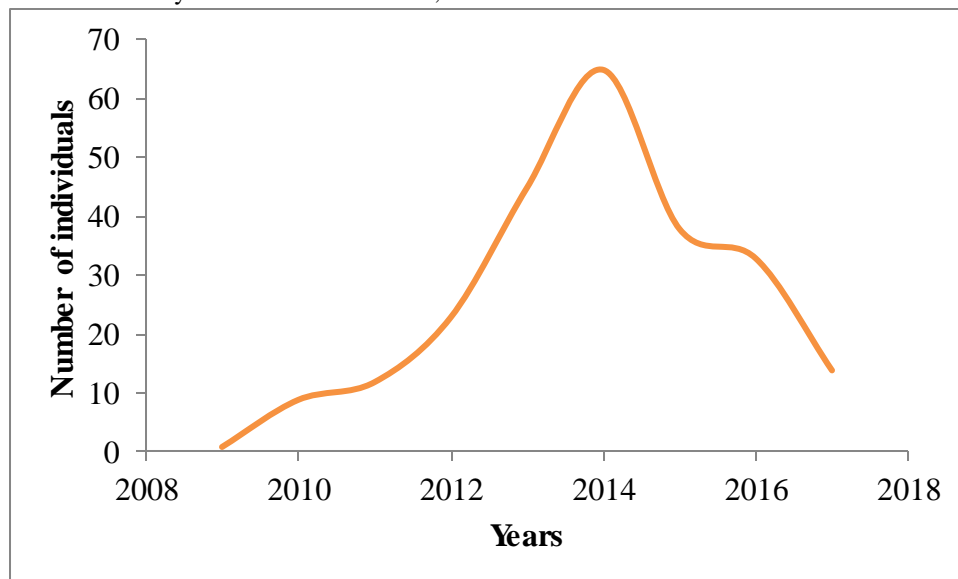


Fig.3: Variation in the number of participants who have seen chimpanzee with time

Spearman correlation did not show any significant difference ($P = 0.097$) between the number of individuals who had encountered chimpanzee with time, coefficient of determination = 0.360. The number of participants who had seen chimpanzees sharply decreased from 2015 (38 individuals) to 2017 (14 individuals) (Fig.3). According to 76.67% of participants, increase agricultural practices have

reduced the habitat of chimpanzee and forced them to live far from human vicinity. This therefore reduces the chances to encounter chimpanzees in recent years. In relation with other works, Plumptre *et al.* (2010) demonstrated that primates have been found to be reducing in human modified habitats as a result of agriculture.

3.3 Local Perception on the Population Status of Pan troglodyte elliotti in the THWS

Participant's response on the population status of the chimpanzee was categorized into increasing, reducing

and stable depending on their degree of encounter and threats (Table 1).

Table.1: Responses on the population trend of chimpanzee in the different villages

Question	Responses	Villages						df	χ^2 - value	P-value	Significance
		Nkong	Bangang	Besali	Bechafi	Folepi	Fossimun di				
In your opinion, how is the population trend of chimpanzee	Increasing	2	0	7	5	2	4	10	13.477	0.198	NS
	Reducing	32	34	26	29	35	27				
	Stable	2	2	1	0	1	1				
	No idea*	14	14	16	16	12	18				

* Category of responses was omitted from the chi square test.

NS = Not significant

According to 61% and 6.67% of the interviewees, chimpanzee populations are reducing and increasing respectively. However, 2.33% said chimpanzee populations are stable while 30% of the interviewees did not have any idea on the population trends. Interviewees' responses on the population trends of chimpanzee in the different villages did not differ significantly ($\chi^2 = 13.477$, $P = 0.198$). The reasons accounting for the population trend of chimpanzee in the THWS did not differ significantly ($\chi^2 = 15.563$, $P = 0.113$) from the different villages. Hunting and habitat loss for agriculture were the primary reasons for the decrease in chimpanzee populations while non-hunting of chimpanzees due to their totemic nature was the only reason for the increase and stability in chimpanzee populations in the THWS. In conformity with other studies, chimpanzees are found to exist at very low densities in heavily hunted areas (Imong and Warren, 2008) and in human modified habitats as a result of agricultural activities (Plumptre *et al.*, 2010). Also, logging as a result of human population increase destroys habitat for primate thus leading to their decrease (Laporte *et al.*, 2007; Hicks *et al.*, 2010). Some subpopulations of the chimpanzees are present in the THWS as 90.33% of the participants were aware of their

presence. The presence of chimpanzees in the THWS could be attributed to their existence in the neighbouring Banyang-Mbo Wildlife Sanctuary with about 500 to 900 individuals (Greengrass and Maisels, 2007).

3.4 Attitude and Perception toward the Conservation of Pan troglodytes elliotti in the THWS

According to respondents, 69.33% strongly agreed with the idea of chimpanzee conservation, 21% strongly reject it while 9.67% had no idea on chimpanzee conservation. There was a significant difference ($\chi^2 = 17.357$, $P = 0.004$) on participants opinion toward chimpanzee conservation in the different villages. A majority of the population (67%) strongly accept the idea of conservation because of the usefulness derived from it while 33% could not derive any usefulness of chimpanzee conservation. These results contradict those of Ebua *et al.* (2011) in the Bakossi area where most respondents (90%) in Bakossi landscape did not consider conservation as beneficial and only 10% agreed that conservation is beneficial. Although 73% of the sampled population say chimpanzees are hunted, the existence of cultural believes (example, taboo) and legal orders hinders hunting activity.

