

## Using the Keywords to Explain the Bonobo Distribution as an Effect of Human Perception of the Species

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Quantitative and qualitative analyses of ecological factors conducted on the distribution of the bonobos of the Lake Tumba Landscape did not fully explain the actual distribution of bonobos in that part of their range. Hence, the aim of this paper was to study the human cultural landscape of the region to shed light on questions raised by differentiated bonobo abundance. This was conducted using a combination of methods, including key word approach through focus group sessions, the Dempster combination rule to calculate the strength of belief and overlaying maps of ethnic groups and that of abundance of bonobos to see if the distribution of ethnic groups correlated with the density of the bonobos. Paired t-tests were used to assess difference in strength of belief between ethnic groups. Focal groups collected 113 stories, centered on six main themes, of which the most striking feature was the *humanization* of bonobos, with themes such as ‘*making of fire*’ (23.8%), ‘*crying by bonobos*’ (21.2%), ‘*bonobo as ancestors of human beings*’ (7.9%) and ‘*rescuing people from imminent danger*’ (6.1%). Calculated values for the strength of belief varied between ethnic groups; the Bateke held the highest (63%) strength of belief, while the weakest (14%) strength of belief was held in the cosmopolitan centers. Paired t-tests indicated that the strength of belief significantly differed (all  $p < 0.05$ ,  $df = 29$ ) between the Bateke and the two other ethnic groups. We concluded that strength of beliefs depicted the fact that Bateke, through their traditional taboos, had protected bonobos over centuries that they have been sharing the same forests.

Keywords: Bonobos, keywords, strength of belief, Lake Tumba, Democratic Republic of Congo

### Introduction

Ways in which people use and conserve the natural resources found in their local territories are often based on communities’ spirituality. For cultures that have a written heritage, those spiritual roots can often be traced back to sacred books and ancient philosophical traditions. Thus, concepts of the way that humans related to nature in the western world originate from the Bible: “...And the Lord planted a garden eastward in Eden; and there he put the man whom he had formed. And out the ground made the Lord God to grow *every tree that is pleasant to the sight, and good for food* (...). And the Lord God took the man, and put him into the Garden of Eden *to dress it and keep it* (Genesis 1:1 – 3: 24). Similar references to God, garden and the role of human beings as keepers of the earth are common across religions (Flood, 2005; Callicott, 1994; Hargrove, 1989; Masson, 1967: Koran XXVII, pp. 60– 61). The 8th Century Hinduistic pantheism of Samkara, or even

or even the later version of Baruch Spinoza (Bullock et al., 1990; Gallez, 1976) is but a stringent echo of that call to respect nature, a call for human beings to become real keepers of their environment.

In modern times, pantheism provides solid ground for activists of animal rights, particularly towards the great apes that are our closest cousins in the animal kingdom.

For cultures lacking written heritages, the spiritual roots of human perceptions towards nature can be uncovered from folk tales and stories embodied in oral traditions. Instilled by myth and ritual, human responses to animals can originate from deep, often irrational, emotional attitudes that are embedded in different cultures (Boitani, 1995). Hence, anthropologists (e.g. Langley, 1976), historians (e.g. Vansina, 1990), and philosophers (e.g. Sumner, 1988) believe that oral traditions can provide important insights to socio-ethnological and linguistic studies. Furthermore, oral traditions can also be useful to track down the history of people and cultures, their perceptions of the world around them, and the ways they interact directly with the nature and natural resources found in their immediate

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surroundings, including animals, plants and landscapes.

Consequently, anyone choosing to study contemporary approaches to conserving natural resources, and particularly to charismatic species of large mammals, will inevitably need to acquire knowledge of the social and cultural implications of natural resources for local people (Boitani, 1995). Oral traditions can be very helpful in gaining understanding of issues such as folk taxonomy, as well as for understanding the ecological footprint of humans (Myers, 1985), who have done much to influence the distribution, abundance and behavior of other species of large mammals across wild areas.

