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Dead or alive? Perception of the COVID-19 outbreak on livelihoods and bushmeat use in the Natural Reserve of Itombwe, Eastern DRC

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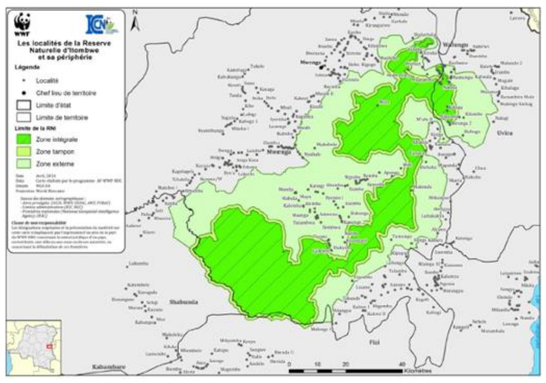
1. INTRODUCTION

Wild meat plays a crucial role in the food security and cash income of subsistence hunters in the tropics and subtropics in Africa. Following the 2020 outbreak of coronavirus disease 2019 (COVID-19) in South Kivu, the government across the region has imposed a ban on hunting, sale, and consumption of wild meat, in particular bats (*Chiroptera*) and non-human primates to curb the spread of this disease.

The consequences of lockdown measures are likely to impede or alter the usual interaction between humans and forests, including wildlife. Hence, this study presents research undertaken to explore the local people perception on the wild meat ban, and in particular, how it has affected communities in the Natural Reserve of Itombwe.

2. STUDY AREA



The study area comprises two chiefdoms in the Natural Reserve of Itombwe (RNI), including Basile in Mwenga territory, and Bavira in Uvira territory. The relief around the RNI is part of the Mitumba mountains range, rising from low altitude (600 m) towards the west in the Ruzizi plain and reaching 3,475 m (Mount Muhi) in the north.

The RNI with 5,732 km^2 has a rich biodiversity. ICCN/RNI (2017) mentioned 583 bird species, of which 30 endemic species to Albertine rift, 72 mammal species (4 endemic), 40 (estimated) reptile species (5 endemic), 39 amphibian species (16 endemic).

From all these species, more than 56 of them were identified as threatened/endangered species. Rare species such as eastern chimpanzee (*Pan troglodytes schweinfurthii*), Grauer Gorilla (*Gorilla beringei graueri*) and forest elephant (*Loxodonta cyclotis*), were also identified in the reserve.

3. METHODS

We carried out from January 22 to February 25, 2021 a survey in and around the Natural Reserve of Itombwe (RNI), in South Kivu province using semi-structured questionnaires to investigate local people perception on impacts of the COVID-19 outbreak on wild meat hunting, sales and consumption.

The surveys were conducted among persons involved in the bushmeat industry consisting of hunters, bushmeat wholesalers and restaurants' owners. In addition, interviews included thirteen (13%) charismatic hunters and some people living in the villages to assess the key species involved in wild meat use in the region.

A total of 130 persons consented to participate in the study, aged between 36 and 45 years. Thirty-two respondents (24.6%) aged between 36 and 45 years. The average age was 40.5 years.

4. RESULTS

Overall, less than 15% of respondents in both sectors reported members were involved in hunting as a livelihood activity. When asked more directly about whether anyone in their household hunted, a higher proportion (61% overall; 56% and 66% in the Bavira and Basile sector respectively) reported being engaged in some hunting.
Of these, 48% in the Bavira chiefdom and 58% in the Basile chiefdom engaged in trap hunting (snare and wire), no respondent acknowledged to be engaged in gun hunting, and a few households in the Uvira sector also used spears (3%), hunting dogs (1.9%) and arrows (0.7%) for hunting.

38.5% reported eating wild meat at least once a week in both study areas (fig. 3).

Most respondents thought that COVID-19 had originated abroad, or been brought by foreigners, with 36.6% saying that it came from 'white people', 28.9% from the Chinese and 20% from foreign countries.

Only 11.3% of respondents referenced wildlife, with 4.5% saying that COVID-19 originated in urban areas (Kinshasa, Goma and Bukavu), 2% saying that COVID-19 came from pangolin (Manis gigantea) and long-tailed pangolin (Manis tetradactyla), 1.5% from hammer headed fruit bat (hypsignathus monstrosus), brush-tailed porcupine (Atherus africanus), 1% from small monkeys and 1% from great apes, including Grauer gorlla (Gorilla beringei graueri) and eastern chimpanzee (Pan troglodytes schweinfurthii) and rodents.

A further 2% reported that it came from 'the air', 1% from a Chinese laboratory and 23% said that they did not know.

Fig. 1. Bushmeat market, Lukolela (Republic of Congo) October 2019 @T. Trefon

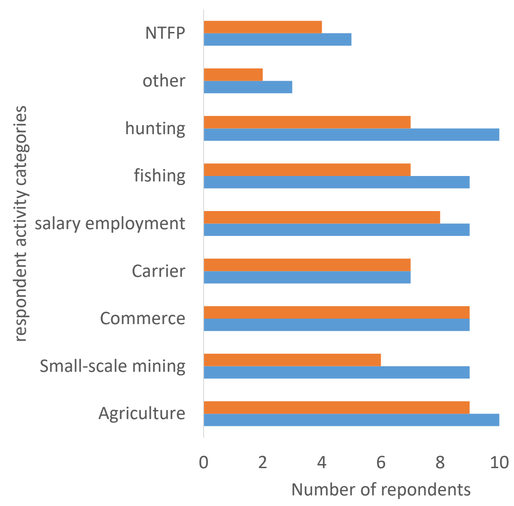


Fig 2. Main livelihood activities of respondents in the Basile and Bavira chiefdom villages. N = 130 respondents

