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ABUNDANCE AND DISTRIBUTION OF LARGE MAMMALS AND HUMAN ACTIVITIES THROUGHOUT THE PROPOSED 4,000KM² DJOLU WAMBA MULTIPLE USE ZONE.

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I. Abstract

As a result of the « Maringa-Lopori-Wamba landscape » Threats and Opportunity Analysis workshop (December, 2004), the 4,000km² forest block of Djolu-Wamba was identified as a priority area that needed development of a management plan for sustainable use of natural resources and for conservation of biodiversity, in particular the bonobo-population. The forest block is delineated by a "square-road" of 345km along which the local populations, users of the natural resources, reside.

During this study, baseline information was collected on abundance and distribution of both large mammals and human activities throughout the forest block. Simultaneously, participative mapping of hunting zones and monitoring of hunting activities and bush meat supply at village markets was carried out. All information was geo referenced. Major attention was given to participation of the local communities as major stakeholders. About 300 assistants were locally selected, trained and involved in data collection. Repetitive sensitization both directly and through local NGO-representatives laid foundation for further civil society strengthening.

During the large mammal surveys, 32 species were identified, 4 fully protected, 17 partially protected and 11 non-protected. Relatively few traces of flagship species – bonobo, forest elephant, and leopard – were recorded. During the surveys, a total of 111 hunting camps were geo referenced, indicating a high hunting pressure on the local fauna.

Local assistants monitored the sale of bush meat at 12 village markets during 7 weeks. We recorded 619 carcasses, 591 of which large mammals. They were supplied by 328 hunters. *Cercopithecus ascanius* (24%), *Cephalophus dorsalis* (14%), *Potamocherus porcus* (9%) and *Cricetomis emini* (8%) are the main species for sale. Neither bonobo nor elephant meat was recorded at the market. Price for bush meat typically is around 400-500 Franc Congolais/kg (which is about 1USD/kg), with primates generally more expensive than artiodactyls. The total amount of bush meat sold, 1,354kg represents about 1,000USD.

Collected baseline data indicate that the forest block of Djolu-Wamba still harbours important potential of biodiversity, including bonobos and forest elephants. Yet, hunting pressure is severe and seems to have affected the actual abundances of different mammal species. Further participative elaboration of a hunting management plan for this forest block will be crucial both for conservation of the biodiversity as for secured access to animal proteins for the local people.

II. Introduction

The 74,000km² Maringa-Lopori-Wamba landscape is one of the 11 landscapes identified in the framework of the USAID-funded Central African Regional Program for Environment (CARPE). As coordinator for this landscape, and with the objective to implement a Landscape Land Use Management Plan, African Wildlife Foundation applies it's Heartland Conservation Process. Following this process, after stakeholder scoping and biological and socio-economical baseline data collection and analysis, a participative Threats and Opportunity Analysis workshop was organized (December, 2004). During this workshop, stakeholders identified the Djolu-Wamba forest block. This forest block covers about 4,000km² and is surrounded by a "square-road" of about 345km that links the major villages/towns of Djolu-Lingomo-Mompono-Wamba-Bokondo. The forest is situated in the Territories of Befale and of Djolu, District Tshuapa, and Province Equateur.

The zone is considered of major importance for conservation of biodiversity and sustainable use of its natural resources. The forest bloc harbours potentially important populations of bonobos (*Pan paniscus*) and other protected large mammals. The bonobo (*Pan Paniscus*), or pygmy

chimpanzee, endemic species in the Democratic Republic Congo (D.R.Congo), is listed as highly vulnerable in the IUCN/SSC Action Plan for African Primate Conservation (Oates, 1986) and as endangered in the IUCN Red Data Book (Baillie and Groombridge, 1996). The species is officially protected by Congolese and International laws, and is listed in Appendix 1 of CITES and on Class A of the African Convention.

The socio economical importance of this zone is due to the fact that it constitutes the main source of animal proteins and of income for the local populations. Historically, the local populations of this forest bloc made a living through agricultural activities, principally though culture of coffee, cacao, caoutchouc and palm trees. The war has caused total destruction of regional infrastructure. To survive without having access to agricultural goods, the local communities depend increasingly on forest products. Former limited subsistence hunting transformed into commercial hunting, allowing local populations to exchange bush meat against clothes, drugs, soap, salt and other first necessity products.

To ensure both the future of the bonobo populations and a sustainable socio economical access by local populations to other faunal natural resources, a sustainable natural resource use management plan needs to be developed.

Discussions with local NGO's revealed the potential for the participative elaboration of a hunting management plan for this forest block. A major element of the strategy towards development of this management plan will be the evaluation of potentially more effective and rational use of the natural resources and of potential alternative creation of economical revenues. While the idea is well articulated, no specific objectives are put forward. It is conditioned that specific ideas come from the local communities, under guidance of AWF. As a first step, baseline data are collected that will allow both local people and AWF to have a more realistic view on the potentials of the forest block, of the actual status of both fauna and human activities and on the needs of the people living along the road that delineates the forest block. In this report, we try to give answer to the following questions:

a. Which large mammals are still present?
b. What is their qualitative abundance and distribution?
c. What is the qualitative abundance and distribution of human activities in the forest block?
d. Are there indications for links between b. and c.?
e. What is the composition of species supplied at the village bush meat markets and from what part of the forest block do they come from?
f. What is the overall importance of bush meat for the local populations and the hunters in particular?

III. Objectives

Global

Understand the biological status and the potentials of the faunal resources in the Djolu-Wamba forest block and related socio-economic statues of the people depending on these resources. The local communities are involved in each phase in order to facilitate a participative strategy towasrds the development of conservation strategies and a management plan for sustainable use of the natural resources.

Specific

- First elaboration of list of large mammal species still present in the Djolu-Wamba forest block ;
- Map the relative abundance and distribution of large mammals throughout the forest block ;
- Map the different human activities and their relative abundance throughout the forest block ;
- Monitor supply of bush meat at the village markets surrounding the forest block ;
- Map hunting areas (micro-zones) of different (groups of) hunters;
- Monitor price of bush meat at the village markets;
- Evaluate potential relationship between relative abundance of mammal species in micro-zones and a. bush meat supply by micro zone; b. observed human activity in micro zone.

IV. Methodology

A. Study area

1. Geographic situation

Djolu-Wamba is located between 0°40'18,12'' and 0°06'17,92'' northern latitudes and between 21°41'48,1'' and 22°38'37,1'' eastern longitudes. Average altitude varies between 300 and 400 meters. The climate of this area is tropical with two rainy seasons: from mid-September to mid-November and from March to April and two dry seasons: from January to February and June to August (Thompson-Handler, 1990). The daily average temperatures vary very little and their variations do not exceed 3° (VandeWeghe, 2004). (See Figure I in annexe J)

2. Administrative situation

The forest block is situated in four administrative "Sectors" which belong to two Territories (Befale and Djolu), situated entirely in the District of Tshuapa (Equateur Province). The local people are organized into 16 administrative « Groupings », which include a total of 102 Localities. (See Annexe I)

3. Fauna and flora

Fauna belonging to this forest area harbors several species both protected (*Pan paniscus ; Cephalophus sylvicultor ; Smutsia gigantea, Tragelaphus spekei*, etc) and none protected (*Cercopithecus mona, Cercopithecus wolfi, Cercopithecus neglectus, Colobus angolensis, Lophocebus atterimus, Cephalophus callipygus, Cephalophus monticola, Cephalophus nigrifrons, Cephalophus dorsalis, Hyemoschus aquaticus*, *Potamocherus porcus, etc*) (Rapport d'activités d'AWF, 2004).

Wamba Djolu forest bloc belongs to Guineo – Congolese low altitude forest type which extends from Nigeria to Uganda. This forest counts about 8000 species of plants among which 80% are endemic.

4. Accessibility

The area has only one airstrip; although not officially recognize, in Djolu. A vast network of rivers - Maringa, Lomako, Bolombo and Duale – makes the area easily accessible over water. Some former main roads links the major villages/cities: Lingomo-Bongandanga; Mompono-Boende and Djolu-Yahuma. A forest path links Lingomo to Basankusu while crossing the site of the Reserve of Lomako. Today, the principal roads are in very bad condition and are mostly only accessible by motorbike or only on foot. Most of the bridges are in very bad shape or non-

existent. The forest path between Lingomo and Basankusu is only accessible on foot and requires good conditions.

B. Data collection

For data collection, the 19 Groupings[1] seconded a total of 285 local assistants, headed by 4 team leaders selected by the partner local NGO's (GACC and Perse). Local assistants participated in participative mapping of hunting zones (95), monitoring of bush meat supply at local markets (19) and the large mammal surveys (171). We opted for a rotating system including a relative high number of local assistants in order to involve the local communities as much as possible. The number of local assistants will decrease as the awareness building/sensitization progresses.

1. Participative mapping of traditional hunting zones

Based on the local traditional concepts of « common hunting areas », we decided to map hunting zones/Groupement. In each Groupement, a team consisting of the Chef de Secteur, Chef de Groupement, a representative of a local NGO, the oldest hunter and a local representative renowned for his knowledge of the forest was created around the Team leader. First, during semi-structured discussions, a first indicative map of the forest and the "Groupement Hunting Zone" was drawn. In a next phase, the team went in the forest to georeference the limits of the suggested hunting zone. .

2. Bush meat use monitoring

Bush meat data collection by local assistants occurred in local markets, by interviewing both sellers and hunters and by measuring weigh of animal specimen with pesola balances. Sellers gave information relative to the name, the sex, the state (fresh vs. smoked vs. rotten), the price, the part of animal sold (leg, half, entire, etc.), the hunter's name and his residence village. Hunters informed local assistants about the forest bloc and the habitat in which the animal was hunted, the hunting method used and the use of captured animal's species (auto-consumption vs. trade) (See annexe: A).

a) Identification of different local markets

During preparation for data collection, we identified 20 local markets along the square road which circumscribes the forest block of Djolu Wamba. Supply of bush meat was monitored in 12 local markets. (See Table 1). Except for the daily Djolu-Market, all markets were open one or twice per week.

***Table 1** : List of local markets*

N°	Market	Grouping	Frequency	Market-Day	Day
1	Lofemba	Likongo	1	6	Saturday
2	Esangani	Likongo	1	6	Thursday
3	Bosenge	Wamba	2	12	Tue & Thu
4	Esangani	Balanga	1	6	Friday
5	Yongolongolo	Likonda	1	6	Saturday
6	Yayau	Likonda	2	12	Wed & Thu
7	Y'Okuwa	Likonda	1	6	Saturday
8	Ekutana	Biimbi	1	6	Saturday
9	Djolu	Djolu	7	45	Everyday

[1] During the preparations, we included 19 groupings located more or less on the limiting road axis. But the results of the study deals only with the 16 groupings that are effectively owners of forest block of Djolu Wamba

10	Yonge kali	Nkok'Olombo	1	6	Friday
11	Y'Osenge	Bokumbo	1	6	Saturday
12	Yokembe	Nkole	1	6	Thursday
Total				**123**	

- Some groupings do not have markets; others have one or more;

b) Identification of hunters

Generally, the hunter was identified from information received from bush meat sellers. These sellers buy bush meat either at the local markets or in hunting campings and bring them to the town market of Djolu in order to sell them again.

Sometimes, a hunter's family member sold bush meat at the local market; in this case, the identification becomes easier, since he was immediately recognized by the local assistant.

3. Fauna, flora and human activitie data collection

The Djolu Wamba forest bloc was compartmented into two parts, situated north and south of the Duale river resp. So two teams were constituted for surveys: the first one worked in the northern part and the second one collected data in the southern part. (See figure 2 in annex J)

a) Collection of indicators of presence for the fauna and human activities

For survey of faunal species (See annexe B) and human activities, we followed "recce-transect" i.e. path of least resistance. (White et Edward, 2001)[i] in north south direction. We covered 401,36 km in 53 days (April 18 to June 08 2006). Simultaneously, along recce-transect, we recorded the presence of fruit-trees that are consumed by bonobos. Each observation was geo-referenced. Data were recorded on pre-established worksheets (See Annex C).

b) Identification of species and determination of the protection status.

The vernacular name of the animal species was given thanks to the indicator of presence; its identification was done in view of the «*list of the animal species in vernacular* [2] *languages* (See annex D)», its presence in the land was confirmed by Kingdom (1997) while its legal status was documented in the «List of protected and non protected animal species in RDC[3]».

The name of the flora species in vernacular language was determined from its external characteristics (trunk, leaves, fruits, etc.); the scientific name was then given in view of the «*List of flora species consumed by the Bonobos* », mentioned above (See Annex E).

C. Data processing and analysis

Relative abundance of faunal species and human activities is calculated as an Indicator of abundance per kilometre
IAK = number of indicator/ covered distance in km.

The surface of the micro zones and the research effort (length of the recce) in each micro zone were determined in Arcview.

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[2] This list was elaborated during the baseline data collection in 2004 in the entire Landscape of Maringa Lopori Wamba

[3] Journal officiel : Arrêté ministériel N°20/Cab/Min/ECN-EF/2006 du 20 mai 2006 portant agrément de la liste des espèces animales protégées en république Démocratique du Congo.

We did not do the statistical analysis of data, because it requires further data. Nevertheless, we did the first visual analysis of the fauna and the human activities with regard to the hunting areas and to the north blocks and the land of the south.

V. Results

The results we are presenting in this paragraph are relating to the 16 local groupings that are the true landowners of the forest block of Djolu Wamba; without Nseme, Wamba and Yaama in it. For reasons of conflict among the population, the participative mapping was not done in the Bomwaka and Enkalankoy; the biological census did not take place, either, in these groupings for the same reasons and in the Balanga, Bolaka, Bolemba, Lingomo and Moma groupings due to the methodology reason; the data on the monitoring on the use of the bush meat at the local markets of Bolemba, Lingomo and Yoolota were not taken into account due to their poor quality.

A. Type and distribution of human activities

1. Different types of human activities and their relative abundance.

The biological information have allowed the identification of several types of human activities in the forest, such as farming, craftsmanship, hunting, harvesting, the cutting of woods, the location of villages (pits, graveyards, missions, houses) and the trails (See Table 2).

