THE IMPACTS OF MINERAL EXPLOITATION AND ASSOCIATED TRADE ON WILDLIFE IN THE DJA-BOUMBA MINING AREA EAST CAMEROON

The delegate of agriculture during the training and capacity building on alternative sources of nutrients and income © M.L.

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1.0. SECTION ONE

PARTICIPATORY COMMUNITY BASED ECOLOGICAL MONITORING PROGRAMME

1.1. Ecological monitoring of bushmeat harvest, consumption and trade

The old hunters association, the Christian women association and the community based village groups have been conducting wildlife surveys in the Dja-Boumba mining area since 2011. The participatory community based ecological monitoring data collection provides bio-indicators for the unsustainable harvest, consumption and trade in wildlife, so that alarm could be raised for the changes. These workable and sustainable strategies would stop the slaughter of endangered wildlife in the Dja-Boumba mining area for the conservation of wildlife for future generation.

1.2. METHODS OF DATA COLLECTION

Field surveys: The community based ecological monitoring team does regular visits of hunting camps, snare lines and hunting footpaths to register the number of animals killed by each hunter.

In the villages: The team interviews hunters on the species of animals hunted, the quantity consumed and traded. Daily bushmeat consumption was assessed through the interviews of members of households. Household bushmeat consumption was also observed directly by the team members.

Market survey of vendors: The team monitored end markets, took account of the quantity of bushmeat and the wildlife species brought into the markets. Occasionally, the team positioned themselves at the villages' squares to collect data on bushmeat harvest and trade.

The team also collected data through informal discussions. The former method was employed while sharing a glass of palm wine and discussions revolved around questions on species of wildlife hunted, consumed and traded by the hunters. Additional data were collected from the Ministry of forest and fauna (MINFOF) control post.

A brief meeting after the daily data collection permitted the team to verify and triangulate information gathered from various sources.

The participatory community based ecological monitoring data collection in the project area has been facilitated by the hunters showing their daily returns to the monitoring team. Awareness campaign activities (sensitisation, meetings and dramas) have dispelled fears of reprisals from the local communities and the immigrants and enhance confident towards sustainable management of wildlife resources.

RESULTS OF SECTION ONE

Ecological monitoring of bushmeat harvest, consumption and trade

Table 1: Monthly data collected consume on the wildlife species hunted, and traded

Scientific name	Common name	Month	Quantity harvested	Quantity consumed	Quantity sold	Hunting days	Status IUCN, CITES	Cameroon legislation
Cephalophus leucogaster	Gabon duiker	January	50	22	28	15	**LRnt**	**B**
		February	77	27	50	25		
		March	76	40	37	18		
		April	16	9	9	9		
		May	23	4	12	6		
Total			**242**	**102**	**140**	**72**		
Cephalophus callipygus	Peter's duiker	January	2	0	2	1	**LRnt**	**B**
		February	6	0	6	3		
Total			**8**	**0**	**8**	**4**		
Atherurus africana	Bush-tailed porcupine	January	42	15	27	15	**DD**	**C**
		February	67	18	49	16		
		March	51	22	29	14		
		April	8	3	6	4		
Total			**168**	**58**	**111**	**46**		
Cephalophus nigrifons	Black fronted duiker	January	18	7	11	9	**LRnt**	**B**
		February	16	5	11	7		
		March	24	11	13	10		
		April	14	5	8	7		
		May	1	1	1	1		
Total			**73**	**29**	**44**	**44**		
Scientific name	**Common name**	**Month**	**Quantity harvested**	**Quantity consumed**	**Quantity sold**	**Hunting days**	**Status IUCN, CITES**	**Cameroon legislation**
Manis teradacyla	Long- tailed pangolin	January	17	9	8	7	**DD**	**C**
		March	23	11	12	10		
		April	3	1	2	3		
Total			**44**	**21**	**22**	**19**		
Smutsia gigantea	*Gaint pangoiln*	March	6	3	3	4	**II**	**A**
Total			**6**	**3**	**3**	**4**		
Cricetomys eminni	*Emin's giant rat*	January	50	41	8	22	**DD**	
		February	4	1	3	1		
		March	22	17	5	11		
		April	4	1	2	3		

