Progress Report

Preliminary Results of Bushmeat Survey Part 1:

Sub-objective: To assess local knowledge, hunting techniques and use of wildlife by local communities.

TABLE OF CONTENTS

List of tables

List of figures

1. INTRODUCTION

Wild meat consumption in rural and urban areas of sub-Saharan Africa is perceived as a major threat to the conservation of many species because their population sizes can generate significant demand for bushmeat, thus causing a growing concern about the unsustainable level's consumption (Luiselli et al., 2020; Fa et al., 2003). In Central Africa alone, at least 177 species are exploited for wild meat, among which half may be threatened by overexploitation (Taylor et al., 2015), with mammals dominating the harvest with over 60% of the total offtake (Abernethy et al., 2013). Such a level of extraction of terrestrial wildlife for food significantly exceeds sustainable harvest rates; the economic value representing a short-term gain that will rapidly decline as wildlife populations are depleted (Coad et al., 2010). While most of the wild meat suppliers are from rural areas, the consumption of wild meat is highly appreciated by urban citizens who are willing to pay large amounts of money to get wild meat (Foerster et al., 2012; Wilkie et al., 2005).

Mbam et Djerem National Park (MDNP) in central Cameroon has the most diverse habitat types of the country and hosts an important wildlife population, which is experiencing diverse threats including poaching mainly for local consumption and trade, and habitat degradation. This situation is driving MDNP's wildlife to the edge of extinction, thus requiring well designed conservation plans and actions to ensure their long-term survival. As an objective of the Rufford funded project, a wild meat survey must be carried out in villages around Mbam et Djerem National Park (MDNP) in order to assess the level of knowledge of local communities about wildlife hunting, wild meat species consumed, frequency of consumption, methods used, and the level of awareness about the protection status of wildlife species present around MDNP. Such information will be used to design and disseminate conservation messages aimed at promoting a positive attitude of indigenous people towards wildlife species present in MDNP.

The aim of the mission thus was to collect data in 18 communities bordering the MDNP. This mission will help us identify gather data useful in making analysis that will assist in planning subsequent awareness raising campaign.

Purpose
The purpose of this study was:

To collect data on wild meat knowledge especially on consumption, trade, hunting as well as the drivers of such behavior and level of awareness about legal protection of wildlife in 18 communities bordering MDNP using *Kobocollect* application

1.1 Methodology

1.1.1. Study area

With an area of 416,512 ha, MDNP is situated between 5°30′ and 6°14′N, and 12°20′ and 13°15′E in central Cameroon. Its climate has two seasons of almost equal length: the rainy season from mid-April to mid-October and the dry season from mid-October to mid-April. The annual rainfall is 1900mm and the annual average temperature is 24°C. The flora is of a Sudano-Guinean type, lying between the dense forest of southern Cameroon and the wooded savannah of the Adamawa plateau, with numerous large gallery forests, tree and shrub savannahs, evergreen forests, giving at some place a type of forest-savanna mosaic with an area of primary lowland rainforest in the south of MDNP. The ecotone forest/savannah can be well

observed over few meters where the galleries forests are in contact with savannahs (Bobo & Weladji, 2011). The relief is almost flat, but there is an altitudinal drop from 930 m to 650 m from North to the South of MDNP. MDNP is bisected by a tributary of the Sanaga River known as Djerem river which flows from the North to the South and is fed by many permanent and intermittent rivers, and by the opening of upstream flood gates at the Mbakaou dam (Bobo & Weladji, 2011; MINFOF, 2007). The fauna consists of species from both savannah and forest ecosystems with about 60 mammals species amongst which are the African Elephant (*Loxodonta africana*), and 3 species of pangolins (MINFOF, 2007). Ethnic groups around the park include the *Tikar, Gbaya, Vouté, Baveuck,* and *Bororos* distributed within 75 villages around MDNP. The human population density and education level are low, and people largely depend on the exploitation of natural resources such as farming, fishing, gathering or hunting for their livelihood (MINFOF, 2007).