***Table 2** : Abundance of human activities*

CATEGORIE	TOTAL 'INDICES	IKA
Farming	159	0,40
Craftsmanship	2	0,00
Hunting	386	0,96
Graveyard	3	0,01
Cutting woods	2	0,00
Harvesting	1	0,00
Pits	1	0,00
House	1	0,00
Mission	1	0,00
Not determined	1	0,00
Passage	43	0,11
Fishing	7	0,02
Total	**607**	1,51

Among these activities, hunting (64%, IKA=0,96), followed by forming (26%, IKA=0,40), present an indicator of abundance higher than any other kinds of human activities in the forest.

a) Hunting

Through the participative mapping, 15 traditional hunting areas were geo-referenced. These zones belong to 14 local groupings. A local grouping (Likongo) has more than one hunting areas.(See figure 3 in annex J)

These hunting zones are, in some cases, limited by rivers, but not always. They often serve as reference points. Their surface varies from 2,16 to 476,39 km². These two extremes correspond respectively to hunting zones of Bolemba and Likundju'a Mba groupings, located in the South-East, in the administrative sectors of Duale, Territory of Befale. Sometimes, these limits cross

one another (Case of Nkok'Olombo and Bokumbo, Lingomo and Yoolota and Likundju'a Mba). These limits of hunting zones were indicated by traditional chiefs of villages and the chief of the grouping who are traditional authorities officially recognized as responsible to maintain the limits and use the resources in each micro zone. Through participative mapping, specific areas that are not claimed to belong to one of the recognized hunting areas were identified, especially in the centre of the forest block. More information on hunting pressure within these areas is needed.

Biological information also allowed to refer geographically 111 (IKA = 0,28) hunting camping and 275 traps (IKA = 0,69).

During the monitoring of the use of bush meat, 328 hunters were indicated by sellers. These hunters referred to 172 different hunting areas. Snaring and gunshot hunting are most commonly used (See table 2).

Table 3: *using of hunting methods*

Hunting Techniques	**Number of captured animals**	**%**
Dogs	21	3
Nets	16	2,6
Gunfire	239	38,6
Arrows	10	1,6
Traps	327	52,8
Not determined	6	1
Total	**619**	**100**

b) Farming

During the census, we counted 159 indicators of farmers' presence out of 607 indicators of human activities' presence (See Table 3).

Table 4 *: Indications of agricultural activities*

Type of indicators	**Number of indicators**	**%**
New fields	121	76
Old plantations	3	2
Cultivated fields or harvested	20	12,6
Not determined	15	9,4
Total	**159**	**100**

During the data collection, the cutting of new fields was more and more frequent. Then cultivated fields or being harvested and finally older plantations. The smaller number of indicators of plantation presence compared to fields being cut or harvested, shows and confirms the falling of agriculture infrastucture in the area.

2. Distribution of human activities throughout the forest block

With regard to Duale and Lolaka rivers, two forest blocks were limited: the north block with 219,7 km of recces and the south block with 181,67 km of recces. The fauna indicators and human activities were respectively of 7,15 and 1,61 for the north block and 9,36 resp. 1,02 for the

south block. This indicates the reverse relation between the human pressure and the abundance of fauna. More data and more in depth analysis is needed for more solid conclusions.

a) Hunting distribution

Visual inspection of the map with hunting camps shows that the hunting signs seem to be equally present throughout the forest block, but with more intensity in the northern than in the southern part of the forest block. It also shows that hunting seems the be the most important human activity. (See figure 4 in annex J)

b) Agriculture distribution

For a visual analysis, the following space mapping distribution, gives more specification about the location of indicators of agriculture presence (See figure 5 in annex J).

As confirmed through remote sensing analysis, agricultural indicators are located in more or less 5 km on both sides of the road axis that limits the forest block. However, 25 indicators of agricultural activities were recorded near the hunting camps, in the most isolated areas of the study area. The map also shows that agricultural signs are more concentrated in north-eastern part than in other parts of the forest bloc.

B. List and distribution of large mammals still present

1. List of large mammals still present

From the collected indicators of presence, 9 orders, 17 families and 32 species large mammals counted were identified. Four species are totally protected, 17 are partially protected and 11 are not protected. Protected large mammals, such as the elephant, bonobos, leopard, etc are still present in the land.

Table 5 : *List of counted large mammals.*

Taxonomic Group	Vernacular language		Protection Status
	Longando	Lomongo	
1. Order:Artiodactyles			
1.1. Family: Bovidae			
1.1.1. Cephalophus callipygus	Bofala	Bofala	Not
1.1.2. Cephalophus dorsalis	Bombende, Nkulufa	Bomende	Partial
1.1.3. Cephalophus monticola	Mboloko	Mboloko	Partial
1.1.4. Cephalophus nigrifrons	Bongundju	Bongundu	Not
1.1.5. Cephalophus silvicultor	Lisoko, Mbende	Lisoko	Partial
1.1.6. Hyemoschus aquaticus	Etambe, Mpambi	Entambe	Partial
1.1.7. Tragelaphus spekei	Mbuli	Mbuli	Partial
1.2. Family: Suidae			Partial
1.2.1. Potamocherus porcus	Nsombo	Nsombo	Partial
2. Order: Carnivores			Partial
2.1. Family: Felidae			Partial
2.1.1. Felis aurata	Lowa	Lowa	Partial
2.1.2. Panthera pardus	Nkoy	Nkoy	Partial
2.2. Family: Herpestidae			
2.2.1. Atilax paludinosus	Buundju	Wundu	Not
2.2.2. Crossarchus alexandri	Efandja	Efandja	Not

2.3. Family: Mustelidae			
2.3.1. Aonyx congica	Liyoko	Liyoko	Partial
2.4. Family: Nandinidae			
2.4.1. Nandinia binotata	Mbiyo	Mbeo	Not
2.5. Family: Viverridae			
2.5.1. Civettictis civetta	Yoo	Djoo	Not
3. Order: Bats (Chiroptères)			
3.1. Family: Pterpodidae			
3.1.1. Lissonycteris angolensis	Lolema	Lolema	Not
4. Order: Hyracoides			
4.1. Family: Procavidae			
4.1.1. Dendrohydrax arboreus	Eeleka	Bombol wa liko	Partial
5 : Ordre: Pholidotes			
5.1. Family: Manidae			
5.1.1. Manis tetradactyla	Nkake	Nkake	Partial
5.1.2. Smutsia gigantea	Ikanga	Ikanga	Total
5.1.3. Smutsia tricupsis	Nkaha	Nkoonyo	Partial
6. Order: Primates			
6.1. Family: Cercopithecidae			
6.1.1. Allenopithecus nigroviridis	Elenga	Elenga	Partial
6.1.2. Cercopithecus ascanius	Nsoli	Nsoli	Partial
6.1.3. Cercopithecus neglectus	Mpunga	Boluwa	Partial
6.1.4. Cercopithecus wolfi wolfi	Mbeka	Mbeka	Partial
6.1.5. Lophocebus atterimus	Ngila	Ngila	Not
6.2. Family: Colobidae			
6.2.1. Colobus angolensis	Liyuka, Likoloto	Liuka	Partial
6.3. Family: Hominidae			
6.3.1. Pan paniscus	Elya, Engombe	Engombe	Total
7. Order: Proboscidiens			
7.1. Family: Elepnantidae			
7.1.1. Loxodonta africana	Ndjowu, Bondamba	Namba	Total
8. Order: Rodents			
8.1. Family: Anomaluridae			
8.1.1. Anomalurus sp.	Likiyo	Lokiyo	Non
8.2. Family: Hystricidae			
8.2.1. Cricetomys emimi	Botomba	Botomba	Non
8.3. Family: Muroidae			
8.3.1. Atherurus africanus	Iiko	Iko	Non
9. Order: Tubilidentata			
9.1. Family: Orycteropodidae			
9.1.1. Orycteropus afer	Iluwo	Iluwo	Total

2. Distribution of large mammals in micro zones

a) Bonobo distribution map (see figure 6 in annex J)

Visual inspection of the distribution of bonobos signs along the transects learns that bonobos are still present throughout the forest bloc. In total, we recorded 119 (IKA = 0,30) traces of presence of bonobos (Voir annex H), only 6 of which are nests. Although presumably still very low, the highest densities seem to be present in the south western and central part of the

forest bloc. Except for small concentration of indices of abundance of bonobos in the hunting area of Likundju'a Mba, bonobos seems to be virtually absent in the western and northern part of the forest bloc.

b) Céphalophes distribution map (see figure 7 in annex J)

Visual inspection of the map above shows that duikers are almost equally distributed throughout the forest block. Hunting nor proximity to the roads seems to influence their distribution.

c) Potamocherus distribution map (see figure 8 in annex J)

As for Cephalophus, Potamocherus seems to be equally distributed throughout the forest bloc, as well into the hunting zone as out of the hunting zones

d) Primates distribution map(see figure 9 in annex J)

Visual inspection of primates map shows that monkey signs are situated more in the deph of the forest bloc than in the peripheries. This can be caused by the intensity of gun hunting human activty.

e) Other large mammals distribution map (Léopard, Eléphant, Bongo, etc.) (See figure 10 in annex J)

As for primates, visual inspection of large mammals map shows that large mammals' signs are mainly situated in the isolated areas of the forest block. Hunting pressure might be a causal factor. But these signs seem to be equally distributed both into hunting zones and out of hunting zones

C. Supply of bush meat at the village markets surrounding the forest block.

1. Number of carcasses inventoried

Table 6 : *Number of carcasses found at the local markets*

Market	Market- Day	Number of carcasses	Average / Day
Lofemba	6	15	2,5
Esangani	6	16	2,7
Bosenge	12	14	1,2
Esangani	6	15	2,5
Yongolongolo & Y'Okuwa &	24	67	2,8
Ekutana	6	62	10,3
Djolu	45	353	7,8
Yonge kali	6	6	1
Y'Osenge	6	35	5,8
Yokembe	6	36	6
Total	**123**	**619**	**5,0**

Over 7 weeks, we recorded in total 619 carcasses on 12 villages markets, 123 markets days. Carcasses recorded are those sold at the market and do not represent the total off take. Yet, market data can be use as an indicator of what is going on in catchment areas.

The number of all mammals killed during this period is not recognized due to the fact that some specimen were directly used, either for consumption in local camping or at the level of villages, or sold elsewhere.

More than half of carcasses were found at the town market of Djolu, because of a higher frequency of this market than others. However, if they bring this frequency daily, the largest number of carcasses is noticed at local market of Ekutana.

2. Identity of species whose carcasses were inventoried at markets.

Table 7: *List of animal species whose carcasses were found at the markets investigated.*

Taxonomic Group	**Status**	**Total**	**%**
1. Order: Artiodactyles			
1.1. Family: Bovidae			
1.1.1. Cephalophus callipygus	Non	18	2,91
1.1.2. Cephalophus dorsalis	Partielle	89	14,38
1.1.3. Cephalophus monticola	Partielle	30	4,85
1.1.4. Cephalophus nigrifrons	Non	7	1,13
1.1.5. Cephalophus silvicultor	Partielle	7	1,13
1.1.6. Hyemoschus aquaticus	Partielle	7	1,13
1.1.7. Tragelapus spekei	Partielle	15	2,42
1.2. Family: Suidae			
1.2.1. Potamocherus porcus	Partielle	55	8,89
Total Artiodactyles : 8		**228**	**36,83**
2. Ordre : Carnivores			
2.1. Famille : Nandinidae			
2.1.1. Nandinia binotata	Non	1	0,16
2.2. Famille : Viverridae			
2.2.1. Civettictis civetta	Non	1	0,16
Total Carnivores		**2**	**0,32**
3. Ordre : Pholidota			
3.1. Famille : Manidae			
3.1.1. Smutsia gigantea	Totale	1	0,16
3.1.2. Smutsia tricupsis	Non	12	1,94
Total Pholidota		**13**	**2,10**
4. Ordre : Primates			
4.1. Famille : Cercopithecidae			
4.1.1. A. nigroviridis	Partielle	1	0,16
4.1.2. Cercopithecus ascanius	Partielle	150	24,23
4.1.3. Cercopithecus neglectus	Partielle	10	1,62
4.14. Cercopithecus wolfi	Partielle	37	5,98
4.1.5. Lophocebus atterimus	Non	14	2,26
4.2. Famille : Colobidae			
4.2.1. Colobus angolensis	Totale	28	4,52

4.3. Famille : Loridae			
4.3.1 Perodictus faustus	Non	1	0,16
4.4. Non identifiées			
4.4.1. Singe non identifiés		26	4,20
4.4.2		1	0,16
4.4.3		5	0,81
Total Primates		**273**	**44,10**
5. Ordre : Rongeurs			
5.1. Famille : Hystricidae			
5.1.1. Cricetomis emimi	Non	47	7,59
5.2. Famille : Muroidae			
5.2.1. Atherurus africanus	Non	25	4,04
5.3. Famille : Sciuridae			
5.3.1. Heliosciurus	Non	1	0,16
5.3.2. Protoxerus stangeri	Non	1	0,16
Total Rongeurs		**74**	**11,95**
6. Ordre : Tubilidentata			
6.1. Famille : Orycteropodidae			
6.1.1. Orypteropus afer	Totale	1	0,16
Total Tubilidenta		**1**	**0,16**
7. Ordre : Crocodylia			
7.1. Famille : Crocodylidae			
7.1.1. Ostealamus tetrapsis	Partielle	1	0,16
Total Crocodylia		**1**	**0,16**
8. Ordre : Testudines			
8.2. Famille : Testudinidae			
8.2.1. Kinexys sp	Partielle	20	3,23
Total Testudines		**20**	**3,23**
9. Ordre : Musophagiformes			
9.1. Famille :Musophagidae			
91.3. Turaco sp.	Partielle	1	0,16
Total Testudines		**1**	**0,16**
10. Ordre : Squamates			
10.1. Famille : Varanidae			
10.3.1. Varanus niloticus	Partielle	4	0,65
Total Varanidae		**4**	**0,65**
11. Ordre : Serpentes			
11.4. Famille : Viperidae			
11.4.1. Bitis gabonica	Non	1	0,16
11.4.2. Bitis sp	Non	1	0,16
Total Serpentes		**2**	**0,32**
Total		**619**	**100,00**

Out of 619 animals sold and counted at the local markets, 591 mammal carcasses were identified. These mammal carcasses belong to 6 orders, 12 families and 24 species among which 3 totally protected, 14 partially protected and 12 not protected at all.