		May	3	3	0	2		
Total			**83**	**64**	**19**	**38**		
Pan troglodytes	Chimpanzee	January	1	0	1	1	**EN, I**	
		March	6	4	2	3		**A**
Total			**7**	**4**	**3**	**4**		
Cercopithecus cephus	Moustached monkey	January	20	10	1O	9		**C**
		February	4	3	1	3		
		March	11	6	25	6		
		April	23	11	13	9		
Total			**58**	**30**	**28**	**27**		
Gorilla gorilla	Gorilla	January	1	1	0	1	**EN, I**	**A**
		March	6	4	2	3		
Total			**7**	**5**	**2**	**4**		
Cercopithecus nictitans	Spot nose monkey	January	51	19	35	13	**II**	**C**
		February	49	14	35	13		
		March	38	17	22	10		
		April	22	10	11	9		
		May	4	2	2	2		
Total			**164**	**62**	**102**	**46**		
Neotragus batesi	Bate's Pygmy antilope	January	10	10	0	6	DD	C
		March	1	**0**	1	1		
		April	1	0	1	1		
Total			**12**	**10**	**2**	**8**		C
Cercocebus agilis	Crested mangabey	January	37	14	23	10	K	
		February	23	9	14	7		
		March	16	6	10	4		
Scientific name	**Common name**	**Month**	**Quantity harvested**	**Quantity consumed**	**Quantity sold**	**Hunting days**	**Status IUCN, CITES**	**Cameroon legislation**
		April	23	8	15	11		
		May	4	2	2	3		
Total			**103**	**39**	**64**	**35**		
Cercocebus albigena	Grey cheeked mangabey	January	18	9	9	7	**II**	
		February	13	9	4	6		
Total			**31**	**18**	**13**	**13**		
Profelus aurata	Golden cat	January	15	7	8	7	II	A
		February	18	7	11	9		
		March	1	0	1	1		
		May	1	1	0	1		
Total			**35**	**15**	**20**	**18**		
Viverra civetta	African civet	January	4	4	0	3	DD	

		February	1	0	1	1		
		April	1	1	0	1		
Total			**6**	**5**	**1**	**5**		A
Dendrohydrax arboreus	tree hyrax	January	7	6	1	6	**II**	
		February	9	9	0	6		
		March	1	1	0	1		
		April	3	3	0	2		B
Total			**20**	**19**	**1**	**15**		
Potamochoerus porcus	Red river hog	January	4	0	4	4	DD	
		February	13	6	7	7		
		March	27	14	13	10		
		April	8	3	5	5		
		May	1	1	0	1		A
Total			**53**	**24**	**29**	**25**		
Hyemoschus aquaticus	Water chevrotain	February	33	16	17	10	**LRnt**	
Total			**33**	**16**	**17**	10		
Phataginus tricuspis	Tree pangolin	January	19	5	15	5		
		February	19	7	12	7		
		March	7	1	6	3		
		May	7	2	5	3		
Total			**52**	**15**	**37**	**19**		
Demochely sp.	Land turtle	January	3	2	0	1	DD	
		March	1	1	0	1		
		April	2	2	1	3		
		May	3	1	2	1		
Total			**9**	**6**	**3**	**5**		
Scientific name	**Common name**	**Month**	**Quantity harvested**	**Quantity consumed**	**Quantity sold**	**Hunting days**	**Status IUCN, CITES**	**Cameroon Legislation**
Genetta servalina	Servaline genet	January	1	0	1	1	DD	
		February	2	1	1	2		
		March	1	1	0	1		
		April	1	1	0	1		
		May	1	1	0	1		
Total			**6**	**4**	**2**	**6**		
Herpestes naso	Long - nosed mongoose	January	1	1	0	1	DD	
		February	2	2	0	2		
		March	1	1	0	1		
		April	2	2	O	2		B
Total			**6**	**6**	**0**	**6**		
Periodicticus potto	Potto	January	7	7	0	4		