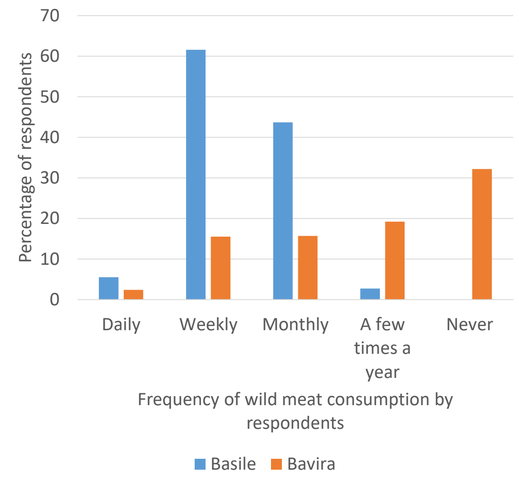


Fig 3. Frequency of wild meat consumption by respondents in the Basile and Bavira chiefdom villages. N = 130 respondents

4.1.Impacts of COVID-19 on livelihoods, hunting activity and wild meat consumption

Most respondents (88.7%) reported having been 'very much' impacted by the response to COVID-19, with 8.3% reporting being 'a little' impacted and 3% not at all impacted. There were no differences in these responses between the two sectors

The findings indicate that the illegal wildlife use increased during the COVID-19 pandemic due to lower surveillance. Vulnerable people depended on the adjacent forests most for their livelihood during the burdensome lockdown. The return to normality from the pandemic outbreak would significantly impact the ongoing and future forest and wildlife conservation in the reserve.

4.2. Perceived disease risks from wild meat

All respondents were asked which types of meat could transmit diseases. Chimpanzee (Pan troglodytes schweinfurthii) with an average of 54.15%, swine (Sus domesticus) with an average of 47.15% and gorilla (Gorilla beringei graueri) with an average of 33.35% were chosen by most respondents, although a high proportion of them also reported red meat and hunting dog as potentially transmitting diseases (30.45% and 26.3% respectively; fig. 3). Only 3 (2.3%) respondents reported that none of these types of meat transmitted diseases.

4.3. Reactions to wild meat market closure

As for the people feedback on bushmeat market ban, we asked all respondents whether they agreed or disagreed with the idea of market closures; amongst the respondents, 67% disagreed, 23% agreed, and 10% neither agreed nor disagreed, with no significant difference in response seen between the two sectors.
When asked why they disagreed, as an open-ended question, most respondents said that closing wild meat markets would significantly affect livelihoods, with 27.9% suggesting a ban would affect people's access to food and incomes, a further 25.1% mentioning reduction in income only and 22% mentioning a reduction in access to food only.

5. DISCUSSION

Familiarity, identity and taste for wildmeat are among the values that our nervous systems shape by starving for the familiar flavours and aromas of wildmeat and rejecting the more unusual tastes (van Vliet and Mbazza, 2011). For most hunters the motivation is not merely to satisfy hunger but also to meet a desire for bushmeat (the so-called "meat hunger" by Dounias and Ichikawa, 2017).

Wildmeat consumption promotes a sense of "groundedness", security and identity, whose value is difficult to capture in materialistic terms (Jepson & Canney, 2003). Food preferences and habits are formed to a large extent through childhood experiences and actually persist throughout the course of an individual's life, helping to maintain memories and strengthen connections with traditional origins and territory (van Vliet et al. 2015). Therefore, despite changing socioecological environments incurred by the COVID-19, wildmeat remains part of the menu (Alves and van Vliet, 2018).

Awareness building through education campaigns of all stakeholders including conservationists, anthropologists, politicians, policymakers, and hunters of the complex interrelationship between wild meat, zoonotic diseases, conservation, and human food security is essential to find the optimal balance between biodiversity conservation and human needs. Such initiatives can be accompanied by other suitable intervention practices such as health controls in wild meat markets for the benefit of human health and biodiversity conservation (Fa et al. 2022).

Research is also needed to assess urban wild meat consumers' attitudes towards wild meat consumption, zoonotic disease risk and new national legislations, to allow more critical analyses of urban consumption behaviours. Further actions will also be needed to reduce consumer demand for bushmeat in urban areas and transition bushmeat traders into alternative livelihood avenues.

6. CONCLUSION

The COVID-19 crisis is threatening conservation efforts in the RNI and other DRC protected areas with a 'perfect storm' of reduced conservation funding, depleted management capacity, collapse of community-based natural resource management enterprises, and elevated threats. The crisis demands concerted international effort to protect and support the country's wildlife and wildlands and people who are dependent on them. DRC national and local governments, the international community, donors and conservation practitioners should collaborate through decisive effort and adaptive management to minimize negative impacts.

Beyond achieving little to no impact on outbreak control in the face of human-to-human transmission, the 'bushmeat' ban has negatively impacted livelihoods, placing additional and unnecessary stress on communities. Given the weakness of zoonotic disease surveillance in the study area, it will be difficult to assess whether the ban has any continuing impact on reducing the risk of zoonotic transmission of COVID-19 and other pathogens,
Criminalizing hunting cultivates community silence, drives activity underground, and further risks jeopardizing surveillance efforts and acceptable, evidence-based prevention strategies for zoonotic disease transmission.

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