4 species (*Cercopithecus ascanius, Cephalophus dorsalis, Potamocherus porcus and Cricetomys emini)* represent >50% of carcasses at market; the smaller mammals, i.e. giant pouched rats, porcupine and blue duiker, represent only 15% of all carcasses; rodents represent only 12% of the carcasses at the

market, vs 36% of artiodactyls. This indicates potentially still very healthy assemblage in the in Djolu Wamba forest bloc (Cfr Fa, 2000).

3. Origin of species whose carcasses were counted

Bush meat that feeds local markets of Djolu Wamba come not only from that forest blocks, but also from other forest blocks around. In fact, all counted carcasses come from 172 different hunting areas. Out of 172, 13 were identified inside the forest block of Djolu Wamba (Voir annex F).

On a total of 619 carcasses, only 161 come from the forest bloc. Thus, it seems that the local communities living along the road depend only for 26% of their animal proteins on the forest bloc. Yet, this doesn't include the importance of the forest bloc for the people living in the forest. The village market only shows the bush meat for sale, and not the bush meat hunting for consumption. More data are needed in order to get a better insight in the relative importance of the faunal resources for consumption vs. trade for the different layers of the local civil society (agriculturalists, hunters, traders, etc.)

4. Bush meat price at the village markets.

***Table 8**: Biomass and average cost of the mammal bush meat*

Groupe taxonomique	Biomass in kg	Sales Price in CF	Average Cost/KG of biomass n CF.
1. Order : Artiodactyls			
1.1. Famille : Artiodactyles			
1.1.1. Cephalophus callipygus	27,5	11950	434,55
1.1.2. Cephalophus dorsalis	179	78050	436,03
1.1.3. Cephalophus monticola	55,5	13020	234,59
1.1.4. Cephalophus nigrifrons	7,5	3485	464,67
1.1.5. Cephalophus silvicultor	14	4100	292,86
1.1.6. Hyemoschus aquaticus	10	5300	530,00
1.1.7. Tragelapus spekei	49	15850	323,47
1.2. Famille :Suidae			
1.2.1. Potamocherus porcus	203	67600	333,00
Total Artiodactyles	***545,5***	***199355***	**365,45**
2. Autres groupes			
2.1.1. Kinexys sp (Eale)	1,5	650	433,33
2.1.2. Kinexys sp. (Iulu)	21	7400	352,38
2.1.3. Ostealamus tetrapsis	2	1000	500,00
2.1.4. Varanus niloticus	3	200	66,67
2.1.5. Yaata	0,5	150	300,00
Total Autres	***28***	***9400***	**335,71**
3. Ordre : Carnivores			
3.1. Famille : Nandinidae			
3.1.1. Nandinia binotata	1	400	400,00
3.2. Famille : Viverridae			
3.2.1. Civettictis civetta	1	300	300,00
Total Carnivores	***2***	***700***	**350,00**
4. Ordre : Pholidotes			
4.1. Famille : Manidae			

4.1.1. Manis tricupsis	11,5	3700	321,74
Total Pholidotes	**11,5**	**3700**	**321,74**
5. Ordre : Tubilidentata			
5.1.Famille : Orycteropodidae			
5.1.1. Orypteropus afer	20	1500	75,00
Total Tubilidentata	***20***	***1500***	**75,00**
6. Ordre : Primates			
6.Famille : Cercopithecidae			
6.1.1. Allenopithecus nigroviridis	1,5	450	300,00
6.1.2. Cercopithecus ascanius	235,5	124280	527,73
6.1.3. Cercopithecus neglectus	11,5	6650	578,26
6.1.4. Cercopithecus wolfi	62	36910	595,32
6.1.5. Lophocebus atterimus	31	16700	538,71
Total Cercopithecidae	341,5	184990	541,70
6.2. Famille : Colobidae			
6.2.1. Colobus angolensis	52,5	27750	528,57
6.3. Autres			
6.3.1. Ntolu	5,5	4250	772,73
6.3.2. Singe	66	8380	126,97
Total autres primates	71,5	12630	176,64
Total Primates	***465,5***	***225370***	**484,15**
7. Ordre : Rongeurs			
7.1. Famille : Anomaluridae			
7.1.1. Atherurus africanus	25,5	13100	513,73
7.2. Famille : Hystricidae			
7.2.1. Cricetomis emimi	57,5	10980	190,96
7.3. Famille : Scuiridae			
7.3.1. Protoxerus stangeri	0,5	150	300,00
Total Rongeurs	***83,5***	***24230***	**290,18**
Total	**1156**	**464255**	**401,60**

The average price of a bush meat kilogram is 401,6 C F, or US$ 1 at the rate of the time (1$ = 420 FC), with a variation of 75 at 484,15 CF the kilogram. Meat of primates is in general slightly more expensive than most other bush meat.

D. Relationship between human activities and faunal signs in micro zones

Table 9 *: relationship between human activities and faunal signs*

Hunting zone	**Research effort (km)**	**Human activities signs**	**Human activities IKA**	**Faunal signs**	**Faunal IKA**	**Carcasse in the market**
Balanga	NO DATA AVIALABLE					
Biimbi	1,13	5	4,42	1	0,88	
Bokumbe Lokole	13,00	6	0,46	126	9,69	
Bokumbo	15,00	28	1,86	194	12,90	
Bolaka	NO DATA AVAILABLE					
Bolemba						
Bomw'a Nkoy						

Enkala Nkoy						
Likonda	15,00	15	1,00	145	9,60	
Likongo	29,38	49	1,67	504	17,10	
Likundju'a Mba	73,30	94	1,28	1046	14,27	
Lingomo	NO DATA AVAILABLE					
Moma						
Nkok'Ololombo	38,20	94	2,46	445	11,64	
Nkole	12,20	15	1,23	167	13,68	
Yoolota	26,00	28	1,00	503	19,30	
Total	**223,21**	**334**	**1,50**	**3131**	**14,00**	

The places of species' capture for bush meat were only cited by sellers/ hunters, but also were not referred geographically. On the other hand, though these places were identified in the land (See annex G), they do not correspond to a specific hunting zone, but to a part or many hunting zones. That is why we were not able to know the exact number of carcasses coming from each hunting zone.

VI. Discussion

From the indicators of presence collected, 9 orders, 17 families and 32 species of large mammals counted were identified. Four species are totally protected, 17 are partially protected and 11 are not at all protected. The large mammals totally protected, such as the Elephant and the Bonobo or partially protected like the Léopard, etc. are always present in the forest block. In addition, the composition of the fauna supplied at the village markets indicate that the fauna in the forest block is not yet much impoverished. The importance of some larger bodied species, the importance of primates and ungulates and the limited supply of rodents indicate that the forest block still harbours a rich biodiversity. This, despite of indications of high hunting pressure.

More than 100 hunting camps are recorded on the forest bloc during the survey. Satelite images confirm destruction of canopy, most probably for slash and burn agriculture, throughout the forest block. Combined finding of high hunting pressure and of still presence of high biodiversity, calls for a strategy for the development of a management plan for sustainable use of the faunal resources and protection of protected species. The presence of areas that seem to be free of any «traditional use for hunting» and in which higher densities of traces for presence of bonobos is found is especially encouraging.

Both hunting and agriculture are practiced in this forest block. For hunting, snares are most common, but also use of guns is widespread. This situation attracts more and more our attention and it gives us, at the same time, an indicator on the choice of priorities for the elaboration of strategies necessary to the creation of a sustainable management plan of natural resources in the forest block. It clearly shows that the management strategies of sustainable management of natural resources in the forest block should be orientated in priority to the control of hunting.

In addition, the trend of local populations migrating in the forest block, looking for new grounds for both slash and burn agriculture and hunting has to be reversed. Migration into the forest results mainly from increased difficulties to make a living in the natal villages along the main roads. The latter phenomenon being a consequence of the collapse of infrastructure and the resulting inaccessibility of the urban markets for the historically important agricultural products. Trends can probably only be reversed if development of a management plan for the controlled/sustainable use of the faunal resources is accompanied by support for development activities in the natal villages. This support will initially focus on agriculture and access to urban markets.

Our investigations have revealed that each local grouping has its own hunting area. This result offers advantage that allows us to be more specific in the choice of interlocutors with whom to negotiate for the elaboration and the setting up of the hunting management plan. However, the fact that hunters do not respect their hunting areas of origin requires the involvement of outside users of faunal resources in the negotiations aiming at elaborating the management plan and the creation of management committees of hunting at the level of local groupings.

Results of the survey indicate that the distribution of fauna is related to human activities. Fauna seems to be more abundant in microzones that are less affected by human activities. The heterogenous distribution of human pressure and fauna indicate the need for microzoning throughout the forest block.

The monitoring of the bush meat has sorted out 591 carcasses of mammals belonging to 6 orders, 11 families and 24 species among which 3 are totally protected, 14 are partially protected et 12 are not protected at all. The presence not sanctioned of protected species at the market is an indicator of either ignorance or the law over hunting and its implementation measures. An awareness campaign for local communities about the legislation on the hunting practices et the reinforcement of this legislation is indicated in order to fight back the capture and the illegal sales of protected species, either totally or partially. Law enforcement will be justified once alternatives for secured and increasing livelihood are developed in a participative way.

The bush meat that feeds the local markets of Djolu Wamba is not only from that forest block, but also from other surrounding forest blocks. The advantage to get from that reality is that these forest blocks may become sources of supply in animal proteins during the closing periods of hunting in the forest block of Djolu Wamba As such; one has to be cautious that any conservation strategy in the target forest block does not negatively influence the neighboring habitat.

The average price of a bush meat kilogram is 401,6 CF, or US$1 with reference to the current rate of the period (1$ = 420 CF), with a variation of 75 at 484,15 FC the kilogram. The Primates make the main source of income, due to the fact that the contribution offered by *Cercopithecus ascanius*. In comparison to urban centers, this price is too low. In Libreville, Gabon (Steel, 1994 cité par Wilkie et Carpenter, 2000), the average price of most popular species of bush meat is US$ 3,7. In Kinshasa, informal talks with consumers of bush meat fix the price at about US$ 5.00. At first sight, the forest block of Djolu-Wamba does not seem to be crucially important economically for the hunters cohort and the local populations living along the square road delineating the study area. More in depth socio-economical analysis is needed for evaluation of potential alternative income generating activities.

VII. Conclusion

This study has sorted out the potentialities and the way of using large mammals still available in the forest block of Djolu Wamba and has opened new opportunities for the elaboration of conservation strategies and the sustainable management of the fauna in this forest block.

These strategies would consist in:

- Developing a plan for the conservation and sustainable management of the fauna in the forest block of Djolu – Wamba ;
- Orientate this management and conservation in priority toward the controlling of hunting;

- Focalize the control of the hunting on the limitation of number of traps and the use of gunfire as hunting methodology;
- Involve not only members of local groupings, but also people not originating form the grouping, but users of faunal resources in the negotiation for the elaboration of the management plan and in the setting up of management committees at the level of local groupings;
- Organize local community awareness campaigns in the use of legislation relating to the practice of hunting;
- Setting up a local participative surveillance structure and monitoring of the implementation of the legislation about the hunting practice;
- To start a micro zoning of other affectations of the forest blocks, particularly farming zones;
- To back up the development of income generating activities at the level of villages in order to set the forest space free
- To identify and value alternate sources of animal proteins and of revenue for local communities, on the other side.
- To set up polyvalent representative committees in sustainable management of natural resources at the level of each local grouping.

VIII. Bibliography

1. AWF : Les potentialités agricoles et les aspirations des populations pour la relance agricole, Rapport d'enquêtes méso macro socio économique dans le Landscape Maringa Lopori Wamba, Octobre 2004, p.1, 9-10, inédit.
2. D. Wilkie & J. F. Carpenter : Bushmeat hunting in the Congo Basin : an assessment of impacts and options for mitigation, p. 213
3. E. Demerode et G. Cowlishaw : species protection, The changing Informal Economy, and the Politics of Access to the bushmeat Trade in the Democratic Republic of Congo, in Conservation Biology, Volume 20, N°4, August 2006
4. J. Kingdom : The Kingdom Field Guide to African Mammals, Princeton University Press, 1997, pp 12-14
5. J.P. Vadewhege : Les forêts d'Afrique Centrale, Ecofac, editions Lannoo, Tielt-Belgique, 2004, pp 42-47
6. L. White & A. Edwards : Estimation du statut des populations animales, in Conservation en Forêts pluviales africaines, méthode de recherche, 1ère édition française, 2001, pp 221-271

IX. Annexes

A. Fiche de collecte des donnée sur l'utilisation de la viande de brousse

Identité de l'enquêteur
Date :
Nom, prénom et postnom :
Heure :
Sexe :
Age :

Marché
Nom :
Way point :

Numéro	*Espèce*	*Sexe*	*Poids*	*État*	*Origine*	*Type de forêt*	*Destination*	*Partie vendue*	*Prix de vente*	*Chasseur*	*Origine*	*Type chasse*	*Photo*

Légende

- **N°** : numéro d'ordre des enregistrements en chiffres arabes ; prendre les deux premières lettres du nom du marché, du nom du chasseur, du jour de la semaine, suivi du numéro d'ordre d'enregistrement de la bête. Exemple EkLoJe01 : il s'agit du marché Ekutana, du chasseur Lokuli , du jour de jeudi et de la première bête.
- **Espèce** : il s'agit du nom vernaculaire de la bête en langue vernaculaire[4]
- **Sexe** : sexe de la bête : mâle (♂), femelle (♀)
- **Poids :** il s'agit du poids de la bête, il s'exprime en kilogramme (kg) ;
- **Etat de la bête** : l'état de la bête peut être vivant frais (Fr), sec (Se) ou pourru (Po);
- **Origine** : il s'agit du lieu ou la bête a été capturée. Donnez le nom de ce lieu en terme de bloc forestier, de la localité ou du groupement
- **Type de forêt :** donnez le nom du type d foret d'où la bête a été abattue. Le type de forêt peut être forêt primaire (FPM), forêt secondaire (FSEC), jachère (JAC), etc.
- **Destination** : il s'agit du l'utilisation de la bête : elle peut être la vente (Ve) ou la consommation (Co) ;
- **Partie vendue** : il s'agit de la partie de la bête en vente. Cette partie peut être la tête (Te), le tronc (Tr), l'entièreté (En), les membres inférieurs (M<), les membres supérieurs (M>) ; tête (Te) la poitrine (Po), le bassin (Ba), etc.
- **Prix de vente** : il s'agit du prix de vente (FC).
- **Chasseur** : nom du chasseur qui a tué la bête
- **Origine :** donnez le nom du lieu de résidence du chasseur. Ce lieu peut être une localité ou un groupement, etc.
- **Type de chasse** : il s'agit du type de chasse pratiqué qui a permis la capture de la bête : fusil (Fu), filet (Fi), chien (Ch), piège (Pi),
- **Photo :** donnez le numéro de la photo en chiffres arabes si disponible.