		February	6	6	0	3		
		April	1	1	0	1		
Total			**14**	**14**	**0**	**8**		
Tragelaphus spekii	Sitatunga	January	1	0	1	1	LRnt	
		March	1	0	1	1		
		April	3	1	3	1		
		May	1	0	1	1		
Total			**6**	**1**	**34**	**5**		
Veranus nilotinus	Varan	January	1	1	**0**	1	DD	C
		March	2	2	**0**	2		
		May	1	0	1	1		
Total			**4**	**3**	**1**	**4**		
Naja melanoleuca	Forest cobra	May	1	1	0	1	DD	
Total			**1**	**1**		**1**		
Cephalophus monticola	Blue duiker	January	14	3	12	2	DD	
		February	11	2	8	2		
Total			**25**	**5**	**20**	**4**		
Cephalophus sylvicultor	Yellow-blacked duiker	January	1	1	0	1	LRnt	
Total			**1**	**1**	**0**	**1**		
Orteolaemus tetraspis	Crocodile	January	2	0	2	1		
Total			**2**	**0**	**2**	**1**		
Bitis gabonica	Gabon viper	April	1	1	0	1		
Total			**1**	**1**	**0**	**1**		

Table. 2. Monthly analysis of wildlife species harvested, consumed and traded in the project area

Month	Quantity of wildlife harvested	Average number of hunting days	Percentage of wildlife harvested	Quantity of bushmeat consumed	Percentage of bushmeat consumed	Quantity of bushmeat traded	Percentage of bushmeat traded
January	396	5.0	32.0	191	34.0	205	30.1
February	342	4.2	28.0	128	23.0	214	31.4
March	315	3.1	25.0	158	28.3	157	23.1
April	136	2.4	11.0	63	11.3	73	10.7
May	51	1.3	4.0	19	3.4	32	4.7
Total	**1240**	**16.0**	**100**	**559**	**100**	**681**	**100**