1.1.2. Field data collection approach

To assess respondents' knowledge about wild meat consumption, hunting and trade as well as their drivers in the study area, we used a semi-structured interview questionnaire (appendix 1) comprised of both open- and closed-ended questions (Newing, 2010). The questionnaire was made up of 49 questions broken down into six sections addressing: (i) respondents information (age, sex, occupation…), (ii) types of proteins consumed and species consumed over the last 14 days, (iii) wild meat hunting and techniques used, (iv) wild meat trade and actors involved, and finally, (v) trends in wild meat availability over the last 5 years as well as awareness about the protection of wildlife in MDNP. We used a random stratified sampling approach to select villages from the list obtained from the conservation services, making sure to include all the villages involved in the BIONAT Project. The random stratified sampling was made to ensure to ensure that our data would represent patterns of pangolin consumption in the study area (Mouafo et al., 2021).

The final questionnaire was incorporated into the *KoboCollect* smartphone application for data collection. We chose the *KoboCollect* approach for data collection because of its ease of use in the field, low cost associated to questionnaire incorporation and implementation, quality data obtained after the survey as *KoboCollect* permits to avoid errors that may occurs during manual data entry (Lakshminarasimhappa, 2022). However, due to the sensitive nature of the study and to minimize risks that might be perceived by some respondents suspecting interviewers to be recording the conversation with the smartphone, a number of paper questionnaires was printed and used in some case before their entry into *KoboCollect* by the interviewers. Before starting data collection, interviewers were trained on how to use *KoboCollect*. The meaning of each question was also explained to them and the minimum time required to fill a questionnaire estimated. They were also briefed on questionnaire survey techniques, with attention being given to how to formulate every question so as to get the best information from the respondent. Ten days before the beginning of the study, information letters were sent to chiefs of selected villages explaining the objectives of our study, but also to give them enough time to engage their respective communities in welcoming our teams. Two days before working in a village, phone calls were made to remind them about our coming. Once we arrived in the villages, we first of all approached the chiefs to inform them of our intentions, explained the objectives of the work again before asking permission for our activities. The chiefs of the villages then helped us in selecting a local guide among local people (Mouafo et al., 2021). The selected local guide who most of the time was the village's youth leader then helped us in selecting respondents he thought could give pertinent information pertaining to our study, but also act as translator when needed. We followed the chain-referral method (also called 'snowball sampling') which is useful for hidden populations as it was the case with persons involved in

wild meat consumption, trade and hunting (Mouafo et al., 2021; Newing, 2010). The first respondent was selected by the local guide while subsequent respondents were recruited by asking respondents to direct the team to people they thought could have good knowledge about wild meat at the end of each interview.

The survey was conducted in the selected villages from end of October to November 2022 by two teams of three persons, a local guide and two interviewers, with each team being made by a man and a woman. Each interview lasted between 15 and 25 minutes and was mainly conducted in French or in the local language (e.g., *Fufulde, Vute, Gbaya*) and translated back to French by the local guide. To ease identification of species being consumed or hunted in the study area, colour pictures of mammal species of the area was presented to each respondent as an entry question after collecting information about the demographics and the types of protein sources consumed. If the respondent recognized not to consume wild meat, specific questions on wild meat were not asked to him. Respondents were in their house, in restaurants, markets, clubs, traveling agencies or by road side, avoiding as much as possible to interview two persons at the same spot.

The research was approved by the ethical committee of the University of Douala and all required authorizations for field work were obtained from the Ministry of Forestry and Wildlife through the Conservator of MDNP.

1.2. Preliminary results

1.2.1. Demographics of the respondents

We interviewed a total of 579 persons in 17 villages (Table 1) within 2 regions (Adamaoua and Center), three divisions (Lékié, Mbam et Kim and Djerem), and four sub-divisions (Obala, Ntui, Yoko and Tibati).

Table 1: Number of respondents interviewed and their respective percentages according to the surveyed divisions.