[4] Voir liste des espèces animales et végétale en annexe.

B. Nature des indices de présence de différentes familles d'espèces animales inventoriées.

Familles	Evidences							
	Directes		Indirectes					
	Vue	Entendu	Crottes	Traces	Broutage	Terrier	Nids	Pistes
Anomaluridae	x	x						
Bovidae	x		x	x	x			x
Cercopithecidae	x	x			x			
Chiroptères	x	x	x		x			
Colbidae	x	x			x			
Elephantidae	x		x	x				x
Herpestidae	x			x				
Hominidae	x	x	x	x	x		x	
Hystricidae						x		
Manidae				x		x		
Muroidae	x					x		x
Nandinidae	x	x	x		x			
Orycteropididae				x		x		
Procavidae	x							
Suidae	x		x	x				x
Viverridae	x		x		x			

C. Fiche de collecte des données sur recce

Date	**Chef d'équipe**	**Secteur**	**Recce ID**	**WP de départ**	**WP de fin**	**Nombre de WP**	**Bearing départ**	**Heure début**	**Heure fin**	**Distance totale**	**EPE**	
Latitude départ	**Longitude départ**	**Latitude fin**	**Longitude fin**	**Conditions climatiques**								
Heure	**N°WP**	**Alt**	**Végétation**	**Topographie**	**Observations**						**Photo**	**Epe & Notes**
					Classe	**Catégorie / espèce**	**Type**	**Dr/Ga**	**Age**	**Nombre**		

Légende :

- **Date** : date avec ordre : jour, mois, année en chiffres arabes
- **Chef d'équipe** : nom du chef d'équipe ; au verso, écrivez le nom des autres membres de l'équipe ;
- **Secteur** : donnez le secteur forestier de travail

- **Recce ID** : écrivez le numéro d'identification du recce ;
- **Conditions climatiques** : pluies, brouillard, rosée, etc.
- **WP départ** : fournir le numéro du Waypoint de départ en chiffres arabes ;
- **Bearing de départ** : donnez la direction de la boussole ;
- **Waypoint fin** : donner le numéro du waypoint final ;
- **Heure de début** : en format de 24 heures
- **Heure de fin** : en format de 24 heures
- **Nombre de waypoint** : en chiffre arabes
- **Distance totale** : longueur totale du recce en chiffres arabes ;
- **Photo fichier** : donner le numéro de la photo correspondante, si prise ;
- **N°WP** : donnez le numéro du way point tel qu'indiqué par le GPS ;
- **Altitude** : donnez l'altitude telle qu'indiquée par le GPS ;
- **Végétation** : forêt primaire mixte avec prédominance : (FPM) ou (FPMN), forêt marécageuse (FMAR) , forêt périodiquement inondée (FPI), forêt secondaire (FSEC), jachère (JAC) ou plantation (PLT).
- **Topographie** : plaine (PLN), pente (PEN), vallée (VAL) ;
- **Classe** : activité humaine (HUM), faune (FAU), fruits (FRUT) ;
- **Catégorie** : chasse (CHA), indéterminée (IND), agriculture (AGR), ou nom de l'espèce an langue vernaculaire, tel qu'écrit sur la liste ;
- **Type** : piste (PIS), trace (TRA), piège (PIE), coupe (COU), arbre fruitier (FRU) ;
- **Age** : récent (REC), frais (FRA), ancien (ANC)
- **Nombre** : donnez le nombre d'individus du groupe d'animaux, si vu
- **Photo :** donnez le numéro correspondant de la photo

D. Liste des noms vernaculaires et scientifiques des espèces animales.

N°	Ordre	Famille	Nom scientifique	Nom scientifique	Nom local	
					Longando	Lomongo
01	Primates	Cercopithécidae	Lophocebus atterimus	Lophocebus atterimus	Ngila	Ngila
02			Cercopithécus wolfi wolfi	Cercopithécus wolfi wolfi	Mbeka	Mbeka
03			Cercopithécus (c) ascanius	Cercopithécus (c) ascanius	Nsoli	Nsoli
04			Cercopithécus neglectus	Cercopithécus neglectus	Buluwa, Mpunga	Buluwa, Mpunga
05			Cercopithécus dryas	Cercopithécus dryas		
06			Allenopithécus nigroviridis	Allenopithécus nigroviridis	Elenga	
07		Colobidae	Colobus engolensis	Colobus engolensis	Lifelaki	Lifelaki
08			Piliocolobus tholloni	Piliocolobus tholloni	Lingofe	Lingofe, Djofe
09		Hominidae	Pan paniscus	Pan paniscus	Engombe	Imek'enenge
10		Bovidae	Cephalophus calipygus	Cephalophus calipygus	Bofala	Bofala
110			Cephalophus dorsalis	Cephalophus dorsalis	Bombende	Bomende
12			Cephalophus nigrifrons	Cephalophus nigrifrons	Bongundju	Bongundju
13			Cephalophus sylvicultor	Cephalophus sylvicultor	Lisoko	Lisoko
14			Cephalophus monticola	Cephalophus monticola	Mboloko	Mboloko
15			Tragelaphus spekei (man)	Tragelaphus spekei (man)	Mbuli noir	Mbuli noir
16			Tragelaphus spekei (vr)	Tragelaphus spekei (vr)	Mbuli blanc, ligne	Mbuli blanc, ligne
17			Syncerus cafer nanus	Syncerus cafer nanus	Mbuli rouge	Mbuli rouge
18		Suidae	Potamocherus porcus	Potamocherus porcus	Nsombo	Nsombo
19	tragulidae		hyémoschus aquaticus	hyémoschus aquaticus	Etambe	Etambe
20		Tubilidontae	Orycteropus afer	Orycteropus afer	Iluwo	Iluwo
21		Hyracoidae	Denndrohydrax arboreus	Denndrohydrax arboreus	Eeleka	Bombolo w'aliko
22		Proboscidae	Loxodonta africana	Loxodonta africana	Ndjou	Ndjoku
23		Polidota	Manis tetradactyla	Manis tetradactyla	Nkaha	Nkake

24			*Manis giganta*	*Manis giganta*		*Ikanga*
25			*Manis tricuspis*	*Manis tricuspis*	*Nkaha (pangolin)*	*Nkalamanya (?)*
26		*Sciuridae*	*Protoxerus stangeri*	*Protoxerus stangeri*	*Rodentia*	*Liyoko*
27		*Anomaluridae*	*Anomalurus beecrofti*	*Anomalurus beecrofti*		*Lokiyo*
28		*Hystricidae*	*Atherurus africanus*	*Atherurus africanus*	*Iiko*	*Iiko*
29		*Muroidea*	*Cricetomys emini*	*Cricetomys emini*	*Botomba*	*Botomba*
30	*Carnivora*	*Felidae*	*Felis aurata*	*Felis aurata*	*Lowa*	
31		*Mustelidae*	*Aonyx congica*	*Aonyx congica*	*Boyenge, liyenge*	
32		*Lopoko, esisi*	*Mellivora capensis*	*Mellivora capensis*		
33		*Herpestidae*	*Crossarchus obscurus*	*Crossarchus obscurus*	*Efandja*	*Efandja*
34		*Viverridae*	*Civettictis civetta*	*Civettictis civetta*		*Bokaa*
35			*Nandinia binotata*	*Nandinia binotata*		*Mbeo*
36		*Testidunae*	*Cycloderma aubry*	*Cycloderma aubry*	*Enjenje*	
37			*Osteolamus tetrapsis*	*Osteolamus tetrapsis*	*Lokwekwele*	
38			*Crocodilus niloticus*	*Crocodilus niloticus*	*Nkoli*	*Ngando*
39		*Pithonidae*	*Python sebae*	*Python sebae*	*Linyolu*	*Nguma*
40		*Viperidae*	*Bitis gabonica*	*Bitis gabonica*	*Liyate, litula mbwa*	
41		*Varanidae*	*Varanus niloticus*	*Varanus niloticus*	*Lombe, laalaka*	
42			*Gucheria pucherani*	*Gucheria pucherani*		*Lokoku*

E. Liste des noms vernaculaires et scientifiques des espèces consommées par Bonobo

N	**Nom scientifique**	**Famille**	**Ordre**	**Nom Local**	
					Lomongo
1	*Irvingia gabonensis*	Irvingiaceae			**Bofálángá**
2	*Parinari glabra*	Rosaceae			Bofale
3	*Gambeya lacourtianum*	Sapotaceae			Bofambu
4	*Scorodoploesus zenkeri*	Caesalpinaceae			Bofili
5	*Grewia louisii*	Tiliaceae			Bofumbu
6	*Synsepalum*	Sapotaceae			Bofunga
7	*Treculia africana*	Moraceae			Boimbo
8	*Mammea*	Guttiferaceae			Bokoli

9	*Polyalthia suaveolens*	Annonaceae			Bolinda
10	*Musanga cecropioides*	Moraceae			Bomambo
11	*Annonidium mannii*	Annonaceae			Bonenge
12	*Landolphia congolensis*	Apocynaceae			Bonsele
13	*Garcinia punctata*	Guttiferaceae			Bosefe
14	*Pancovia Laurentii*	Sapindaceae			Botende
15	*Anthoclitandra robustior*	Apocynaceae			Botofe
16	*Dialum sp.*	Caesalpinaceae			Elimilimi
17	Crudia laurentii	Caesalpinaceae			Esènge
18	Autranella congolensis	Sapotaceae			Likoso
19	Ficus sp.	Moraceae			Lokumu
20	Colia griseflora	Sterculiaceae			Lonyama
21	Celtis mildbraendii	Ulmaceae			Bolólé
22	Afromomum				Mbole
23	Palisota sp.	Commelinaceae			Lintentele lisangu
20	Haumania				Nkômbe

F. Origine des carcasses trouvées aux marchés.

N°	**Origine**	**Origine**	**Total**
1	Afengunda	Externe	2
2	Baale	Externe	1
3	Bafeleke	Externe	3
4	Bakumo	Externe	17
5	Basenge	Externe	1
6	Baula	Externe	1
7	Bebanga bebanga	Externe	1
8	Beembe	Externe	7
9	Beendjo	Djolu Wamba	14
10	Befofe	Externe	2
11	Befori	Externe	2
12	Bekelekele	Externe	2
13	Bekendju	Externe	1
14	Bekondo	Externe	11
15	Bekungu	Externe	1
16	Belele	Externe	1
17	Belongilongi	Externe	3
18	Bembeli	Externe	2
19	Bembende	Externe	2
20	Bendembe	Externe	1
21	Beololo	Externe	2
22	Bepaka	Externe	4
23	Besange	Externe	1
24	Besasa	Externe	5

25	Besenge	Djolu Wamba	6
26	Besoho	Externe	2
27	Biifi	Externe	3
28	Biila	Externe	1
29	Biilo	Externe	9
30	Biimbo	Externe	1
31	Bikolo	Externe	1
32	Bofasa	Externe	1
33	Boheke	Externe	1
34	Bohima	Externe	3
35	Bohoku	Externe	2
36	Boila	Externe	7
37	Bokaela	Externe	5
38	Bokakata	Externe	8
39	Bokongo	Externe	1
40	Bokota	Externe	1
41	Bokotango	Externe	2
42	Bokotangonda	Externe	1
43	Bokotombolo	Externe	2
44	Bolombo	Djolu Wamba	47
45	Bolongo	Externe	8
46	Bombelo	Externe	1
47	Bombèsè	Externe	2
48	Bompoke	Externe	2
49	Bondondo	Externe	1
50	Bopaka	Externe	1
51	Bopolo	Externe	5
52	Bosenge	Externe	2
53	Botamba	Externe	1
54	Botembo	Externe	1
55	Boteyi	Externe	3
56	Bowanga	Externe	1
57	Bowangi	Externe	1
58	Bowo	Externe	6
59	Boyoyo	Externe	1
60	Buya	Externe	1
61	bembende	Externe	1
62	Duale	Djolu Wamba	2
63	Efase	Externe	17
64	Ekalakala	Externe	4
65	Ekolikoko	Externe	1
66	Ekombe	Externe	8
67	Elesa	Externe	3
68	Elonda	Externe	2
69	Elosa	Externe	1
70	Eoka	Externe	2
71	Eomba	Externe	2
72	Etsiko	Externe	1
73	Ifaka	Externe	2

74	Ifeto	Externe	1
75	Ikelemba	Djolu Wamba	10
76	Ikoli	Externe	3
77	Ilongo	Externe	3
78	Ingungu	Externe	1
79	Isofo	Externe	1
80	Isokungu	Externe	1
81	Isole	Externe	1
82	Isombo	Externe	2
83	Ite	Externe	1
84	Iyali	Externe	3
85	Iyate	Externe	3
86	Iyela	Externe	3
87	Iyoole	Externe	1
88	Kandola	Externe	1
89	Kelekete	Externe	2
90	Laale	Djolu Wamba	5
91	Laambe	Externe	1
92	Lana	Externe	2
93	Leelya	Externe	5
94	Leeya	Externe	5
95	Lenge	Externe	1
96	Lifanga	Externe	2
97	Liile	Externe	3
98	Liindja	Externe	1
99	Lilefo	Externe	1
100	Lilue	Externe	1
101	Lilukuluku	Externe	1
102	Lingomo	Externe	8
103	Lofofe	Externe	2
104	Lofoko	Externe	4
105	Lofoli	Externe	1
106	Lofoso	Externe	1
107	Lokaka	Externe	3
108	Lokangi	Djolu Wamba	2
109	Lokendju	Externe	5
110	Lokinda	Externe	6
111	Lokombe	Externe	1
112	Lokongo	Externe	8
113	Lokuli	Externe	1
114	Lolaka	Djolu Wamba	4
115	Lolembo	Externe	1
116	Lolenge	Externe	5
117	Lomako	Djolu Wamba	33
118	Lomame	Externe	7
119	Lombongo	Externe	3
120	Lomoko	Externe	1
121	Lomomose	Externe	1
122	Londondo	Externe	2