Source: Field data, 2013

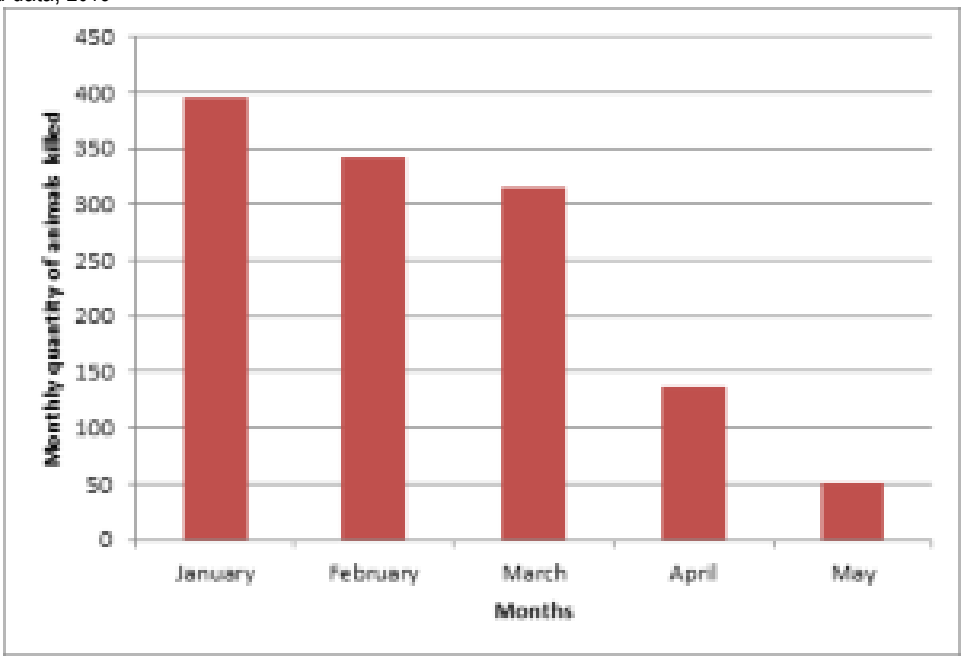

Fig.1. Monthly quantity of wildlife species killed in the project area

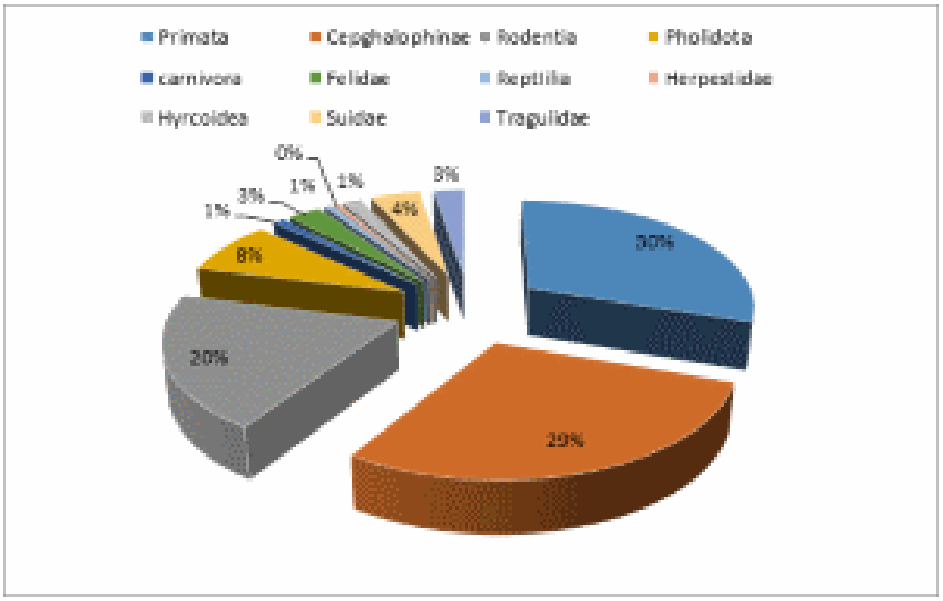

Fig.2. Percentage of wildlife species killed in the project area

Interpretation of the results of section one

The participatory community based ecological monitoring data on bushmeat harvest, consumption and trade was collected in the project area from January to May, 2013. These empirical indicators are needed to:

- Measure trend in wildlife threats mostly rare and endangered species,
- Acquire knowledge on the level of evolution of bushmeat use and trade,

- Create data bank for the sustainable management of wildlife resources and
- Determine the factors that influence bushmeat harvest, consumption and trade in the Dja-Boumba mining area.

Within the first half of the year (January to May) a total of 1240 wildlife were killed in the project area consisting of 31 wildlife species. More bushmeat was traded (55%) as major source of income as compared to the quantity consumed (45%) by households in the project area (table 2). Monthly comparisons of the quantity of wildlife killed showed that there were a significant number of mammals killed in the months of January, February and March.

Table 1 showed that primates including gorillas and chimpanzees (384), duikers (367) and rodents (251) were the most commonly hunted groups of animals in the project area, with duikers both numerically and in terms of biomass being the most important bushmeat species group. Harvest rates estimated from the field survey data (Table 2) showed that 78 animals were killed in an average of 16 effective hunting days. The data suggest that hunting rates is 5-10 times higher than the estimated human population size of the project area. The results showed that the local communities still hunt and eat gorillas and chimpanzees which are endangered taxa and deemed to be in immediate danger of extinction in the near future.

2.0. SECTION TWO

ECOLOGICAL MONITORING OF LIVE ANIMALS IN THE PROJECT AREA

2. 1. Determination of the forest carrying capacity

The local communities in and around the Dja-Boumba forest obtain their animal protein by harvesting wildlife species, there is a limit to the number of people that this forest can support. That limit is the carrying capacity of the forest for the local communities. Determining the sustainable level of game harvesting requires basic knowledge of the quantitative evolution of wildlife resources in the forest and the use by the local communities. The local communities should be able to have basic knowledge on the density or relative abundance (IKA) of wildlife species present in the Dja-Boumba forest.

In order to limit the losses in fauna diversity and encourage sustainable management of wildlife resources, the local communities have to be highly adaptable and flexible. These local villagers must been able to switch to the alternative sources of nutrients and income. The carrying capacity of the forest was determined using the follow methods:

2.2. METHODS OF DATA COLLECTION

2.2.1. Reconnaissance walk

The community based ecological monitoring team used existing footpaths established for hunting, collection of non-timber forest products (NTFP) and swidden agriculture to collect data on wildlife present. On the way to their retain activities the team scanned the forest for animal signs, listened to vegetation movement and vocalisation of animals. Additional information on wildlife species were also collected at night by the ecological monitoring team members who do extended-stay farming in the forest. The individuals usually travel for more than three hours and established permanent huts in the forest for their activities.