Villages/cities	Number of respondents	Percentage (%)
Obala	98	15.03
Yoko	69	10.58
Tibati	66	10.12
Ntui	62	9.51
Nguila Babouté	45	6.9
Doumé	41	6.29
Matsari	35	5.37
Ngouetou	28	4.29
Mangai	25	3.83
Megang	23	3.53
Mba'am	22	3.37
Mbitom-Conseiller	21	3.22
Makouri	21	3.22
Ngoum	20	3.07
Sengbé	20	3.07
Gongontoua	19	2.91

Guere	18	2.76
Léna	17	2.61
Total	**652**	**100**

We interviewed both male and female respondents, with male respondents representing 62.57% (N=408), and female just 37.43% (N=244), with a large majority of respondents being married (64.26%, N=419). Interviewees ranged from 18 to 83 years old (mean= 36.75, median= 33). The dominant ethnic group was *Vute* with 34.5% (N=225), followed by *Eton (*16.41%; N=107). The most frequently recorded occupation was farming (38.8%, N=253), followed by job from informal sector (30.82%, N=201). Secondary school level of education or higher was the most common level attained (60.12%, N=392), with the major religion being Christians (75.61%, N=493).

1.2.2. Types of proteins and wild meat species consumed and frequency of consumption.
When asked the types of proteins they mostly consume, a large majority claimed to consume all the types available, including fish, domestic meat and wild meat (83.74%, N=546). Figure 1 shows the percentage of respondents in relation to the types of protein sources they claimed to consume more often.

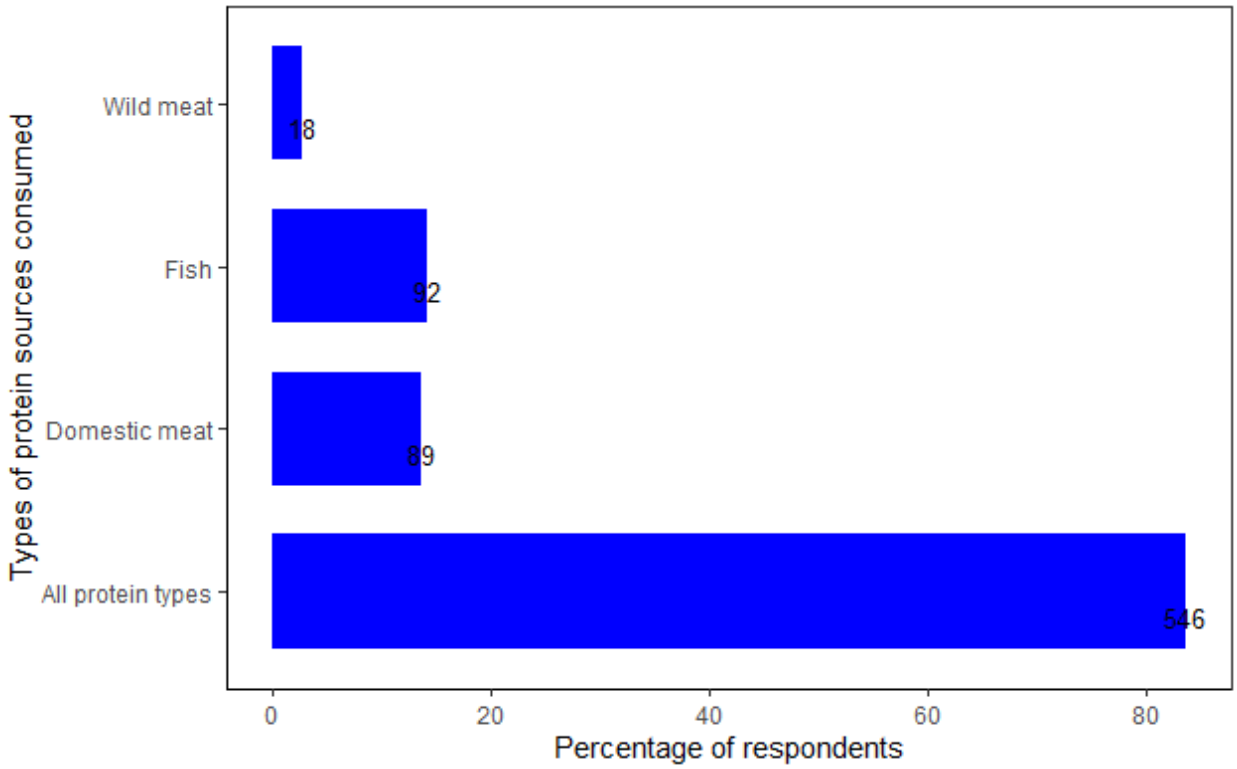

Figure 1: Percentage of respondents in relation with the type of proteins sources mostly consumed in our surveyed villages

1.2.3. Frequency of wild meat species consumption and number wild meat consumption days over the last two weeks
When asked about the frequency of wild meat consumption, most of the respondents claimed to consume it at least once per week (64.64%, N=362), followed by those who recognized to do so at least once each month (10.17%, N=57). Table 2 shows the percentage of respondents in relation with the frequency of wild meat consumption.