This paper aims to provide an overview of the cultural landscape of Lake Tumba Swampy Forests (LTSF), in order to shed light on questions arising from the bonobo distribution that cannot be explained by using purely ecological correlates. Previous research (Bennett & Robinson, 2000; Butynski & Koster, 1994; Gadsby, 1990) has shown the importance of local human history, local demographic patterns and different local cultures in shaping human attitudes toward the wildlife with which local people share their land. In turn, such attitudes may help explain the distribution patterns of large mammals, through their influence on such factors as local hunting patterns on, and levels of protection afforded to, wildlife. Therefore, this paper aims to:

- Map the distributions of different ethnic groups across the LTSF and the ethnic group map layer as it is super-imposed on the distributional map of the bonobos.
- Discuss the emerging differences on bonobo abundance based on an examination of folk tales and keywords assembled from focus group sessions. In doing so, the aim is to see if the local population's attitude is correlated with the distribution of the bonobos.

## **Methods**

### ***Mapping ethnic groups***

Maps of ethnic groups living within LTSF were compiled from existing map-based data sources. The first source was the detailed ethnographic maps compiled by Hulstaert (1993a, b), which are the most detailed available for LTSF, and are supported by text that provides insights on occupation of the land since colonial times.

The second source was the tribal distribution maps made as part of the administrative map of the Congo, which provides the geographic area occupied

by each recognized Congo's tribes. The tribe was defined following previous studies (Vansina, 1990; Mudimbé, 1988) as a community that defines and understands itself as a natural and social body recognizing a single traditional authority deployed through accepted political institutions and laws, sharing a common history, customs and rites, and occupying one more or less homogeneous territory. These map sources were complemented by the map published by SIL (2008) on the distribution of languages spoken in the DRC currently and in 1959 (Heenen, 1959). These maps were triangulated and ground-truthed by geo-referencing the villages where interviews and focal group discussions subsequently took place, using a Garmin 12XI handheld GPS and confirming tribe present, and language spoken at each reference point.

The exercise to map ethnic groups showed that the hinterland of the Lake Tumba – Lake Maindombe supported a very high cultural diversity (Marcot & Alexander, 2004). Some 13 tribes were found to live in LTSF, including seven in the province of Equateur and 6 in the province of Bandundu. It appeared that each tribe followed its own techniques for exploiting natural resources, and for placing different values on each wildlife species that they encounter locally. Furthermore, such a varied 'cultural landscape' may well reflect the observed patterns of distribution among different species of large mammals.

### ***Focus group discussions***

Acquiring sufficient comparable focal group discussion and questionnaire data from all 13 tribes in LTSF was not possible, given the time and resources available in this study to adequately cover the wide geographic spread of these tribes. To account for that reality, the focal group discussions focused on bonobos. This was meant to provide a broad view on the bonobo conservation status, what local communities had as knowledge on the bonobos and how that knowledge could be useful to conserving the species.

### ***Key word approach***

Data from focus group discussions were first grouped using the key-word approach (Sumner, 1988). The approach is based on the fundamental assertion that a word reveals a thought and a structure (Vansina, 1990; Sumner, 1988; Langley, 1976; Turnbull, 1973; Soja, 1970). This means that words are not only a string of syllables, but also embody some social and cultural textures of what they are supposed to convey. In this sense, the approach does not require the subject to be defined before undertaking any

scientific inquiry; rather the key words suggest the subject for the researcher.

Following Sumner's (1988) philosophic perspective, a key word does not only mean a word that is repeated along the text but also a word that has a qualitative dimension. Thus, Russell and Harshbarger (2004), Schensul et al., (1999), Bernard (2000; 1995) and Vansina (1990) believe that this philosophical approach allows researchers to acquire the bulk of anthropological knowledge. In turn, such knowledge can be used in socio-historical research, particularly if that knowledge is augmented by various utilitarian and sociological considerations. Despite the polemics on the notion of the innocent information that words, proverbs, songs and admonitions might contain, researchers can start their enquiries based on key words, and deepen their cumulative knowledge without being pulled towards the unproductive comparisons. The key word method has been proven to produce crucially informative insights that have led to studies of institutions, social structures, and economic trends of a society (Strauss & Corbin, 2007).