The following information was recorded upon detecting an animal or sign:

- Time of encounter, wildlife species, animal activities (eating, movement, playing, resting), number of males, females, weaned individuals and babies, the time the animal spent in the position the observer saw it and animal signs observed.
- All data were recorded on simple designed sheets for direct and indirect observations.

2.2.2. Data analysis

Key issues to be addressed by the community based ecological monitoring team are:

- The data collected must be used to generate defensible estimates indices of abundance or densities of the wildlife in the forest;
- Information must be collected in such a way that builds local skills on sustainable management of wildlife resources;
- The data collected must be easily analysed and interpreted by the community;
- Information from the ecological monitoring must generate results frequently in order to maintain a community interest in the work;

2.2.3. Relative abundance of wildlife species

The carrying capacity of the forest was collected using Indices of Kilometres of Abundance (IKA) of various wildlife species signs observed. In order to estimate indices of kilometres of abundance (IKA), direct and indirect observations (pellets, footprints, vocalisation, feeding, and movement signs) were expressed as the number of encountered with a specie or sign per kilometre walked. The rate of encountered in km (IKA) of different groups of information was calculated as: IKA = ND, where N is the total number of observations recorded along the reconnaissance paths and D is the distance covered in kilometres.

RESULTS OF SECTION TWO.

Ecological monitoring of live animals in the project area

Table 3: Small, medium and large-sized mammals observed in the project area

Wildlife species	Number of males	Number of females	Number of weaned inds.	Number of babies	Indices of presence					
					N	P	VO	FT	FP	T
Cercopithus nictitans	23	56	28	17			33			
Cercopithus cephus	20	60	35	13			39			
Cercocebus agilis	25	48	25	8			33			
Gorilla gorilla					1	2		7	1	11
Pan troglodytes					4		1	6	1	
Smutsia gigantea										1
Potamochoerus porcus	3	6	5	17						
Tragelaphus spekii									3	
Cephalophus sylicultor								1		
Cephalophus nigrifons						1				
Cephalophus leucogaster	3	3								
Neotragus batesi									2	
Herpestes naso	2	6	2	1						
Veranus nilotinus	2									
Dendrohydrax arboreus							1			
Cricetomys eminni						5				3
Psittacus erithacus	11	13								

Indices of animal presence: N = Nests, P = Pellets, VO = Vocalisation, FT = Feeding trails, FP = Footprint, T=Traces

Inds: Individuals.

2.2.4. Status of wildlife species

Seventeen small, medium and large-sized mammals were recorded in the project area, two species were listed in the 2012 IUCN Red Data Book and four species listed in the IUCN Red List of threatened species. Three species listed in class A and two in class B of the Cameroon forest and wildlife legislation (MINFOF). Ten small, medium and large-sized mammals were defined as taxa that are *suspected* but not definitely known to belong to any assigned category indicating the degree of threats, because of lack of information.

2.2.5. Gorillas

A gorilla nest and other indices of animal presence as faeces, footprints, feeding signs and tracks were recorded during the reconnaissance surveys. With an estimated indices of kilometres of abundance of 2.8 signs of individuals/km.

2.2.6. Chimpanzees

A total of 4 chimpanzees nests were recorded in the project area, with other indices of animal presence as vocalisation, foot prints and feeding signs. These indicators gave an IKA of 2.4 signs of individuals/km.

2.2.7. Diurnal primates

Three species of arboreal primates were observed in the study area; *Cercopithecus nictitans, Cercopithecus cephus* and *Cercocebus agilis.* Of the three groups of arboreal primates observed within five months, 124(31%) were the greater spot nosed monkeys (*Cercopithecus nictitans)*, 128(32%) were *Cercopithecus cephus* and 106(23.6%) were *Cercocebus agilis.*

Table 4: IKA of Diurnal primates recorded in the project area

Species	IKA (Number of group/km
Cercopithecus nictitans	2.1
Cercopithecus cephus	3.6
Cercocebus agilis	5.0

2.2.8. Ungulates

Six species of ungulates were recorded in the study area; *Cephalophus sylicultor, Cephalophus nigrifons, Cephalophus leucogaster, Tragelaphus spekii, Potamochoerus porcus* and *Neotragus batesi.* The indices of kilometres of abundance (IKA) for the red duikers as a group were estimated at 1.1 individuals/km.