Table 2: Percentage of respondents in relation with their frequencies of wild meat consumption

Frequency of consumption	Number of respondents	Percentage
At least once per week	362	64.64
Once each month	57	10.17
Once or less per year	52	9.28
Two or three times per month	47	8.39
Once each quarter	31	5.53
Once each semester	11	1.99
Total	**560**	**100**

When asked about the number of time wild meat has been eaten in their household over the last 14 days, the mean number of times was 3.87 (min=0, median= 2; max= 14).

1.2.4. Wild meat species consumed.

Among wild meat species consumed over the last 14 days, the top 3 of mostly consumed were made of black-fronted duiker (27%, N=176), porcupine (20.09%, N=131) and blue duiker (19.78%, N=129). A large majority however recognized not to have consumed wild meat species over the last 14 days (21.62%, N=141). Figure 2 shows the percentage of respondents in relation with species that have been consumed over the last 14 days.

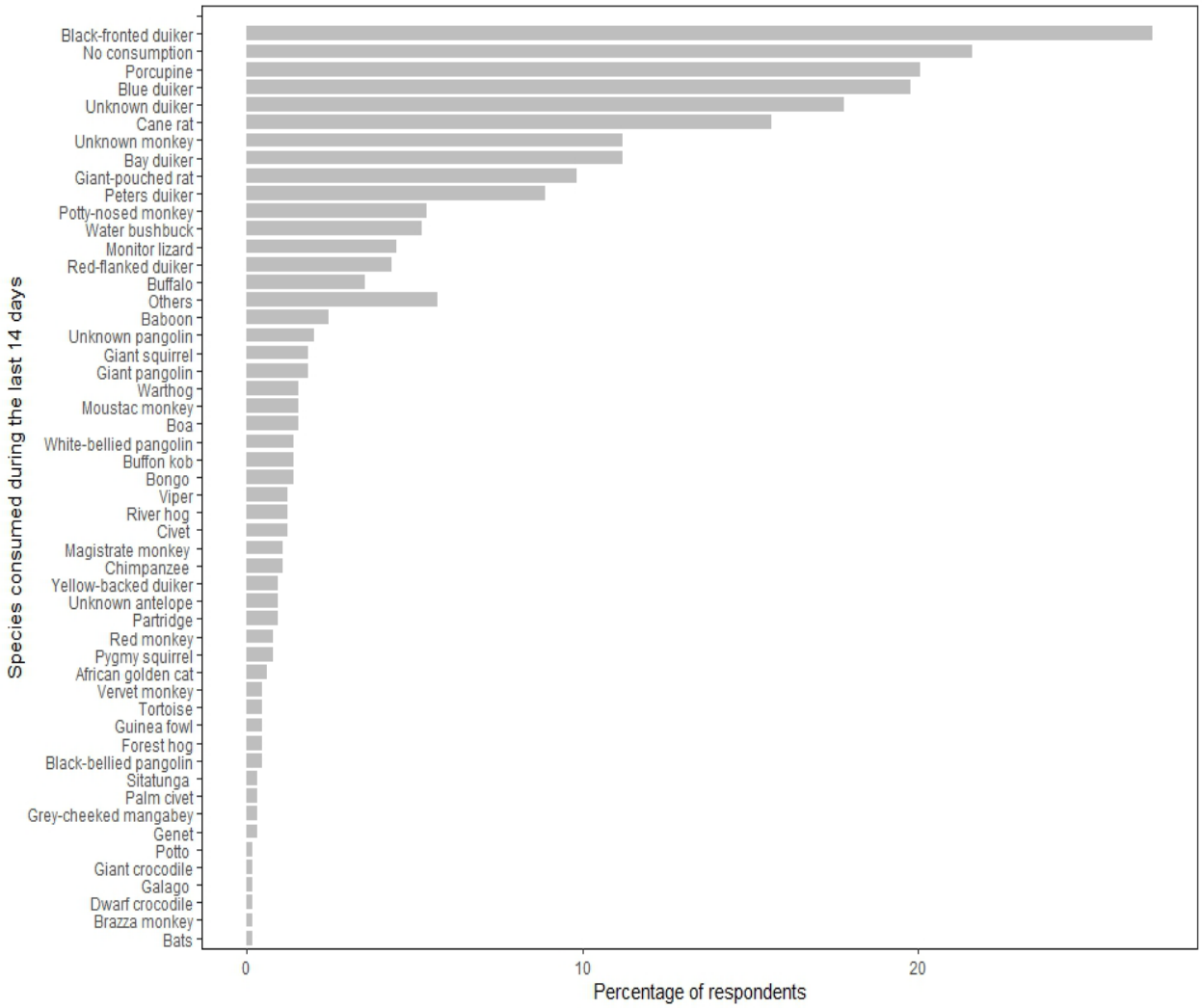

Figure 2: Percentage of respondents recognizing to have consumed particular species over the last fourteen days.

1.3. Wild meat hunting and trade

1.3.1. Wild meat trade

A large proportion of respondents recognized to buy wild meat (78.37%, N=442), wild meat being purchased two or three times per week (39.48%, N=152, Figure 3A), and the main reason for wild meat purchase being for consumption (94.8%, N=419; Figure 3B).

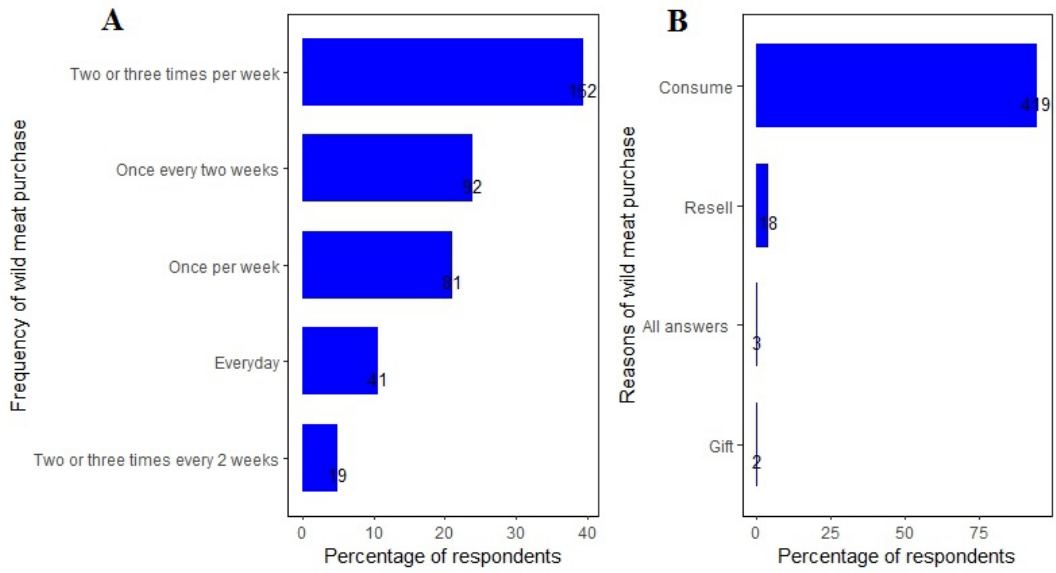

Figure 3: Percentages of respondents in relation with A) frequency of buying, B) reasons of purchase

The major place of wild meat supply as reported by respondents were as follow: through a hunter (46.6%, N=261), in the market (42.86%, N=240), self-hunted (25.36%, N=142), in a restaurant (22.14%, N=124) or through other means (5.17%, N=29) such as gifts, or along roadside during a trip.

Figure 4: Piles of wild meat being sold in Yoko.