### *Analytical approach*

The likelihood that key words might influence local behaviour toward conservation of biodiversity in general, and of bonobos in particular was examined using existing quantitative metrics to evaluate the strength of beliefs (Yager, 2004a, b; Bryson & Mobolurin, 1998). We fused data from different sources using the Dempster combination rule (Yager, 2004a, b; Bryson & Mobolurin, 1998; Liu & Kerre, 1918), which has its basis in the theory of evidence

through the formula: 
$$W_j = \frac{\prod_{k=1}^a w_j(k)}{\sum_{j=1}^n \left[ \prod_{k=1}^a w_j(k) \right]}$$

In this equation  $W_j$  is the weight (or the strength) associated with the information, in this case the keyword from the source  $k$ , whether villages or tribes. The assumption is that  $W_j \in [0, 1]$ . This

means that  $\sum_{j=1}^n W_j(k) = 1$  (Yager, 2004b).

Therefore, no weight associated to the information equals zero while information repeated all over the sampled villages (or interviews) has a value of 1 or 100%.  $\prod$  is the possibility distribution, indicating the degree to which a keyword or a concept is comprised

in different subsets, in the case of this thesis villages and interviewees.

Methods indicated above have been tested during a pilot survey; the questionnaire was pre-tested on one village belonging to each of the four ethnic groups targeted by the survey and equal proportions of women and men as well as equal proportions by age groups responded to question in in each of these village. In each tested village, 24 people responded to the questionnaire, making a total of 96 respondents. This helped refine the questionnaire in such critical questions as how to incorporate gender sensitivities in administrating interviews. Gender has been accounted for by incorporating women among investigators. Therefore, women in villages were interviewed separately but were also present in the general focus group sessions.

Questions consisted of general knowledge about the bonobo presence in the region, qualitative estimates of abundance, qualitative estimates of distances between villages and first encounters with bonobos, where bonobos were absent, questions included whether they have been present in past or not and why people thought bonobos were absent in their villages, etc. Focus group sessions were essentially around collecting stories on bonobos in each village.

## **Results**

### *Distribution of ethnic groups relative to bonobo abundance*

Maps of the distributions of different ethnic groups (Figure 1) indicated that at least seven ethnic groups have been present in the hinterland of LTSF since the early 18<sup>th</sup> Century (Vansina, 1970).

This total of seven ethnic groups was arrived at after several steps. First, by dissociating the Baboma, also known as Eboo, who had previously been lumped together with the Bateke in one source of ethnographic maps of Congo (SIL, 2008). Second, by accepting that the Ntomba occur in two different areas adjacent to the two lakes of Maindombe and Tumba. Third, by excluding more recent immigrants such as the Nunu-Bobangi or the Ngando who have mostly established themselves either in major towns such as Bolobo (Figure 1) and in isolated new settlements such as Mbanzi.