One species of wild pig, the red river hog (*Potamochoerus porus)* was registered during the survey period. Results recorded gave indices of kilometres of abundance of 3.9 individuals/km. Footprints of sitatunga (*Tragelaphus spekii)* were observed in three occasions with an indices of abundance of 0.4 individuals/km. The footprints of Neotragus batesi were recorded during the survey with very low observations to estimate IKA per kilometre walked.

2.2.9. Other small, medium and large-sized mammals recorded in the project area

N=1 track of the giant pangolin (*Smutsia gigantea) was recorded on the reconnaissance paths. Small mammals; Herpestes naso, Veranus nilotinus, Dendrohydrax arboreus, Cricetomys eminni and avifauna specie (Psittacus erithacus) were observed in the project area.* Indices of animals' presence observed included direct observation, vocalisation, pellets and tracks.

3. Discussions

3.1. Ecological monitoring of bushmeat harvest, consumption and trade

During the five months period from January to May 2013, local hunters in the project area captured 1240 small, medium and large-sized mammals belonging to 31 species. Amongst

the 1240 wildlife captured 30% were *Primata,* 29% *Cephalophinae*, 20% *Rodentia*, 8% *Pholidota*, 4% *Suidae* and 3% *Tragulidae*. This results tally with the work of Ngandjui, (1997) who asserted that in the northern part of Dja reserve 69 medium and large-sized mammals were captured during a 6 week period consisting of 16 species including 27% *Cephalophus*, 32% Primata, 25% *Rodentia*, 1% *Pholidota* and 1% *Carnivora*. The biomass regulation factor does not influence hunting in the project area, because immigrant hunters use every innovation at their disposal to bring down their prey irrespective of the biomass. During this period the level of unsustainable hunting is exacerbated by the military that does hunting and also supplies the villagers with arms, ammunitions, clothes and shoes to enhance ample supply of cheap proteins to the armies. The establishment of military camps near the mining area by the Cameroon Government for security reasons has increased the volume of harvest and trade in bushmeat in the project area. The local communities commonly complain of these abuses, but are often unwilling to threaten the social and economic ties that exist with them.

More bushmeat were traded (n=681) than consumed (n=559). This showed the preference for bushmeat is not related or linked to habits, taste or cultural attachment but to hunters' supplier's need for cash.

Endangered and protected species are still hunted, consumed and traded in the project area (table 1). Ape are mostly been killed for rituals, medicine and for trophies purposes. The increased slaughtering of gorillas and chimpanzees during this period could be linked to the political atmosphere of Cameroon. The local communities killed ape to honour political elites during their home coming because it is considered a delicacy, and locally called **"La viande du sous-préfet"**(meat for the sub divisional officer). IRSNB, (2007) reported that gorillas and chimpanzees have been killed for their heads, hands, and feet, which were sold to collectors.

Since 2011 the project's major environmental education component focuses on awareness raising, sensitisation of the local communities to switch to alternative sources of nutrients and income, in order to reduce pressure on wildlife species. This has resulted in the increased reproduction rates(gestation, breeding season, number of young, age of sexual maturation) in wildlife species in and around the forest and the native wildlife has returned to the edges of the villages. The local communities noted that arboreal monkeys, ape and duikers were habituated to the courteous behaviour of humans towards them and they thus do not fear attack when hearing or see mining vehicles or humans. The militaries and local immigrants job seekers have profited from this increased in the relative abundance of wildlife species and eventually result in their being killed. This is ascertained why 78 wildlife species have been captured within two weeks of effective hunting days.

Pangolin species (tree pangolin, long- tailed pangolin and the giant pangolin) are now hunted for their meat and for trophies purposes to serve the rising demand among urban women, where it is considered a fashion instrument for nails decoration in urban ladies. This explained why 100 pangolins were killed during a five month period with an average of 2 pangolins per day.