123	Longofe	Externe	1
124	Longombo	Externe	2
125	Lonuka	Externe	13
126	Lonya	Externe	3
127	Loo	Externe	2
128	Loola	Externe	2
129	Loolu	Externe	4
130	Loongo	Externe	1
131	Lopori	Externe	3
132	Losaila	Externe	1
133	Losangalema	Externe	2
134	Losenge	Externe	9
135	Losifo	Externe	1
136	Losofo	Djolu Wamba	1
137	Losofo	Djolu Wamba	3
138	Losombo	Djolu Wamba	3
139	Lufo	Externe	4
140	Lufu	Externe	1
141	Luwa	Djolu Wamba	34
142	Luwo	Externe	1
143	Mbole	Externe	2
144	Mbondo	Externe	4
145	Mbotolongo	Externe	7
146	Mpekese	Externe	3
147	Mpetsi	Externe	4
148	ND	Externe	3
149	Ngali	Externe	2
150	Ngel'Okili	Externe	3
151	Ngofola	Externe	3
152	Nkele	Externe	9
153	Nkole	Externe	2
154	Ntaango	Externe	1
155	Taaka	Externe	2
156	Taango	Externe	2
157	Tata	Externe	1
158	Tofili	Externe	1
159	Tokako	Externe	1
160	Toole	Externe	9
161	Tosolo	Externe	3
162	Tosou	Externe	2
163	Totenge	Externe	1
164	Yaindjo	Externe	3
165	Yapere	Externe	2
166	Yelenge	Externe	1
167	Yesiya	Externe	4
168	Yetota	Externe	6
169	Yokembe	Externe	3
170	Yolota	Externe	3
171	Yonganga	Externe	2

172	Yongongo	Externe	1
	Total		619

Le mot externe employé ici veut dire en dehors de Djolu wamba.

G. Distribution des carcasses en fonction des zones de chasse d'origine

	Beendjo	Besenge	Bolombo	Duale	Ikelemba	Laale	Lofoso	Lokangi	Lolaka	Lomako	Losombo	Luwa	Total	%
Allenopithecus nigroviridis			1										1	0,62%
Atherurus africanus			1		1				1	2		2	7	4,35%
Cephalophus callipygus			1										1	0,62%
Cephalophus dorsalis	1		9		1				1	7	1	10	30	18,63%
Cephalophus monticola	2					1				3		1	7	4,35%
Cephalophus nigrifrons					1							1	2	1,24%
Cephalophus silvicultor										2			2	1,24%
Cercopithecus ascanius	7	1	12		5			1		7	1	15	49	30,43%
Cercopithecus neglectus			1										1	0,62%
Cercopithecus wolfi	3		3		1		1	1				1	10	6,21%
Colobus angolensis			7								1		8	4,97%
Cricetomis emimi		3	1										4	2,48%
Kinexys sp			1										1	0,62%
Lophocebus atterimus		1								2			3	1,86%
Manis tricupsis						1				1			2	1,24%
Ntolu			4										4	2,48%
Potamocherus porcus	1		4		1	2			2	9		4	23	14,29%
Singe				1									1	0,62%
Tragelapus sp		1	2	1									4	2,48%
Varanus niloticus						1							1	0,62%
Total	14	6	47	2	10	5	1	2	4	33	3	34	161	100,00%
%	8,70%	3,73%	29,19%	1,24%	6,21%	3,11%	0,62%	1,24%	2,48%	20,50%	1,86%	21,12%	100,00%	

- Le chef d'équipe au sud de la rivière Duale n'a pas nommé les secteurs forestiers lors des recensements biologiques. Tous les secteurs forestiers originaires des carcasses cités dans ce tableau se trouvent dans le nord de la rivière Duale ;
- Sur les 619 carcasses inventoriées 161, soit 26%, sont provenues du bloc forestier de Djolu Wamba, particulièrement des terroirs de Bolombo, Lomako et Luwa. Les 458 autres sont provenues des blocs forestiers voisins.

H. Indices d'abondance des espèces

Groupe taxonomique	Langue vernaculaire		Statut de protection	Abondance		Type de végétation					
	Longando	Lomongo		Total	IKA	FMAR	FP	FPM	FSEC	JAC	PLT
1. Ordre:Artiodactyles											
1.1. Famille: Bovidae											
1.1.1. Cephalophus callipygus	Bofala	Bofala	Non	607	1,51	60	338	208	1		
1.1.2. Cephalophus dorsalis	Bombende	Bomende	Partielle[1]	822	2,05	62	209	485	27	34	5
1.1.3. Cephalophus monticola	Mboloko	Mboloko	Partielle	410	1,02	33	165	178	13	17	4
1.1.4. Cephalophus nigrifrons	Bongundju	Bongundu	Non	187	0,47	116	36	32	1	2	
1.1.5. Cephalophus silvicultor	Lisoko	Lisoko	Partielle	548	1,37	72	241	229	6		
1.1.6. Hyemoschus aquaticus	Etambe	Entambe	Partielle	95	0,24	47	25	21		2	
1.1.7. Tragelaphus spekei	Mbuli	Mbuli	Partielle	151	0,38	94	18	30		9	
Total 1.1				**2820**	**7,03**	**484**	**1032**	**1183**	**48**	**64**	**9**
1.2. Famille: Suidae											
1.2.1. Potamocherus porcus	Nsombo	Nsombo	Partielle	1026	2,56	161	319	516	16	11	3
Total 1.2				**1026**	**2,56**	**161**	**319**	**516**	**16**	**11**	**3**
Totaux 1				**3846**	**9,58**	**645**	**1351**	**1699**	**64**	**75**	**12**
2. Ordre: Carnivores											
2.1. Famille: Felidae											
2.1.1. Felis aurata	Lowa	Lowa	Partielle	9	0,02		1	7	1		
2.1.2. Panthera pardus	Nkoy	Nkoy	Partielle	22	0,05	5	8	9			
Total 2.1				**31**	**0,08**	**5**	**9**	**16**	**1**	**0**	**0**
2.2. Famille: Herpestidae											
2.2.1. Atilax paludinosus	Buundju	Wundu	Non	5	0,01	5					
2.2.2. Crossarchus alexandri	Efandja	Efandja	Non	50	0,12		16	28	2	4	
Total 2.2				**55**	**0,14**	**5**	**16**	**28**	**2**	**4**	**0**

2.3. Famille: Mustelidae											
2.3.1. Aonyx congica	Liyoko	Liyoko	Partielle	8	0,02	6	2				
Total 2.3				**8**	**0,02**	**6**	**2**	**0**	**0**	**0**	**0**
2.4. Famille: Nandinidae											
2.4.1. Nandinia binotata	Mbiyo	Mbeo	Non	2	0,00		2				
Total 2.4				**2**	**0,00**	**0**	**2**	**0**	**0**	**0**	**0**
2.5. Famille: Viverridae											
2.5.1. Civettictis civetta	Yoo	Djoo	Non	11	0,03		2		1	8	
Total 2.5				**11**	**0,03**		**2**	**0**	**1**	**8**	**0**
Totaux 2				**107**	**0,27**	**16**	**31**	**44**	**4**	**12**	**0**
3. Ordre: Chiroptères											
3.1. Famille: Pterpodidae											
3.1.1. Lissonycteris angolensis	Lolema	Lolema	Non	3	0,01	1	1	1			
Total 3				**3**	**0,01**	**1**	**1**	**1**	**0**	**0**	**0**
4. Ordre: Hyracoides											
4.1. Famille: Procavidae											
4.1.1. Dendrohydrax arboreus	Eeleka	Bombol wa liko	Partielle	4	0,01	1	3				
Totaux 4				**4**	**0,01**	**1**	**3**	**0**	**0**	**0**	**0**
5 : Ordre: Pholidotes											
5.1. Famille: Manidae											
5.1.1. Manis tetradactyla	Nkake	Nkake	Partielle	7	0,02	1	3	3			
5.1.2. Smutsia gigantea	Ikanga	Ikanga	Partielle	407	1,01	34	149	203	18		3
5.1.3. Smutsia tricupsis	Nkaha	Nkoonyo	Partielle	1	0,00			1			
Totaux 5				**415**	**1,03**	**35**	**152**	**207**	**18**	**0**	**3**
6. Ordre: Primates											
6.1. Famille: Cercopithecidae											
6.1.1. Allenopithecus nigroviridis	Elenga	Elenga	Partielle	3	0,01	3					
6.1.2. Cercopithecus ascanius	Nsoli	Nsoli	Partielle	27	0,07	3	9	11	2	2	
6.1.3. Cercopithecus neglectus	Mpunga	Boluwa	Partielle	5	0,01	3	1	1			
6.1.4. Cercopithecus wolfi wolfi	Mbeka	Mbeka	Partielle	21	0,05	1	9	8	1	2	
6.1.5. Lophocebus atterimus	Ngila	Ngila	Non	19	0,05	4	14	1			

Total 6.1				**75**	**0,19**	**14**	**33**	**21**	**3**	**4**	**0**
6.2. Famille: Colobidae											
6.2.1. Colobus angolensis	Liyuka, Likoloto	Liuka	Partielle	21	0,05	14	5	1	1		
6.3. Famille: Hominidae											
6.3.1. Pan paniscus	Elya, Engombe	Engombe	Totale	119	0,30	12	7	95	3	2	
Totaux 6				**215**	**0,54**	**40**	**45**	**117**	**7**	**6**	**0**
7. Ordre: Proboscidiens											
7.1. Famille: Elepnantidae											
7.1.1. Loxodonta africana	Ndjowu, Bondamba	Namba	Totale	2	0,00			2			
Totaux 7				**2**	**0,00**	**0**	**0**	**2**	**0**	**0**	**0**
8. Ordre: Rongeurs											
8.1. Famille: Anomaluridae											
8.1.1. Anomalurus sp.	Likiyo	Lokiyo	Non	2	0,00		1	1			
8.2. Famille: Hystricidae											
8.2.1. Cricetomys emimi	Botomba	Botomba	Non	14	0,03	3	6	5			
8.3. Famille: Muroidae											
8.3.1. Atherurus africanus	Iiko	Iko	Non	324	0,81	88	136	94	3	3	
Totaux 8				**340**	**0,85**	**91**	**143**	**100**	**3**	**3**	**0**
9. Ordre: Tubilidentata											
9.1. Famille: Orycteropodidae											
9.1.1. Orycteropus afer	Iluwo	Iluwo	Totale	100	0,25	7	17	72	4		
Totaux				**5032**	**12,54**	**836**	**1743**	**2242**	**100**	**96**	**15**

Légende :

IKA = Indice kilométrique d'abondance
FP = Forêt primaire
FPM = Forêt primaire mixte
FSEC = forêt secondaire
JAC = Jachère
PLT = Plantation

I. Liste des Secteurs, Groupements et localités du Carré Djolu

1	Yayenge/Wamba	Wamba	Luo	Djolu		CDJ
2	Yasongo	Wamba	Luo	Djolu		CDJ
3	Yowala	Wamba	Luo	Djolu		CDJ
4	Yopete	Wamba	Luo	Djolu		CDJ
5	Yokose	Wamba	Luo	Djolu		CDJ
6	Bolongola	Sema	Luo	Djolu		CDJ
7	Bofeto	Sema	Luo	Djolu		CDJ
8	Yakole	Sema	Luo	Djolu		CDJ
9	Ndongo	Sema	Luo	Djolu		CDJ
10	Yongulu	Sema	Luo	Djolu		CDJ
11	Yelifo	Sema	Luo	Djolu		CDJ
12	Yalango	Sema	Luo	Djolu		CDJ
13	Biamba	Sema	Luo	Djolu		CDJ
14	Yaunga	Sema	Luo	Djolu		CDJ
15	Mputsuanga	Sema	Luo	Djolu		CDJ
16	Yolumbualisele	Sema	Luo	Djolu		CDJ
17	Yalisele	Sema	Luo	Djolu	004	CDJ
18	Bokondo	Balanga	Luo	Djolu		CDJ
19	Yasonge	Balanga	Luo	Djolu		CDJ
20	Yapanga	Balanga	Luo	Djolu		CDJ
21	Yambembe	Balanga	Luo	Djolu		CDJ
22	Mputsuanga	Balanga	Luo	Djolu		CDJ
23	Bombeka	Balanga	Luo	Djolu		CDJ
24	Yengunda	Bokumbo	Luo	Djolu		CDJ
25	Yosenge	Bokumbo	Luo	Djolu	011	CDJ
26	Nkole	Bokumbo	Luo	Djolu		CDJ
27	Bongila	Bokumbo	Luo	Djolu		CDJ
28	Yeke	Bokumbo	Luo	Djolu		CDJ
29	Mputsuanga	Bokumbo	Luo	Djolu		CDJ
30	Yona	Bokumbo	Luo	Djolu		CDJ
31	Yakua	Bokumbo	Luo	Djolu		CDJ
32	Yankoke	Bokumbo	Luo	Djolu		CDJ
33	Yalikombo	Nkokolombo	Luo	Djolu		CDJ
34	Yaloko	Nkokolombo	Luo	Djolu		CDJ
35	Yalongonda	Nkokolombo	Luo	Djolu		CDJ
36	Lifanga	Nkokolombo	Luo	Djolu		CDJ
37	Nkile	Nkokolombo	Luo	Djolu		CDJ
38	Yampotsi	Nkokolombo	Luo	Djolu		CDJ
39	Mbotolongo	Nkokolombo	Luo	Djolu		CDJ
40	Djolu	Nkokolombo	Luo	Djolu	021	CDJ
41	Lokinda	Nkole	Lingomo	Djolu		CDJ
42	Ingungu	Nkole	Lingomo	Djolu		CDJ
43	Yetombe	Nkole	Lingomo	Djolu		CDJ
44	Yokembe	Nkole	Lingomo	Djolu	032	CDJ
45	Yankolo	Nkole	Lingomo	Djolu		CDJ