1.3.2. Wild meat hunting

When asked if they set traps to protect their farms or to get wild meat, a minority of respondents claimed to be doing that (30.67%, N=200), the mean number of persons carrying out such activity being 1.75 (min=1; median=1; max=10). Species mostly recorded as being caught in the set traps over the last 14 days were porcupine (9.7%, N=65), cane rat (9.2%, N=60) and the black-fronted duiker (7.06%, N=61), representing the top three most caught species. Some respondents reported no catch over the last 14 days from their set traps (9.35%, N=61). Figure 4 shows species that were reported as being caught by set traps over the last 14 days in the surveyed villages.

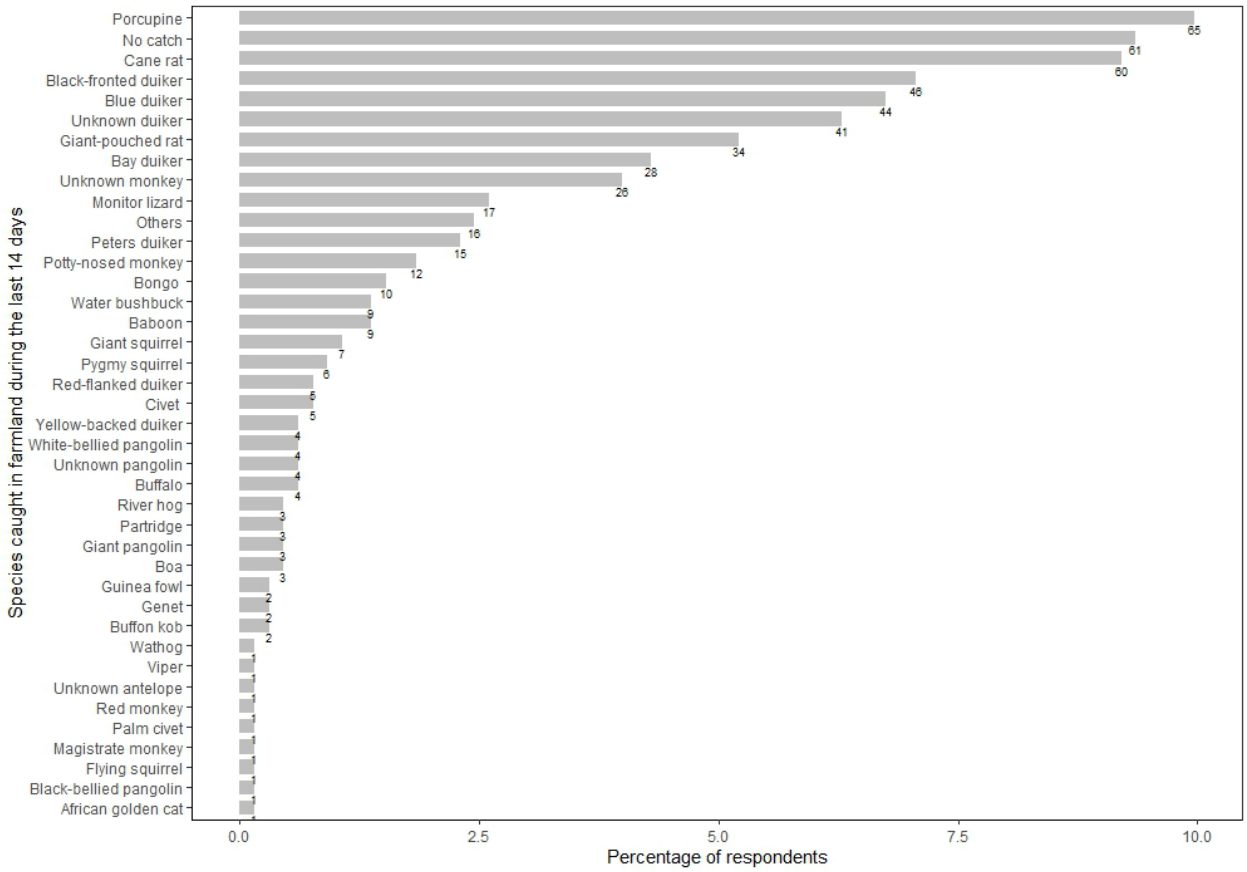

Figure 5: Percentage of respondents in relation with the species caught over the last 14 days

Snare traps were recognized by respondents to be the most used trap (70.76%, N=138), while guns represented just 16.41% (N=32) of hunting methods commonly used.