3.2. Ecological monitoring of live animals in the project area

In this study the IKA of gorilla was calculated at 2.8 signs of individuals/km. Considering the fact that each gorilla in a group, with the exception of infants which sleep with their mothers, makes a nest each night in which to sleep. IKA were calculated for gorilla activity signs (feeding trials, tracks and nests). In 2004 (Ngandjui and Makazi, 2004) gorilla IKA was calculated at 1.0 weaned gorilla/km as compared to 0.35 weaned gorilla/km in 2008 and 0.2 weaned gorilla/km in 2010. With increased awareness campaign activities amongst the target population, it seems that a certain level of human activities does not necessarily drive gorillas away, as mine workers admitted seeing groups of gorillas, nests, feeding signs and perceived their body odour during working hours.

Chimpanzee IKA was estimated at 2.4 signs of individuals/km as compared to 0.065 chimpanzee nest sites/km in 2004, 0.25 chimpanzee nest sites/km in 2008 and 0.03 chimpanzee nest sites/km in 2010. This study in comparism with different studies in the project area showed that the great ape have regained the Nkamouna forest in 2013.

Table. 5: Diurnal primates IKA in different studies in the project area

Species	IKA this study	IKA 2008	IKA 2010
Cercopithecus nictitans	2.1	0.68	2.2
Cercopithecus cephus	3.6	0.38	0.71
Cercocebus agilis	5.0	0.38	Un known
Lophocebus albigena	Un known	0.63	Un known

There is strong relationship between the level of awareness campaign activities and the frequency of primates' observations in the project area. This implies that sensitisation activity is highly related to the IKA of primates. There is insignificant variation in the relative abundance of *C. nictitans, C. cephus* and *C. agilis* within the various years of studies in the project.

Six species of ungulates were confirmed in the study area as compared to four species in 2010. The indices of abundance (IKA) for the red duikers as a group were estimated at 0.2 individuals/km. This value fall well below the findings from this study (1.1 individuals/km).

Indices of small mammals presence were frequency observed in the entire forest. These small mammals are the most frequently hunted animals in the study area, although not endangered but they must be harvested sustainably.

4. DEVELOPMENT OF MICRO-SCHEME ON THE ALTERNATIVE SOURCES OF NUTRIENTS AND INCOME

Training and capacity building workshops were organised from the 15th to the 17th of July, 2013 in the project area, to train the local communities on the alternative sources of nutrients and income.

4.1. Training and capacity building programs in the project area

4.1.1. Vegetables cultivation

The cluster level training and capacity building programs brought together hunters, common initiative groups, community based organisations, associations, Christian women groups, youths and the minority Baka pygmies. The participants established common understanding to the modern approaches of vegetables cultivation and modern beekeeping. For three days the delegate of agriculture and rural development for Lomie sub division, in collaboration with the project management committee did training and capacity building of the target communities on: soil treatment with nematicides, seeds planting, seedlings transplanting, indicators of infected vegetables plants, modern methods of spreading, modern agricultural techniques and the development of micro-scheme proposals (see photos of training programs). All the target communities acquired knowledge and gain information on vegetables cultivation techniques.

4.1.2. Dja-Boumba Hunters' Beekeeping initiative

The Dja-Boumba hunters' beekeeping initiative (apiculture) was launched as one of the objectives of the project to introduce beekeeping as an alternative to bushmeat hunting amongst the Baka pygmies and the Nzime ethnic groups. The hunters, youths and associations were trained in beekeeping techniques and were supplied with local equipment and technical support necessary to construct top-bar hives.

4.2. Mutual Agreed Terms (MAT) for micro-scheme beneficiaries

Participants were expected to develop micro-scheme proposals as associations, households, groups and individuals. At the end of the workshops the proposals of the participants were evaluated by the project management committee. 12 individuals, 5 households and 2 associations or common initiative groups were selected to apply for micro-scheme in the vegetables production and 10 groups were selected to construct top-bar hives. The aim was to encourage the target geographic group to switch to alternatives sources of nutrients and income in the project area. All those selected to established vegetables farms and beehives signed mutual agreed terms (MAT) with the project. The project management committee supplied those selected for vegetables

production with; nematicides, insecticides, watering cans, spreading cans, hand groves, nose caps, wheel barrows, rainboats and raincoats. In addition to the essential materials, the following vegetable seeds were donated to the beneficiaries: green beans, pepper, green pepper, tomatoes, garbage, okra, carrots, condiments and maize.

Essential materials as untreated woods for the top-bar hives construction were sourced locally to reduce cost and other construction materials (nails, zinc, sugar, sugar cane chaffs) were provided by the project.