46	Lolingo	Nkole	Lingomo	Djolu		CDJ
47	Bembongo	Yolota	Lingomo	Djolu		CDJ
48	Yoloko	Yolota	Lingomo	Djolu		CDJ
49	Yefili	Lingomo	Lingomo	Djolu		CDJ
50	Lingomo	Centre	Lingomo	Djolu	042	CDJ
51	Yalokamba 1	Yolota	Lingomo	Djolu		CDJ
52	Yango	Yolota	Lingomo	Djolu		CDJ
53	Yalokamba 2	Yolota	Lingomo	Djolu		CDJ
54	Mpelenge	Yolota	Lingomo	Djolu	050	CDJ
55	Yelonga	Yolota	Lingomo	Djolu		CDJ
56	Yambula	Yolota	Lingomo	Djolu	056	CDJ
57	Ilima	Likunduamba	Duale	Befale		CDJ
58	Lotulo	Likunduamba	Duale	Befale		CDJ
59	Bolima	Likunduamba	Duale	Befale	068	CDJ
60	Lilanga	Bomwankoy	Duale	Befale	073	CDJ
61	Ikelemba	Bomwankoy	Duale	Befale		CDJ
62	Inkandja	Bomwankoy	Duale	Befale	076	CDJ
63	Lifanga	Bomwankoy	Duale	Befale	082	CDJ
64	Bongila	Bomwankoy	Duale	Befale		CDJ
65	Wamba	Bomwankoy	Duale	Befale		CDJ
66	Waka	Bomwankoy	Duale	Befale		CDJ
67	Bolima	Ekalankoy	Duale	Befale		CDJ
68	Ikelemba	Ekalankoy	Duale	Befale		CDJ
69	Lisokoene	Ekalankoy	Duale	Befale		CDJ
70	Lokombe	Ekalankoy	Duale	Befale		CDJ
71	Bosango	Ekalankoy	Duale	Befale		CDJ
72	Mompono	Mompono	Duale	Befale	093	CDJ
73	Bolaka	Bolaka	Duale	Befale		CDJ
74	Bokungu	Ekalankoy	Duale	Befale		CDJ
75	Wamba	Ekalankoy	Duale	Befale	099	CDJ
76	Lileko	Ekalankoy	Duale	Befale		CDJ
77	Bofaka	Ekalankoy	Duale	Befale		CDJ
78	Ifomi	Ekalankoy	Duale	Befale		CDJ
79	Bosango	Ekalankoy	Duale	Befale		CDJ
80	Ilolo	Bokumbelokol	Duale	Befale	110	CDJ
81	Nkone	Bokumbelokol	Duale	Befale		CDJ
82	Bongila	Bokumbelokol	Duale	Befale		CDJ
83	Lokuta	Moma	Duale	Befale		CDJ
84	Yankogolo	Moma	Duale	Befale		CDJ
85	Efoto	Likongo	Duale	Befale		CDJ
86	Ikela/ Lioko	Likongo	Duale	Befale	120	CDJ
87	Yansongombotoo	Likongo	Duale	Befale		CDJ
88	Efonde	Likongo	Duale	Befale		CDJ
89	Ekembela	Likongo	Duale	Befale		CDJ
90	Bingoli	Likongo	Duale	Befale		CDJ
91	Lofemba	Likongo	Duale	Befale		CDJ

92	Esangani	Likongo	Duale	Befale	132	CDJ
93	Nyalamo	Likongo	Duale	Befale		CDJ
94	Yakaa	Likongo	Duale	Befale	134	CDJ
95	Yamboyo	Likongo	Duale	Befale		CDJ
96	Yaama	Yaama	Duale	Befale		CDJ
97	Befori	Likonda	Luo	Djolu	141	CDJ
98	Ipopo	Likonda	Luo	Djolu		CDJ
99	Losomba	Likonda	Luo	Djolu		CDJ
100	Bokilia luo	Likonda	Luo	Djolu		CDJ
101	Etsiko	Likonda	Luo	Djolu	144	CDJ
102	Mpombi	Likonda	Luo	Djolu		CDJ