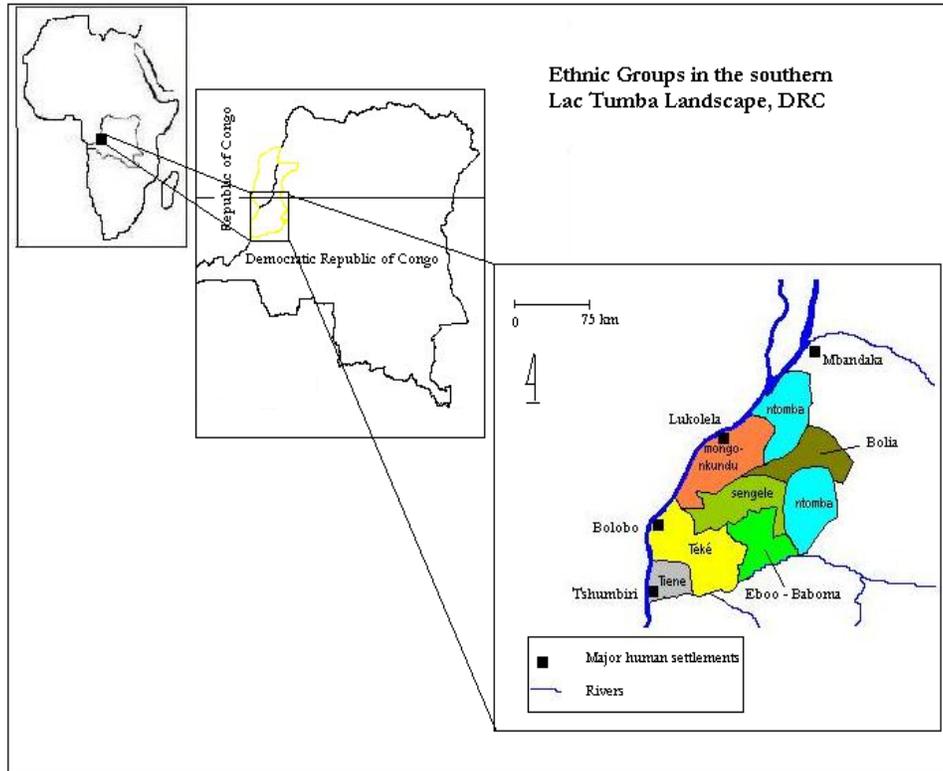


Figure 1. Distribution of different ethnic groups in LTSF.

n overlay of the estimated mean bonobo densities derived from line transects (Inogwabini et al. 2007a, b) over the distribution of ethnic groups shows a relationship between ethnic group and bonobo densities (Figure 2). Thus, mean bonobo densities were highest in the territory occupied by the Bateke and at the Bateke territorial border with the Tieni. Bonobo densities were second highest in very

isolated and tiny areas within the territories occupied by the Basengele and within a small part of the Ntomba area, near Lake Tumba. However, no bonobos were found close to the major trade route in the region, the Congo River, irrespective of ethnic group. Thus, there were no bonobos in areas such as Bolobo (Figure 2) where Bateke comprise the majority of the population.

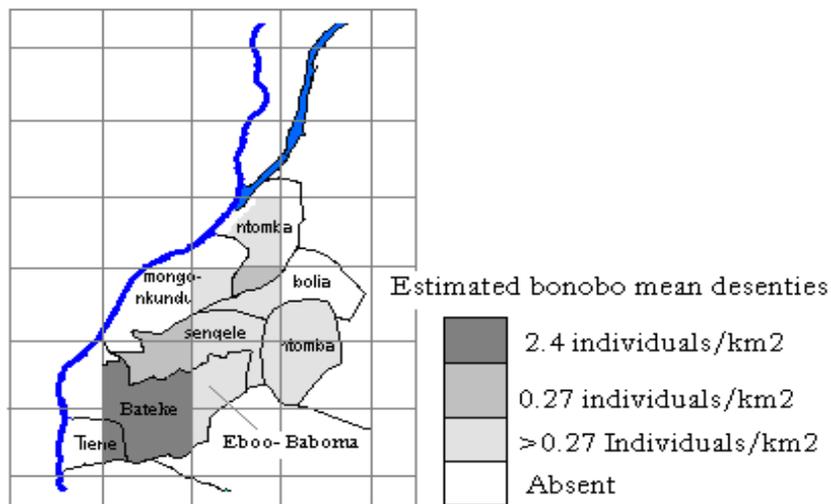


Figure 2. Estimated mean bonobo densities overlaid on distribution of different ethnic groups.