1.4. Wild meat availability, trafficking and awareness about the legal protection status of wildlife in Cameroon

1.4.1. Wild meat availability and trafficking

Most of the respondents recognized that compared to 5 years ago, it was more difficult to get wild meat (71.49%, N=464). Both village inhabitants (32.98%, N=215) and outsiders (35.12%, N=229) were reported by respondents to be involved in buying wild meat to resell in urban cities. This was reported to be done weekly by both village inhabitants (34.57%, N=74) and outsiders (36.84%, N=84), the most reported urban city to which wild meat is sold being Yaoundé (50.38%, N=130).

1.4.2. Awareness about the legal protection status of wildlife in Cameroon

When asked about their awareness about the legal protection status of wildlife in Cameroon, most of the respondents claimed to be aware of that (87.73%, N=572), the major reported reason for wildlife species being protected was that their populations have reduced (38.19%, N=249). Most of the respondents recognized to have been informed about the laws protecting species (79.45%, N=518), the information being obtained through rangers (49.85%, N=325), or during workshops organised in their villages (31.13%, N=203).

2. DISCUSSION

The purpose of this field survey was to carry out a wild meat survey in 18 villages around Mbam et Djerem National Park to have knowledge about wild meat consumption, trade, hunting as well as the drivers of such behaviour and level of awareness about legal protection status of wildlife in 18 communities bordering MDNP.

Preliminary results showed that a large majority of respondents prefer to consume major types of proteins available in their environment (fish, domestic meat and wild meat), the most consumed wildlife species over the last 14 days being the black-fronted duiker, porcupine and blue duiker. This might be explained by the availability of these species in the market or their easy capture by affordable trapping techniques such as snare traps and traditional guns. Most the respondents claimed to buy wild meat two or three times per week, the main reason being for consumption. This might be due to the availability and affordability of wild meat in our study area, which is mostly rural, local communities depending on hunting to fulfil their daily needs or setting traps to protect their farms. The local consumption reported by most of the respondents and the number of times wild meat was consumed over the last 14 days might be explained lack of alternatives to wild meat (beef, pork, chicken…), which most of the time are more expensive in rural areas than in urban areas.

Hunting was reported by a large majority of respondents be done to protect farmlands or to get wild meat, the most reported hunting technique being snare traps. This is mainly due to the fact that wildlife usually raid crops in farmlands, requiring intervention such as setting traps or guarding farmlands to avoid attacks. This is mainly done with snare traps which are the most used types of hunting techniques, due to their availability and affordability as well as their ease to set, not requiring a lot of experience as it is the case with guns. The major species caught in traps set around farmlands were porcupine, cane rat and black-fronted duiker. These species are those commonly found in farmlands or around human settlements, and are primarily those reported as being involved in crop raiding.

Wild meat was reported to be less available compared to 5 years ago, a situation explained by the overexploitation which has recently passed from hunting for subsistence to commercial hunting, fuelled by demand from urban cities such as Yaoundé or Ntui. This was reported to be done by both outsiders and village inhabitants weekly. This might be explained by the fact that wild meat sellers will place orders to focal points in villages. The focal points will then gather the wild meat and once per week, those sellers will go back to village and collect their orders. Also, the recent construction of a national road near the park to Yaoundé and Tibati might have ease the transportation of wild meat, thus explaining why these cities have been reported as major town receiving wild meat from surveyed villages.

There is still hope as most of the respondents were aware of the legal protection status of wildlife in Cameroon, especially in rural areas or villages around MDNP, a situation that is

explained by the sensitization campaigns that have been carried out by ABOYERD, the conservation services and other NGOs. Despite this knowledge about the legal protection status of wildlife, wild meat continue to be hunted and consumed by local communities, thus showing the emergency to undertake actions aiming to reduce hunting and consumption of wild meat.
Despite good results yielded during this study, some difficulties were encountered during fieldwork:

- The reluctance of some respondents to participate to the study, considering interviewers as MINFOF agents or spy of the wildlife services;
- Bad state of road leading to some villages (Megang, Makouri and Guéré);
- Language barrier in some circumstances with respondents unable to speak French nor English.
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3. CONCLUSION