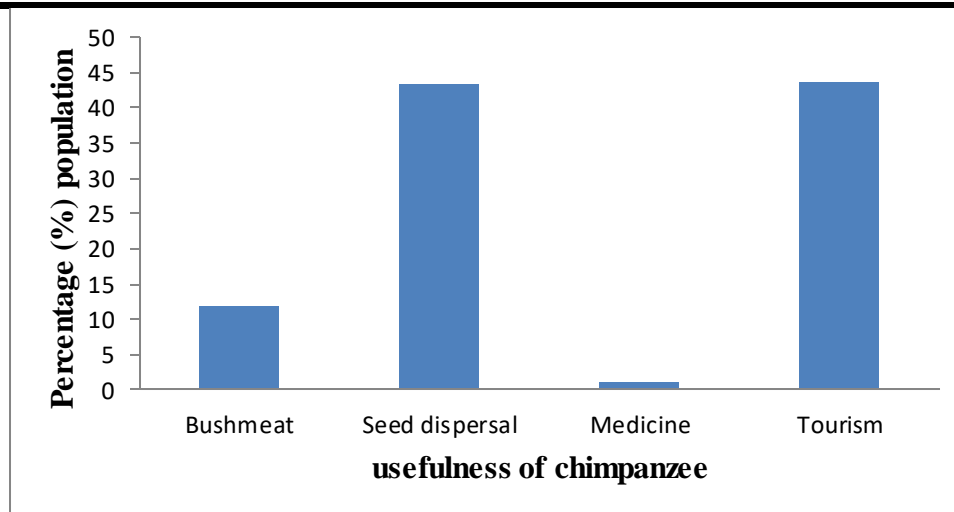


Fig.4: Usefulness of chimpanzee according to the sampled population

Tourism (43.28%) and seed dispersal (43.78%) were the primary reasons why 67% of the sampled population found chimpanzee conservation important (Fig. 4). However, 11.94% and 1% said they are used for bush meat and medicine respectively. Chimpanzees were primarily hunted for bush meat but most hunters attest to the fact that chimpanzees are people's totems and the death of a chimpanzee may lead to a decrease in human population. Therefore, a majority of the hunters (76.19%) supported the idea of chimpanzee conservation in protection of human population. In conformity with the results of other studies, primate conservation is important because they are totems of people (Etiendem, 2008).

Levels of education influenced the perception of the local population toward chimpanzee conservation. People with no formal education (62.96%) did not find chimpanzee conservation important whereas more educated people (76.76%) found chimpanzee conservation a priority. Participants opinions toward the importance of chimpanzee conservation differ significantly ($\chi^2 = 20.731$, $P < 0.001$) in their respective levels of education. Nonetheless, increase in participant's levels of education increases their acceptance to conserve chimpanzee while the idea of chimpanzee conservation was poorly accepted by participants with no formal education. In close acceptance with other studies, Tsi *et al.* (2008) demonstrated that in Northern Cameroon, idle and less educated people who inhabit areas surrounding national park territories are more prone to wildlife crimes (thus, found conservation less important). Most participants (90.37%) rely on respecting conservation laws in contributing towards chimpanzee conservation while 9.54% were willing to pay a sum in contribution towards chimpanzee conservation. Poverty stood as the primary reason why a majority of the local population could not pay

a sum to contribute toward chimpanzee conservation. High income earners can pay while low income earners will not find it important to pay because of insufficient income to run livelihood activities. Other studies have reported that, Environmental services are rather a necessity than a luxury, because they tend to affect low-income groups more strongly than high-income groups (Hökby and Söderqvist, 2005). However, a number of recent studies have examined the issue of local perceptions towards conservation and development (Fiagbomeh and Bürger-Armdt, 2010).

3.4.1 Attitude toward the Sale of Wildlife species in the THWS

A majority of respondents (57.04%) affirmed that high income is generated from the sales of primate species and that the mean price of primate sold is 9000FCFA with Chimpanzee being the most expensive (15,500FCFA) and Bushbaby (*Galagoid sp*) the least expensive (2000FCFA).

IV. CONCLUSION

This study has revealed the local attitudes and perceptions towards chimpanzee conservation in the THWS, South West Region of Cameroon. The local population strongly acknowledged the presence of the chimpanzee in the area but it is clear that conservation benefits are unequally distributed in the villages and may turn to influence community perception toward chimpanzee conservation. Though their perceptions toward chimpanzee conservation are generally positive, some poor attitudes still stand as a barrier in the conservation process. The results of the present study help us to make the following recommendations which could be useful to mitigate chimpanzee conservation in the area. Increasing public awareness of the benefits and values of wildlife

conservation through media such as radios, televisions and smart phones could help change the attitudes of the population towards conservation. Also, negative attitudes and perceptions can be shifted with carefully implemented conservation programs which serve to alleviate poverty by initiating entrepreneurial activities that can generate income to the local residents to offset the costs incurred. Nevertheless, instigating outreach programs to communities living in close proximity to primates and other wildlife species is often high on the agenda of conservation NGOs with the assumption that long-term change can best be achieved through accelerating change in societal attitudes towards wildlife. This will help sensitize the entire population on general conservation issues as well as particular conservation issues for the areas highly concerned.

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