PhD topic

Sustainable Adaptive Community-based Health and Hunting Management in a Wild Meat Livelihood System of Central Africa

Context: In the socio-ecosystem of the Congo basin region, wildlife is a major source of edible proteins for the rural and urban human populations and wild meat production is paramount to the socioeconomic and nutritional wellbeing of disadvantaged communities living within or close to forested areas. However, the sustainability of wild meat production is threatened by rising levels of animal harvests due to human demographic growth and a rising demand for animal products that, in the long run, threaten the access to animal proteins. In addition, actors of wild meat value-chains are at high risk of exposure to zoonotic diseases. 72% of emerging zoonotic diseases are considered to have originated from wildlife since the middle of the 20th century[1]. This exposure to infectious diseases is exemplified by several Ebola virus epidemics that were originally caused by the manipulation of carcasses of apes and duikers[2]. The effective control of epidemics of animal origin will heavily depend on the capacity of state and communities to implement reliable disease surveillance and rapid response instruments as well as safe practices of wildlife hunting, manipulation and consumption[3]. However, health interventions that limit or change the interactions of humans with animals can have a substantial impact on people's subsistence and well-being in wild meat livelihood systems[4], justifying a community-based participatory approach to address this question.

Objectives: The objective of this PhD is to evaluate the socioeconomic viability and sustainability of wild meat value-chains that ensure a reduced risk of biodiversity loss and exposure to zoonotic diseases in the context of a wild meat livelihood system of Gabon, located in Central Africa. The candidate will study the process of engagement of actors of the identified livelihood system in the adoption of production and consumption practices and surveillance and early response mechanisms that contribute to the health of the socio-ecosystem by preserving ecosystem services for future generations and reducing the risk of disease emergence.

Methodology: The candidate will use tools of participatory action-research and experimental economics (such as role-playing games and experimental games[5,6]) to develop suitable data collection and learning tools with the double objective of:

(1) Design and implement a participatory monitoring protocol for hunting activities and harvesting levels by species in order to collectively evaluate at the scale of each village the plausible scenarios for the dynamics of the targeted wildlife populations for initiating an adaptive management process for them that is sustainable from an ecological and socioeconomic perspective[7];

(2) Engage communities in a process of identifying control action against zoonotic diseases, in complement to disease surveillance, that are effective and acceptable for all actors of the wild meat livelihood system. In particular, the candidate will assess the added-value of experimental games as a scientific tool for analysing the decision of actors and as a social learning tool for engaging communities in sustainable health management practices.

Thesis committee disciplines: Ecology: wildlife population dynamics; Socioeconomics: community engagement, experimental economics, food consumption behaviour; Epidemiology/one health sciences: zoonotic risk exposure assessment

Research questions

- What trends can be observed between supply and demand of wild meat? What is the ecological and economic viability of harvesting levels according to target species and populations (mostly duikers, porcupines, suids and primates)?
- What are the changes of practices that are acceptable from a socioeconomic perspective by the actors of the wild meat livelihood systems?
- What interventions to control zoonotic disease risks in response to an alert are efficient and acceptable from the standpoint of actors of the wild meat livelihood systems?
- How much are urban and rural consumers of wild meat willing to pay for products that guarantee a sustainable production and a reduction of the zoonotic risks?
- Role of serious or experimental games for defining control interventions of zoonotic diseases and adaptive hunting management?

Expected outputs

- A community-based monitoring tool enabling the regulation of hunting to preserve wild meat resources and ensure a sustained access of populations to animal proteins
- The formulation of zoonotic risk reduction strategies that could be incorporated in the national One Health strategy of the country
- A pricing and marketing strategy for wild meat produced in a sustainable way and with a limitation of zoonotic risks
- 3 scientific papers with focuses on different disciplines: (1) ecology (sustainable wild meat harvest), (2) socioeconomics (community engagement, social learning through experimental games) , (3) epidemiology (zoonotic risk reduction strategies)

Feasibility: This PhD will be conducted within the framework of the SWM program. In Gabon, the SWM program is implemented by CIRAD in the department of Mulundu. CIRAD and its national partners have been working for 5 years with 10 village communities (300 hunters over 1,500 km²) to establish a sustainable village hunting system. The long-term ambition is to develop a legal, sustainable and healthy wild meat sector in Gabon that will supply nearby urban centers with local products of known origin[8]. The PhD student will benefit from the first SWM phase studies (prioritization of zoonotic risk, community-based surveillance systems, ecological studies of hunted species) and will interact with other students and the project's well-established local team.

References

1. Jones, K. E. et al. Global trends in emerging infectious diseases. Nature 451, 990-993, doi:10.1038/nature06536 (2008).
2. Leroy, E. M. et al. Multiple Ebola virus transmission events and rapid decline of central African wildlife. Science 303, 387-390, doi:10.1126/science.1092528 (2004).
3. Watsa, M. & Wildlife Disease Surveillance Focus, G. Rigorous wildlife disease surveillance. Science 369, 145-147, doi:10.1126/science.abc0017 (2020).
4. Saylors, K. E. et al. Market characteristics and zoonotic disease risk perception in Cameroon bushmeat markets. Social science & medicine 268, 113358, doi:10.1016/j.socscimed.2020.113358 (2021).
5. Edmonds, B. and R. Meyer (eds.), Simulating Social Complexity. Springer-Verlag Berlin Heidelberg, pp.499-540 (2013).
6. Böhm, R., Betsch, C. & Korn, L. Selfish-rational non-vaccination: Experimental evidence from an interactive vaccination game. Journal of Economic Behavior & Organization, doi:10.1016/j.jebo.2015.11.008 (2015).
7. Van Vliet, N., et al. Innovative monitoring methods in the context of adaptive management of hunting in the amazon, Colombia. In : Visconti, P., et al. (ed.). Proceedings of the 27th International Congress for Conservation Biology and 4th European Congress for Conservation Biology " Mission biodiversity: choosing new paths for conservation". Washington DC : Society for conservation biology, p. 725-725. International Congress for Conservation Biology. 27, 2015, Montpellier (France).
8. Cornélis, D., Vigneron, P. & Vanthomme, H. Vers une gestion durable de la chasse villageoise. Diagnostic approfondi du département de Mulundu et recommandations stratégiques. SWM Programme. (FAO, CIRAD, CIFOR et WCS, Rome, 2022).

Candidate profile:

- Training: Master degree or equivalent in one of the following fields: ecology, environmental economics, veterinary public health, epidemiology, population biology.
- Ability to work in an interdisciplinary environment
- Aptitude to conduct research in rural areas and engage with rural communities
- Willingness to live abroad aver long periods abroad in a tropical environment
- Proficiency in a data processing and statistical analysis software (e.g. R, stata, matlab, python)
- Languages: very good command of spoken and written French, good command of spoken and written English.
- Level B driver license is an advantage for conducting field work

People to contact :

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