J. Figures (Different maps are situated in the following pages)

Figure 1 : Djolu Wamba location

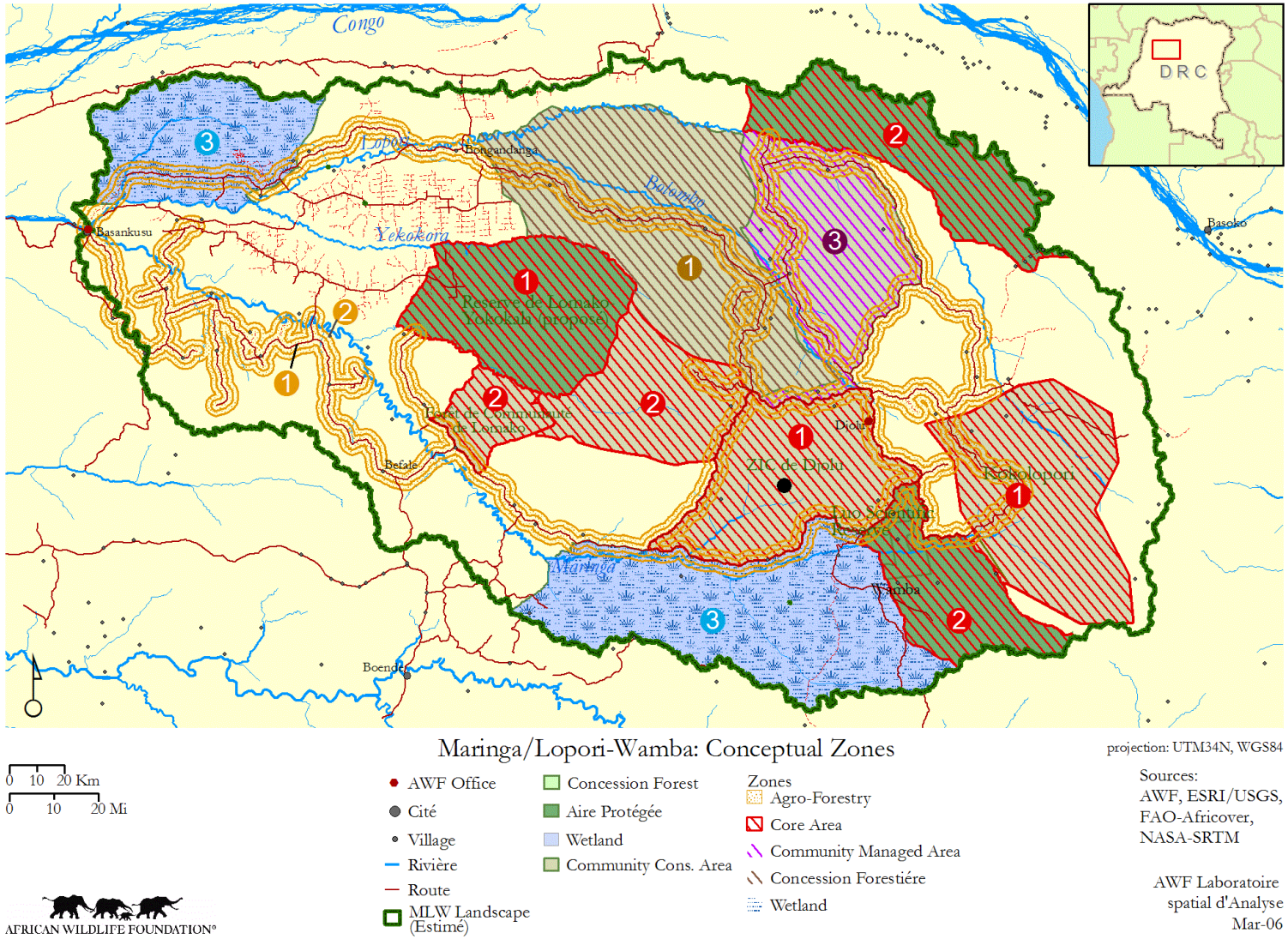


Figure 2 : Survey design

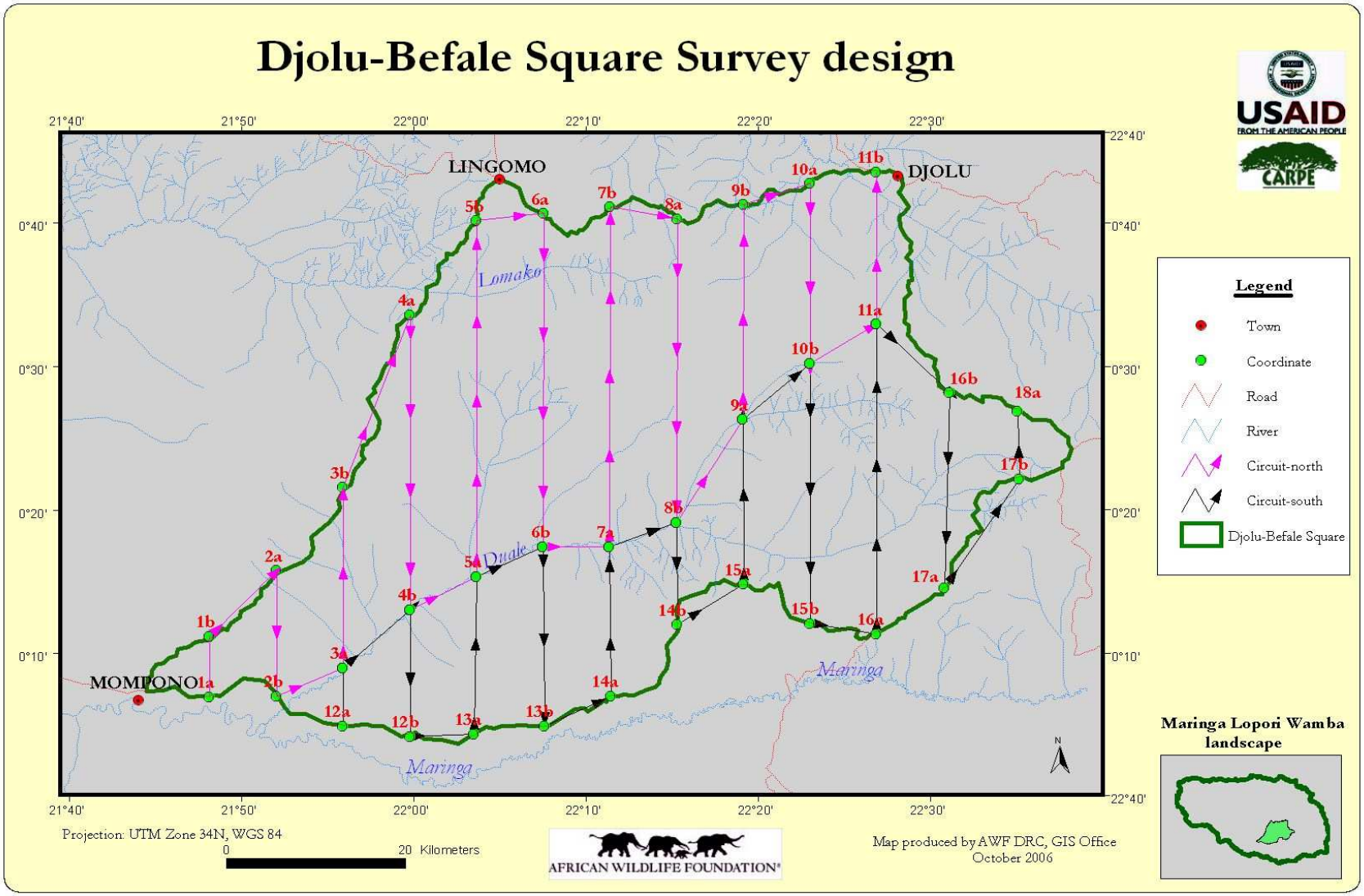


Figure 3 : Traditional hunting zones

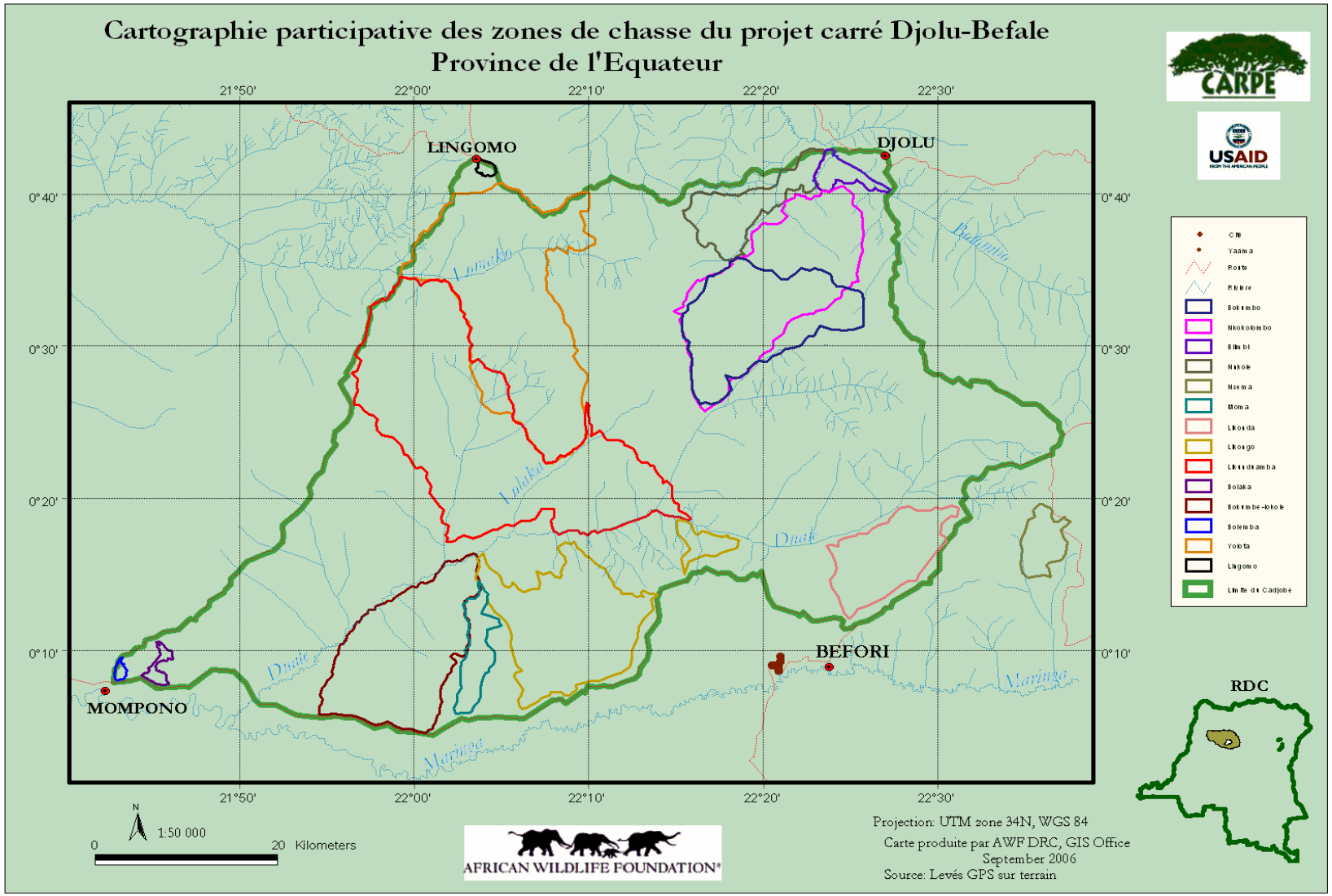


Figure 4 : hunting signs

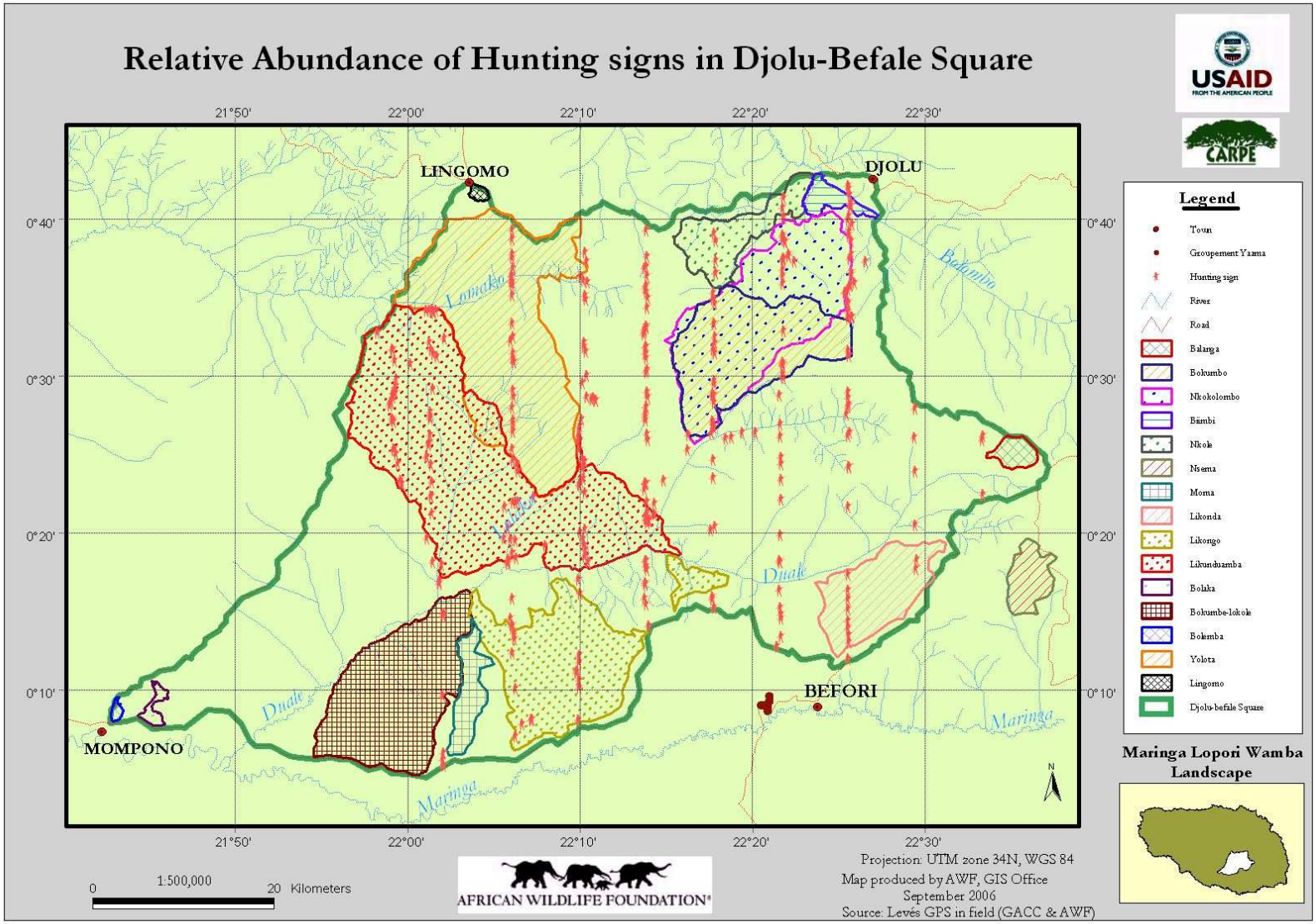


Figure 5 : Agricultural signs

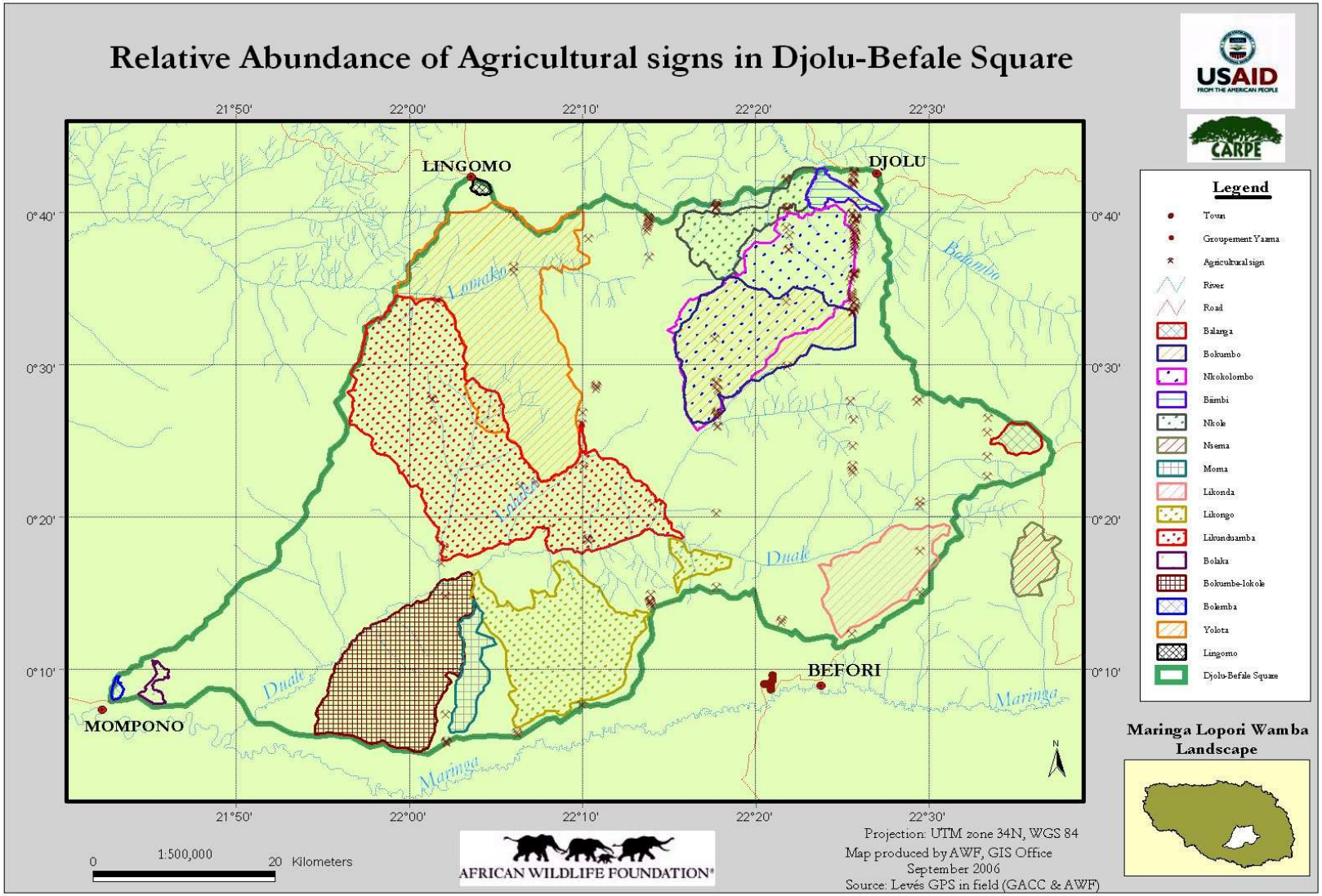


Figure 6 : Bonobos signs

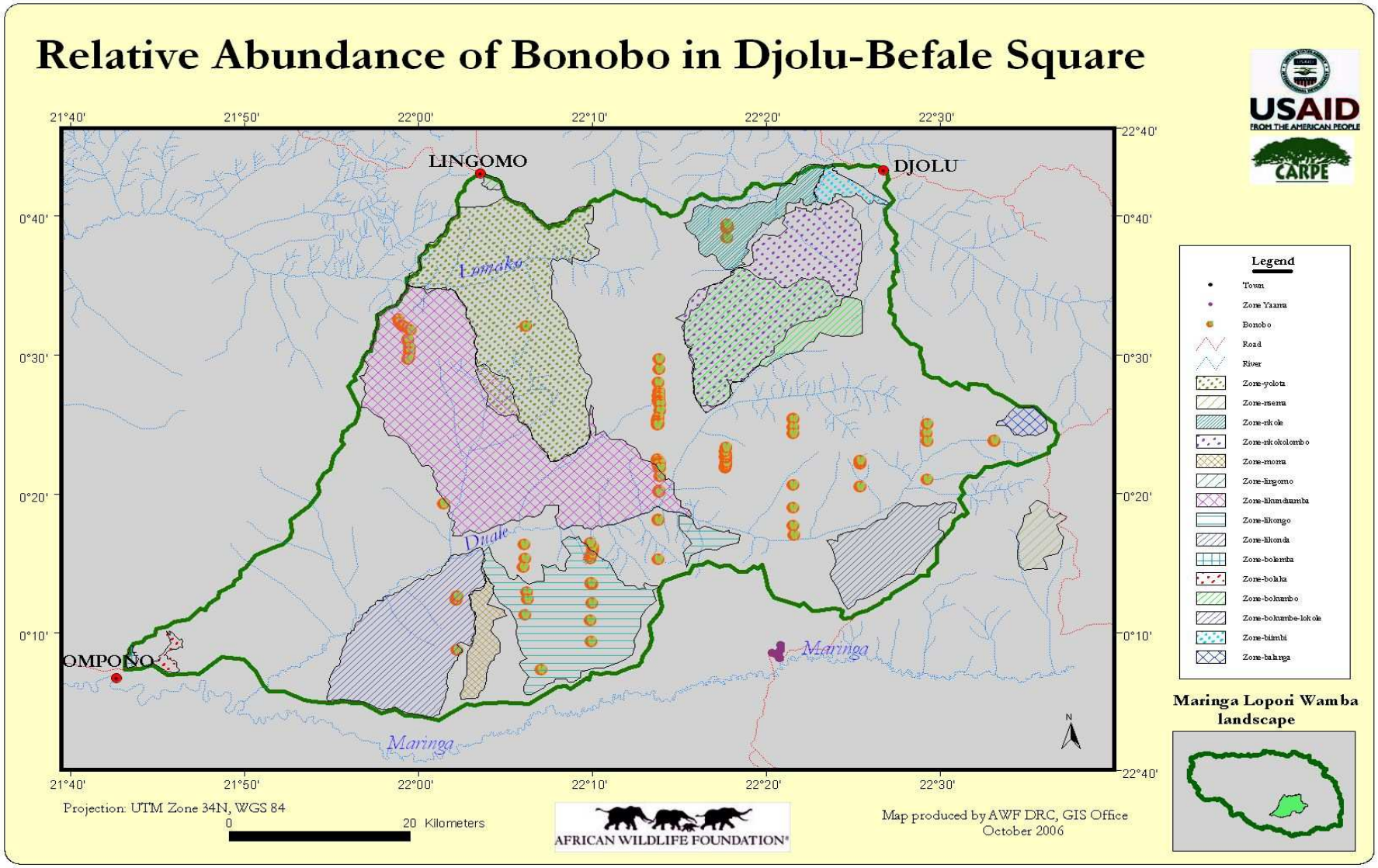