**Folk tales and key words from focus groups**

Focal groups and other discussions resulted in the collection of 113 stories from local communities representing four different human communities (Table 1), subtracting the cosmopolitan areas. The stories centered around six main themes, even though certain details varied across villages and ethnic groups. The most striking feature of all these tales and stories was the *humanization* of bonobos. The most recurrent (23.8%) folk tale was the ‘*making of fire*’ by bonobos, a skill bonobos had acquired before the appearance of humans and that they subsequently

passed on to people. The second most recurrent (21.2%) folk tale was ‘*crying by bonobos*’ who were saddened by events, such as their separation from people (Table 1).

Among the least frequently told folk tales were ‘*bonobo as ancestors of human beings*’ (7.9%) and ‘*rescuing people from imminent danger*’ (6.1%). However, both these last two folk tales were most often told by villagers belonging to the Bateke, and were only told infrequently by other ethnic groups. Calculated values for the strength of belief varied between ethnic groups (Table 1).

Table 1 Recurrent themes in folk tales about bonobos across villages in three ethnic groups with LTSF.

	Baboma					Basengele					Bateke					Cosmopolitan				
	Kentale	Mongana	Kenya	Mambou	Kesoni	Nsondia	Ibanda	Mpole	Ntandembelo	Madiba	Botanankasa	Bosina	Mbee	Obornossia	Nkala	Mbanzi	Asana	Yumbi	Malebo	Lebomo
Making fire	2	1	0	2	1	0	1	1	1	2	3	1	4	1	3	0	1	1	1	1
Hunting	2	0	0	1	1	0	1	1	1	2	3	1	2	2	3	0	0	2	1	0
Fishing	1	1	1	0	1	0	2	1	2	2	3	1	2	2	3	0	0	0	1	0
Crying	1	0	1	0	0	0	2	2	1	2	1	4	2	3	4	0	0	0	0	1
Rescuing people	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0
Ancestors	0	0	0	0	0	0	0	0	0	1	1	1	1	0	3	0	0	0	1	1
Village	6	2	2	3	3	0	6	5	5	9	12	9	12	9	17	1	2	3	4	1
Tribe	Baboma					Basengele					Bateke					Cosmopolitan				
Strength (%)	28					27					63					14				

The Bateke held the highest (63%) strength of belief, while the weakest (14%) strength of belief was held in the cosmopolitan centers. Paired tests indicated that the strength of belief differed (all  $p < 0.05$ ,  $df =$

29) between the Bateke and the two other ethnic groups (Table 2). Furthermore, the strength of belief also differed between other tribes (Table 2).

Table 2. Paired t-test for difference between folk tales across ethnic groups.

Pairs	Mean	SD	t	df	Sig. (2-tailed)
Baboma – Basengele	-.30000	1.02217	-1.608	29	.119
Baboma – Bateke	-1.43333	1.22287	-6.420	29	.000
Bateke – Basengele	-1.13333	1.00801	-6.158	29	.000
Baboma – Cosmopolitan	.06667	1.04826	.348	29	.730
Basengele – Cosmopolitan	.36667	1.03335	1.943	29	.062
Bateke - Cosmopolitan	1.50000	1.35824	6.049	29	.000

**Discussion**

The publication of ‘*The limits of growths*’ has stimulated increased interest over the last six decades

in exploring the role played by humans in the ecosystems in which they live (Morris, 2000). However, interdisciplinary data have often been lacking to demonstrate inter-relationships between

people and wildlife. This study provides a contribution to that debate by demonstrating clear differences in the abundance and distribution of bonobos in areas occupied by the Bateke compared with other ethnic groups in the LTSF (Figure 1), and in their positive attitudes to bonobos within their traditional beliefs.

### ***Folk tales about bonobos***

Similar folk tales were told by different tribes areas across LTSF, and centered around six main themes that all *humanized* bonobos. However, there were different variants of some folk tales. Nevertheless, given that all ethnic groups in LTSF are descendants of the Bantu culture, all the folk tales appear to have emerged from the same cultural matrix (Mac-Gaffey, 1975; Vansina, 1970; Vansina et al., 1996).