Field survey permitted us to gather information that analyses will permit us to better understand the local knowledge of wild meat consumption in villages around Mbam et Djerem National Park in order to better plan our awareness raising campaigns. Preliminary results permitted us to notice that Black-fronted duiker, porcupine, cane rat and blue duiker are the consumed and hunted wild meat species around MDNP, a large majority of respondents recognizing to have consumed or bought wild meat at least once every week, the main reason being for household or individual consumption. Wild meat trafficking was reported as being undertaken by both village inhabitants and outsiders, major cities were the wild meat is sent being Yaoundé and Ntui. It was interesting to find from preliminary results that a large proportion of respondents were aware of the legal protection status of wildlife, information being learnt from rangers. However there is some concerns about this results since wild meat exploitation is still ongoing despite this awareness on the legislation, thus requiring that appropriate actions are undertaken to curb this tendency. In depth analysis of the data will permit us to better understand the drivers of the consumption, trade and hunting.

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5. APPENDICES

Smoked carcasses of an unknown monkey and duiker being cleaned to be cooked in a restaurant in Ntui.

Leg of a sitatunga being sold along roadside near Yoko (left), and fresh carcass of a Peter's duiker in one of the surveyed villages (right).

Other activities
Sub-objective: to quantify the level of offtake (with a focus on pangolins) and harvest rates, fate of carcasses (consumed and/or sold), and species-specific hunting techniques used by local communities to guide the development of a sustainable use plan for the site.

Wild meat survey part 2 training of participants and launching.
Meetings were organized in 4 villages: Ngoum, Mégang, Léna, Mbitom-conseiller in order to select participants to the bushmeat study. Each meeting was organized early in the morning, or late in the evening to be sure to have many participants. Globally, 88 persons of both sexes attended the meetings organized in the villages, with males representing 59.09% (N= 52, Table 1).

Table 3: Number of participants of each sex in each village who attended the meetings organized during the field mission.

Villages	Women	Men	Total
Ngoum	6	13	19
Léna	9	21	30
Mbitom-conseiller	5	7	12
Mégang	16	11	27
Total	**36**	**52**	**88**

During the meetings, the purpose of the study was explained to the participants as well as the conditions for being part of the study, and various advantages linked to taking part to the survey. Each meeting ended up by selecting volunteers in each village. Globally, we selected 54 volunteers in 4 villages willing to take part to the survey.

Family picture after a meeting in Léna village.

Two weeks after the participants were selected, a training was organised in each village to train the volunteers on how to use the balance scales to weigh their daily bushmeat consumption, but also how to fill the prepared datasheet to report. The meetings lasted between 4 and 6 hours, and major participants were women.

Family picture of the training in Ngoum.

The meeting started by explaining the purpose of the study once more. After the introductory speech, we then divided participants in groups of 3 persons to fill a sample prepared datasheet, but also to learn how to use a balance scale. At the end of each meeting, each participant was allowed to practice what was learnt during the training and if error occurred, they were immediately corrected.

PI showing a volunteer how to use a balance scale.

At the end of each meeting a balance scale and a pre-prepared datasheet was given to each participant to effectively start collecting data.

Many other activities were carried out since the beginning of the project, among which the setup of the tree nursery in Ngoum village, with 3 thousands sapling in the nursery, three times

more than initially planned. This was due to additional funding we got from Mohamed bin Zayed Species Conservation Fund. Major species were those that were accepted locally, especially guava, soursop, cocoa, cashew nut, avocado, bush mango, but also ecological tree such as Pachi (*Pachi loba*), Iroko (*Milicia excelsa*)

Pictures of the nursery in Ngoum

At the occasion of the celebration of the Youth day in Cameroon, some activities were carried out during the Youth week among which sensitisation activities in schools, closing the week with a match pass organised in Yoko, gathering members of existing pangolin club of the Yoko town. Many tools were used for the occasion among which comic books, drawing books, brochure and posters.

Some pictures of the sensitization


"SI LA CONSOMMATION DU
PANGOLIN S'ARRETE, LA CHA
VA S'ARRETER"
LYCEE DE YOKO
CLUB ENVIRONNEMENT