Figure 7 : Duikers signs

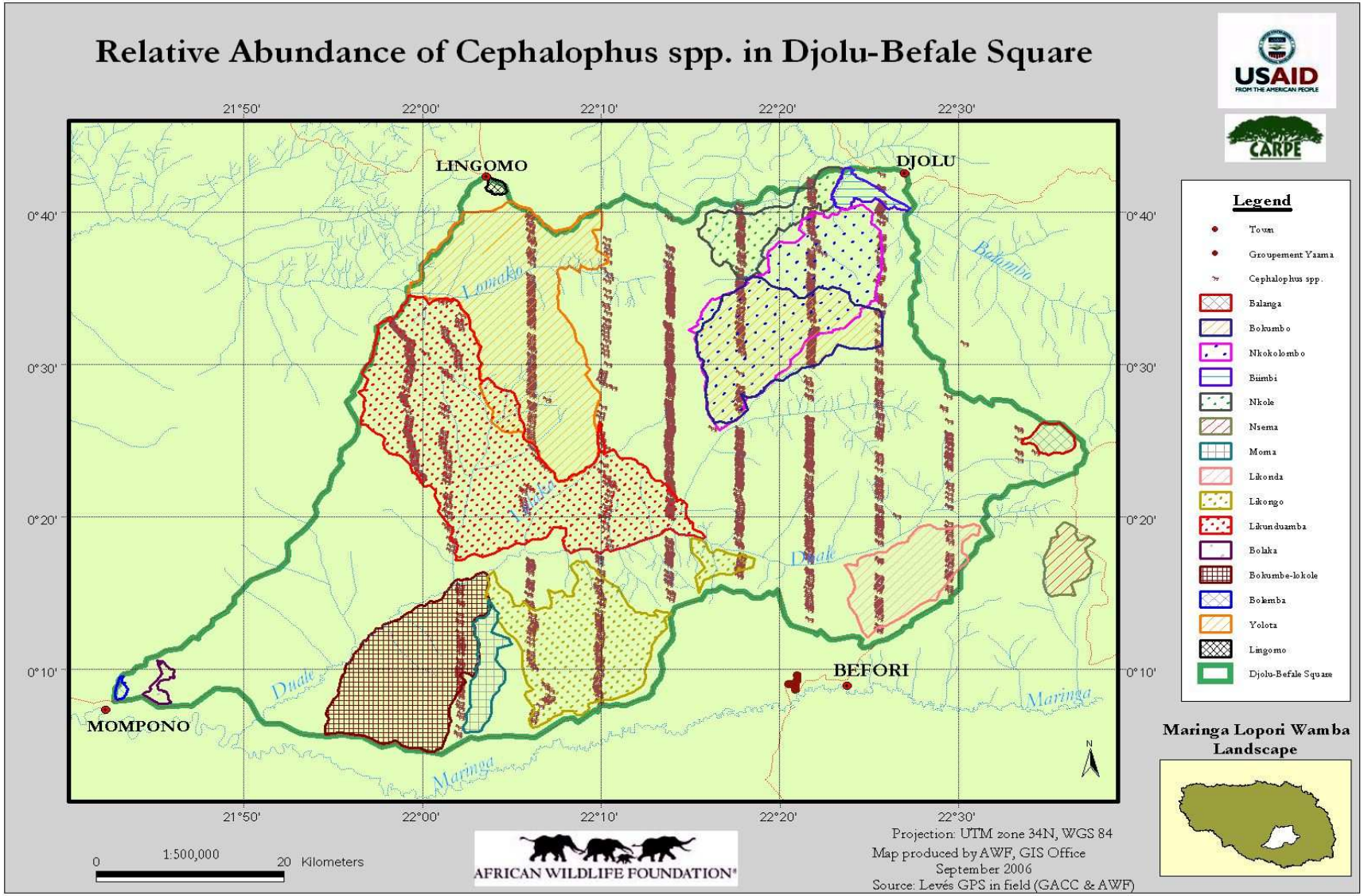


Figure 8 : Potamocherus signs

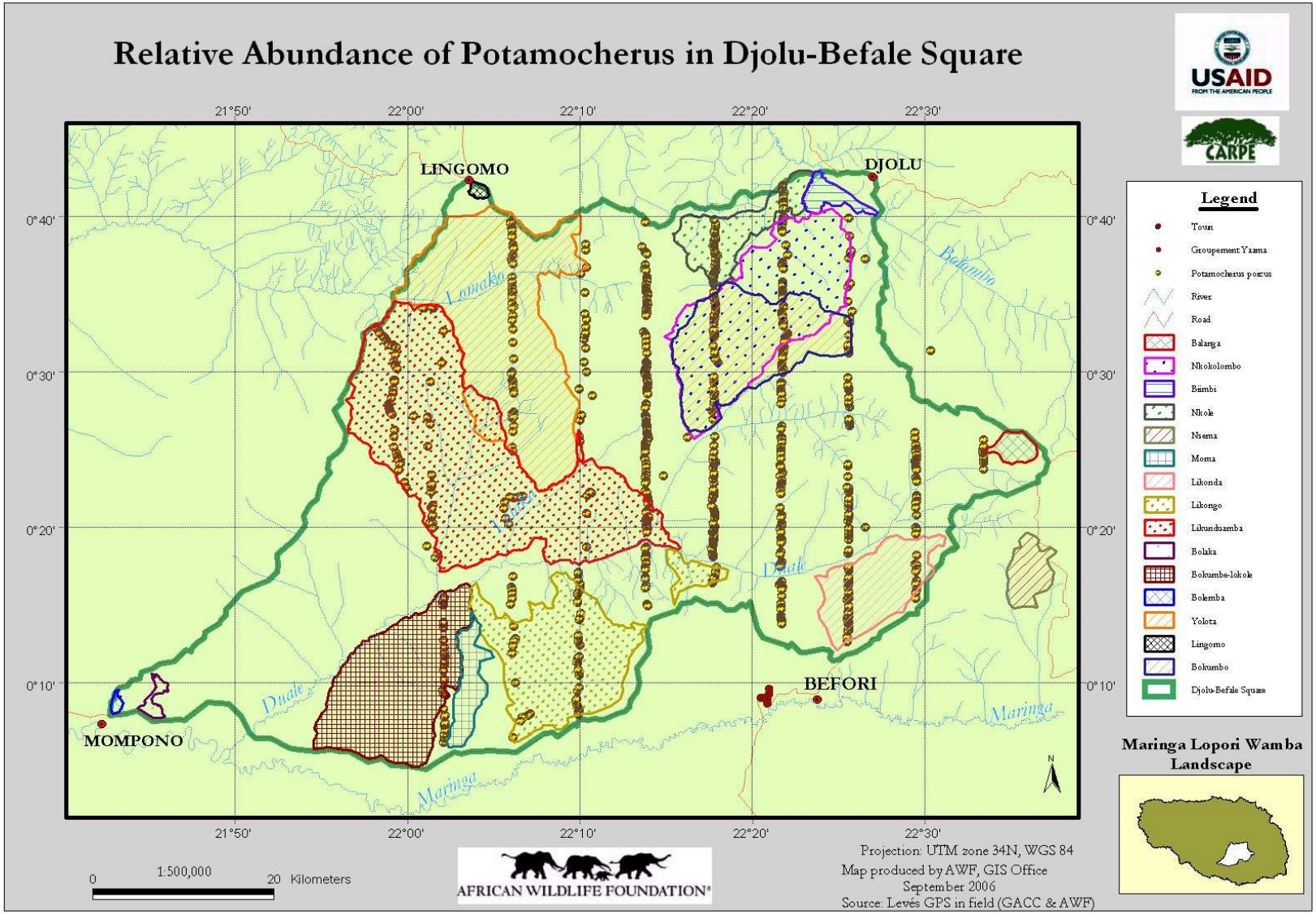


Figure 9 : Primates signs

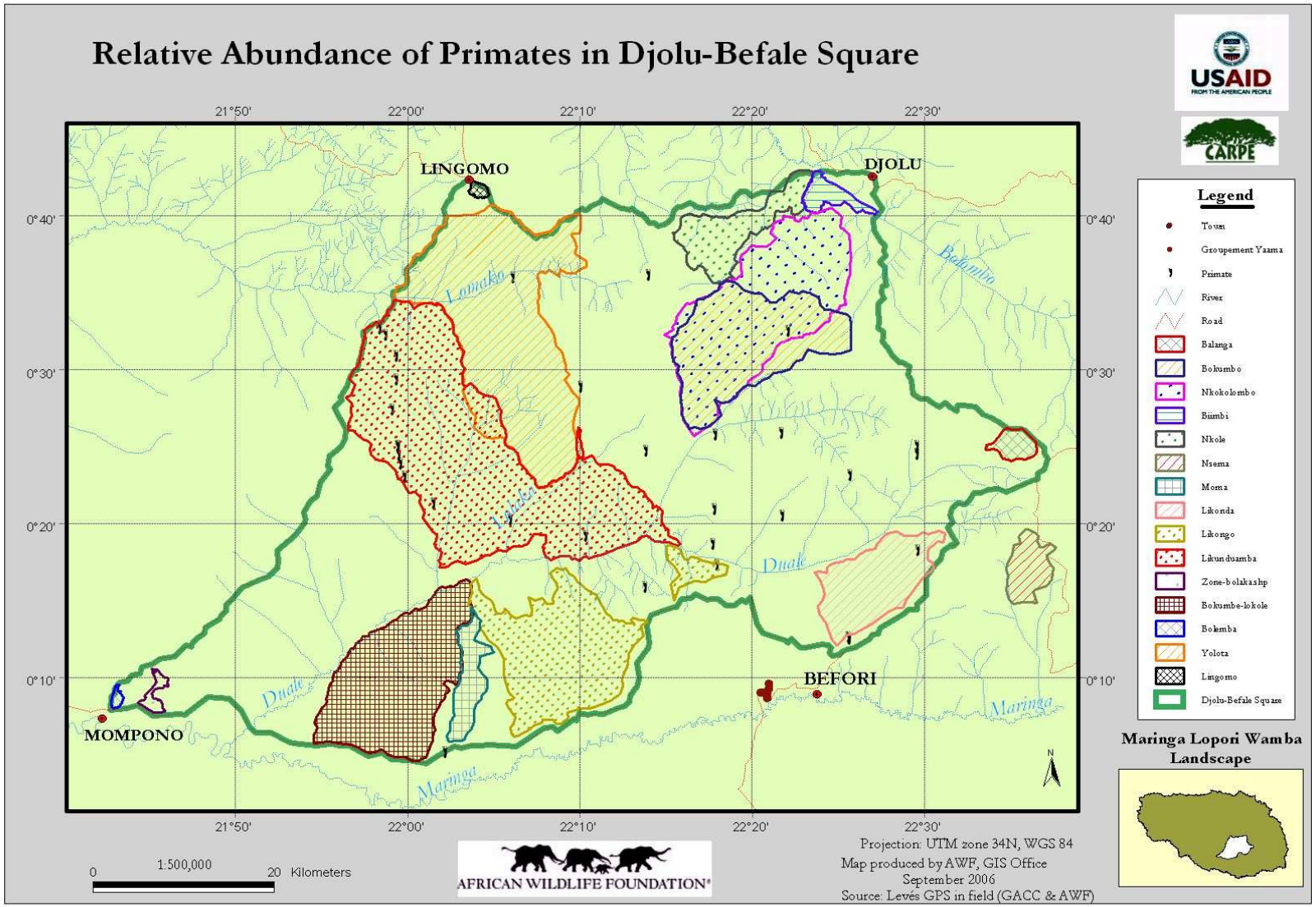
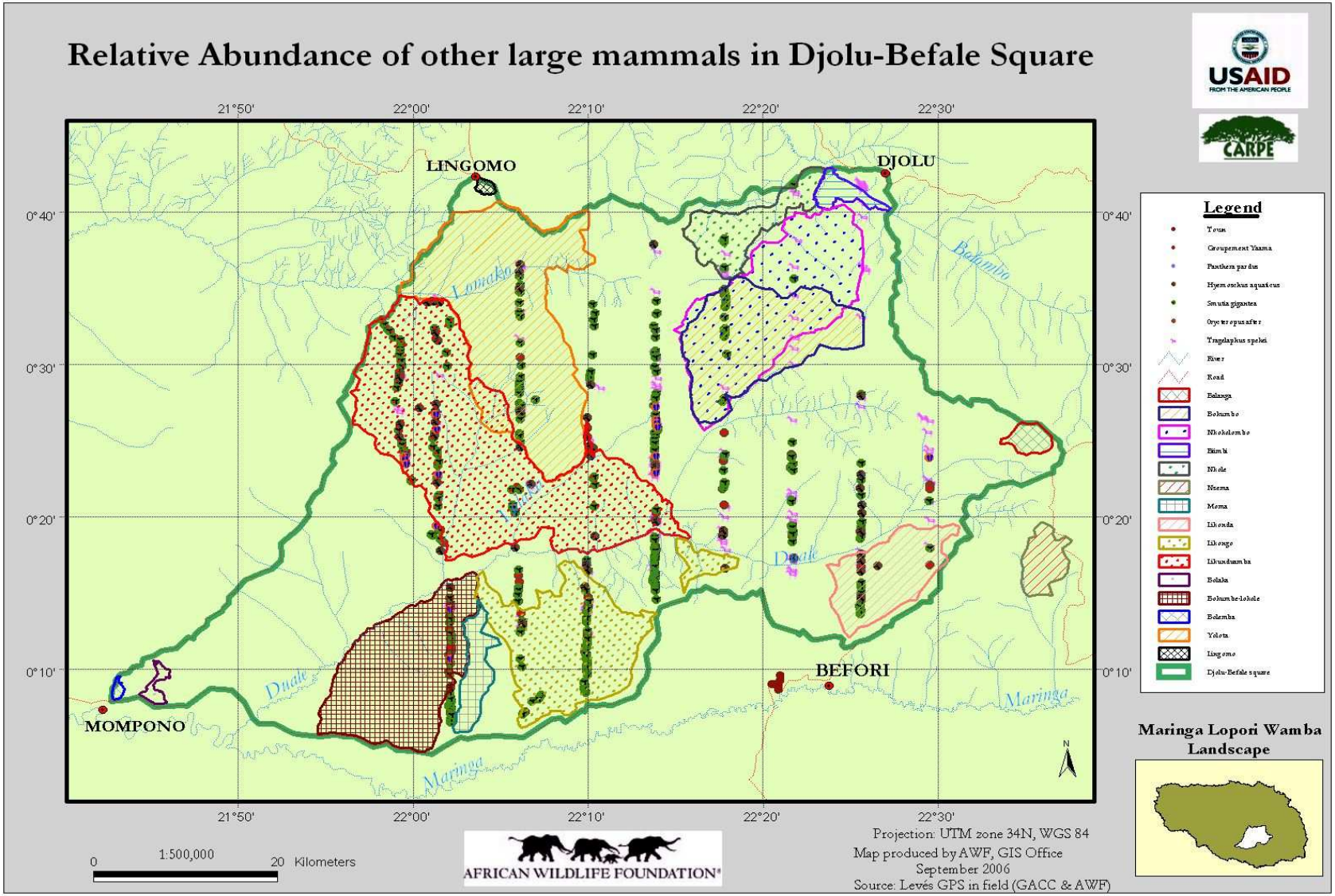


Figure 10 : Other large mammals signs



[i] [i] Lee White & Ann Edwards : Estimation du statut des populations animales, in Conservation en forêt pluviale africaine, méthode de recherche, 1ère édition française, 2001, pp 221-271