The *'making of fire'* story was almost constant across different ethnic groups. This story notes that bonobos used fire before people and handed it over as gift to ensure human well-being. A second folk tale that remains almost constant across ethnic groups is the emotion attributed to bonobos when they mourn dead offspring or dead members of their group. However, the overall values calculated for the strength of belief in these tales varied significantly between ethnic groups, the Bateke held the highest (63%) value while cosmopolitan centers held the weakest (14%) value.

In contrast, tales about bonobos as *'ancestors of human beings'* and bonobos *'rescuing people from imminent danger'* were particular to the Bateke. The human ancestor story is told in two variants. First that bonobos remained in the forest to keep the secret of nature from being stolen by intruders from other tribes and other countries. In this first variant, bonobos remain the secret keepers for all the Bateke people, and so killing bonobos would result in the loss of all traditions. This first variant concords with historical and ethnographic reports that the Bateke remain deeply attached to their traditions, taboos, rituals and social systems to the point that pioneer missionaries reported serious difficulties in converting them to Christianity (Robb, 1998). This first variant also concords with the fact that the Bateke are deeply rooted to their ancestral lands, to the point that describing anything as humanly accomplishable equates to talking about land over which the landlord *Mfumum a Ntsie* reigns (Malanda, 2001). In turn, the landlord remains the link between the ancestors and the living people and traditional thrones (Vansina, 2004). This historical and cultural reality sheds some light on the importance attributed locally to traditional systems through taboos and traditional chiefs in protecting bonobos, rather than

protecting them through the actual legal system and its law enforcement mechanisms.

The second variant of the ancestor story runs that bonobos were living with the Bateke in villages. However, the bonobos then took out a contract for a loan from visitors and, because they could not afford to reimburse the debt, they decided to return to the forests where they remain pre-occupied by the work of protecting their human cousins from bad spirits.

This second variant of the human ancestor story is linked to another story which runs that bonobos have rescued women from being killed in the forest by enemy tribes during the land occupation wars that occurred in the distant past. The version about the loan may be historically grounded because the Bateke were originally known as the Tio (Vansina, 1973; Vansina, 1970). As the Tio were considered a mainly mercantile people during the 17th–19th centuries, their pseudo-name of Bateke was derived from the verb *'koteka'*, a Kikongo word meaning *'to sell'* (Ndaywell, 1998; M'bokolo, 1995; M'bokolo, 1992; Vansina, 1973). Although the interviewees did not strongly indicate the inclination of the Bateke towards commerce, trade must have been one of their essential daily activities in the past and the notion of taking out a loan would have been very sensible. Because commerce can take people away from practicing their activities in the forest, this must also have played a role in protecting wildlife in the region where the Bateke currently occur.

### ***Ethnic groups and bonobo density***

An overlay of the mean densities of bonobos on the distributional map of different tribes in LTSF showed that bonobos occurred at higher density in the traditional territory of the Bateke (Figure 1). Their occupational chart showed that Bateke are primarily cultivators (Inogwabini, 2010) who have traded their agricultural products along the Congo River with traders and fishermen such as the Banunu-Bobangi who settled in the vicinity of Bolobo since the 18th Century (Harms, 1989). Trade or commerce have been dubbed as the principal activities of the Tio in historical times, and this may even have given them their nickname of Bateke (Ndaywell, 1998; M'bokolo, 1995; M'bokolo, 1992; Vansina, 1973). Indeed, cultivating and selling agricultural products may have prevented the Bateke from hunting, including of bonobos. However, this alone seems an insufficient explanation of the different bonobo densities. Thus other ethnic groups such as the Ntomba, Basengele and Eboo-Baboma are also known primarily as agriculturalists, and have also been trading along the Congo and other navigable rivers since historical times, yet bonobos occur at

much lower densities in their traditional territories. As argued previously, another interpretation of Figure 1 would be that the Bateke were the only ethnic group in LTSF that thought bonobos were close ancestors that, in dire moments, might rescue people from imminent danger. Consequently, the Bateke might be expected to be the most tolerant of the people who share LTSF with bonobos. Bonobos, thought of as both an ancestor and as rescuing people in times of need, might have contributed to the strongly held beliefs observed among the Bateke compared with other ethnic groups in LTSF. Therefore, the Bateke may perceive how bonobos have actually influenced their perceptions and encouraged them to wish to conserve the species (Inogwabini et al., 2007b).