The Dja-Boumba project management committee and the delegate of agriculture and rural development accompanied the beneficiaries to their project sites for the implementation of the various projects (see photo of coverage page).

The beneficiaries of the micro-credit scheme have participatorily agreed to organise weekly meetings in collaboration with the delegate of agriculture that will provide opportunities for socialising and sharing information. Such gatherings will promote the spread of novel behaviours and attitudes, such as the use of modern agricultural techniques, reveal levels of evolution in crops diversity, indicators of infections and basic knowledge in book keeping.

4.3. Lessons learned

- The project has achieved a milestone in one of its main objective by providing variable alternative sources of nutrients and income to the target communities, in order to reduce pressure on wildlife exploitation.
- The beneficiaries were in praised with the acquisition of the micro-scheme and pledged to refrain from unsustainable hunting and collaborate with the various partners of the project to achieve the objectives of the micro-scheme.
- The local people now share the responsibility for sound management of the wildlife resources they depend on by exercising the skills and the management capacity they have acquired from the project. The ecological monitoring team now possesses the skills and the community interest in monitoring trends in live animals and bushmeat harvest and trade in the project area.

5. CONCLUSIONS

The local communities, the stakeholders and other interest partners are now supporting conservation efforts in the Dja-Boumba mining area. Successful approaches to the project goal are comprehensive and include a variety of training, capacity building and awareness campaigns activities among the broad sector of the local communities.
The second phase of the alternative sources of nutrients and income (the rearing of domestic animals) will be implemented after the evaluation of the vegetables and apiculture programmes.

Arboreal monkeys, gorillas, chimpanzees, duikers and rodents now whoop the Dja-Boumba mining forest, as if to celebrate a promising relationship between villagers and the forest.

Awareness campaign activities amongst the militaries, local immigrants and bushmeat middle persons has to be reinforced to enable the local communities and the civil society to give value to wildlife resources and understand better the factors that stimulate changes.

6. REFERENCES

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7. ANNEXES I. CONSERVATION STATUS

The species identified as threatened by IUCN are assigned a category indicating the degree of threat as follows:

IUCN status

- EN = Threatened (Endangered); Taxa in danger of extinction and whose survival is unlikely if the casual factors continue to operate. This category indicates taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.
- VU = Threatened (Vulnerable); Taxa believed to move into "Endangered" category in the near future should the causal factors continue to operate.

This category includes taxa whose populations are decreasing because of over exploitation, extensive habitat destruction or other environmental disturbance; taxa with populations that have been seriously reduced and whose ultimate security has not yet been assured; and taxa with populations that are still abundant but are under threat from severe adverse factors throughout their range.

- LRnt («Lower risk, but near threatened ») = Species coming up very close to qualifying as threatened depending on conservation measures.
- LRcd (« Lower risk but conservation dependent ») = Lower risk conservation measures dependent, that is: sufficient evaluation of the documented species have proved that it cannot be classify in any of the above categories.

- R = Taxa with small world population that are not at present “Endangered” or vulnerable, but are not at risk. These taxa tend to be localized within restricted geographical areas or habitats, or are highly dispersed over more extensive range.
- I = Intermediate; Taxa known to be “Endangered” , “Vulnerable” or Rare but where there is not enough information to say which of the three categories is appropriate.
- DD («Data Deficient») = A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.
- NT = Not Threatened; Taxa that are not considered to be threatened at the present time.
- K = Insufficiently Known; Taxa that are suspected but not definitely known to belong to any of that above categories, because of lack of information.
- **Convention on International Trade in Endangered Species (CITES):** I, II OR III = Appendix I, II or III of CITES
- **Cameroon Legislation**; Law No. 0648 of 18 December 2006, Articles 2(1) and 3(1) laying down forestry and fauna regulations:

Class A = Rare or Endangered species with full protection.
Class B = Species where by hunting and export should be regulated or monitored.

ANNEX II. PHOTOS OF FIELD ACTIVITIES

Fig.3. One of top-bar hives positioned at the forest edge

Fig. 4. The project coordinator handling over materials to the micro-scheme beneficiaries

Fig. 5. Kids from the military camps selling bushmeat as a part-time holiday activity