Indeed, the two stories about bonobos rescuing people and being the guardians of the ancestral forests close by prohibiting the Bateke from hunting bonobos. The prohibition goes on to conclude that if a descendant of the Bateke kills a bonobo, he would never father children. If he had already fathered some children, his children would never succeed in any enterprise with which they might engage over their lifetime. Trained Bateke refer to a similar condemnation in the Bible, in which successive generations suffer from the wrong-doings of their parents. Given the importance that the African cultures attribute to having families and extended numbers of children, it is not surprising that Bateke may avoid hunting bonobos to avoid compromising the future of their descendants. This assertion might appear to contradict the claims of some Bateke that they have witnessed bonobos being hunted in their villages. However, this apparent contradiction most probably arises because the Bateke are prone to publicly denounce their neighbors who, accidentally or willingly, have killed bonobos to avoid any malediction from befalling on the entire neighborhood. Meanwhile in other villages people may simply have shied away from the issue during the focus group discussions and interviews, either because they were afraid of potential legal consequences of killing bonobos or they wanted to show that they too cared about bonobos in expectation of seeing their villages become part of the WWF's Bonobo Community Conservation Project.

Local communities all over the world hold taboos and perceptions about species that occur (Gompper, 2002; Infeld, 2001; Marcus, 2001). On the one hand, wide-ranging species and wild predators such as lion, wild dog, wolf and cheetah have succumbed to persecution and local extinction in many areas where they were not tolerated by people (Lindsey et al., 2005; Bauer, 2003; Treves &

Karanth, 2003a, b; Treves et al., 2002; Woodroffe, 2000; Kellert, 1985). On the other hand, species such as primates and their wild habitats are protected by local communities that look on them as an integral part of the material and spiritual landscapes in which they dwell together (Straede & Helles, 2000). There are other examples of where primates have received considerable levels of protection from local populations through obedience to traditional taboos. One such situation has been described in Ghana, where black and white colobus *Colobus polykomos* and mona monkey *Cercopithecus campbelli* were protected by local communities from the Boabeng and Fiema ethnic groups (Fargey, 1992).

In Nigeria, taboos observed by the communities in Edo state have protected primate species such as baboon, *Papio* spp. and the Patas monkey *Erythrocebus patas* (Osemeobo, 1994). In particular, traditional taboos observed by the same Edo communities have helped preserve endangered species of great apes such as *Pan troglodytes* chimpanzee and gorillas *Gorilla gorilla diehli* (Osemeobo, 1994), at a time when growing human population have posed a considerable threat to Nigeria's overall biodiversity. Taboos and other traditional institutions have played key roles in preserving endangered species in many areas around the world, including Madagascar (Lingard et al., 2003). Most respondents in LTSF thought bonobos were well protected, both currently and in the past, by traditional taboos and by recognition of traditional authority. Given that the southern LTSF has held ~20% of the wild population without prior intervention by conservation managers or scientists (Inogwabini, 2010; Inogwabini et al., 2007a, b), taboos and the place of local traditional authority should be recognised as a successful way to manage and protect this critical population of bonobos. Therefore, conservation organizations should be encouraged to incorporate local knowledge, traditional taboos and the local traditional authority in future law enforcement schemes.

## Conclusion

Effects of human attitudes on the distribution have been criticized by some bonobo researchers because of lack of documented evidence. This study fills in this gap and provides a clear demonstration that bonobo distribution is not only dictated by ecological factors such food availability, habitat types but it is also a factor of human behavior. The study also provides a sensible scientific method to be used in other areas where bonobo occur. Hence, future studies on bonobo should consider adding on human attitudes as part of their research portfolio.

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