Final Evaluation Report

Your Details	
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Project Title	Enhancing frogmeat monitoring and population estimation as a key step to sustainable harvesting in Ghana
Application ID	40143-1
Date of this Report	30th May, 2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Employ Capture per unit effort to estimate the population size of exploited frog species			✓	Although capture per unit effort (CPUE) was employed during data collection, it was not used to estimate population sizes due to the absence of continuous data over an extended period. Instead, it was applied to answer several key questions, including: • Which habitat type produced the highest offtake numbers within the same hunting period? • Which species was most frequently collected? • In which season (dry or wet) was hunting intensified, resulting in higher offtake numbers? • Are certain hunting methods more likely to yield higher offtake numbers than others? A total of 25,664 individuals of *Hoplobatrachus occipitalis* (n=21,399), *Ptychadena trinodis* (n=3,354), and *Pyxicephalus edulis* (n=911) were reported captured by 44 hunters. Hunting success was highest in the dry season and within rice fields compared with grasslands and riverine habitats. To evaluate the impact of harvesting on hunted frog species, relative abundance was assessed within the irrigated rice fields at Navrongo in northern

				Ghana. Three sites were studied for six months (thrice in a month). A total of 800 m² of irrigated area with intensive hunting was studied in comparison to a control irrigated rice field (300 m²), where no harvesting occurred. Data on sex and life stages of captured individuals were collected, alongside microhabitat variables such as water temperature, turbidity, and conductivity. These variables, informed by literature, were used to examine whether they influenced species abundance at the sites and to assess hunting pressures on exploited frog species. The results indicated that *H. occipitalis* was the dominant species at all sites accounting for a relative abundance between 83% to 92%. There were significantly more individuals of *H. occipitalis* at the non-harvesting site compared to the harvesting sites. Furthermore, snout-vent length of captured individuals was significantly smaller at the harvesting sites compared with the non-harvesting site.
Explore the socio-economic drivers influencing exploitation of frog meat in Upper East Region of Ghana			✓	This was highly successful with 847 respondents (555 men and 292 women) from three districts (Builsa North and South and Kassena-Nankana) in the Upper East Region of northern Ghana engaged. Importantly, their responses were analysed to help answer questions on who exploits frogs within this area and why.

				At least, 60% of respondents were active frog consumers. Of the 341 who did not eat frogs, at least 65.7% did so in the past. Based on a logistic regression analysis, the variables that influenced a person's decision to eat frogs were: gender, age, religion, ethnicity, and distance of a community from the only irrigation dam within the districts, Tono Dam. Men were significantly more likely to eat frogs than women, persons above the age of 45 years were more likely to eat frogs than younger people; persons belonging to African traditional faiths were more likely to eat frogs than Christians or Muslims; and people belonging to the Builsa ethnic group were also more likely to eat frogs than other ethnicities. The farther a community was from the Tono Dam, the more likely, inhabitants were to consume frogs. The study also recorded the first ever record of toad consumption in Ghana although not on a commercial level. Thirty-two hunters and 29 traders were interviewed respectively. Frog hunting was conducted by men while women traded them. Most traders augmented the trade of frogs by selling other protein including fish and other wildmeat. All hunters were also farmers and relied on frog harvesting to support the purchase of farm supplies. Frog hunting and trade served as a

				low-capital but substantive income source for these actors.
Develop a guiding framework that will assist in tracking the population of other hunted amphibians		✓		A draft of the framework has been produced but needs further scrutiny from other experts before rolling it out to the scientific community including upload to WILDMEAT database.

2. Describe the three most important outcomes of your project.

a). Harvesting was found to be negatively impacting on the population of *H. occipitalis* which is the most frequently sold frog species at local markets. The study found a significant difference in the relative abundance of H. occipitalis within sites where hunting occurs and at the none collection site. This is the first empirical data in West Africa that supports the claim that frog harvesting is negatively impacting the species' population.

b). The study has identified the key factors which influences people's decisions to exploit frogs, which are: ethnicity, age, gender, distance of a respondent's community from Tono irrigation dam, and religion. Persons above the age of 45 years were more likely to exploit frogs than younger people, as these individuals had been exposed to frog consumption the longest within the study area. Younger people tend to lean towards foods influenced by western culture. People belonging to traditional African faiths explored frogs more than other faiths because many had practices rooted in their culture, which also influences their diet. Furthermore, people belonging to the Builsa ethnicity were more likely to consume frogs than those within the Kassena or Nankana ethnicities where the Tono irrigation dam is situated. The Tono irrigation dam is the largest dam in West Africa which supplies irrigation water to an estimated 3,840 ha of farmland (Adams *et al*., 2014). The dam has boosted agricultural activities, opening up the district of Kassena-Nankana to other economic activities. Thus, people here had other protein alternatives they could easily afford. Please see the progress report for more details.

c). The study also documented for the first-time the consumption of toads in Ghana which was a rare find because this involved secluded communities, making them easy to miss.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

As this research formed key objectives of my Ph.D., there were delays in making the final report as reviewers had to assess and evaluate the findings before they could be made public.

4. Describe the involvement of local communities and how they have benefitted from the project.

Local people were "employed" (used loosely here to denote monthly engagement of persons at a fee) on the project to collect socio-economic data and relative abundance data. Three local assistants helped with community interviews and translation between enumerators and respondents during the socio-economic data collection. Six others were engaged to assist with the relative abundance data collection, including the capturing of frog species and recording snout-vent length. Engaged project team members were paid a little higher than the local rate which greatly improved income and further supported their households. One of the team members (Frederick Abendiba) also took inspiration from the project and applied for local funding from Kosmos Innovative Center and won USD2,000 which he has used to start frog farming under the business name - EcoLeap. It may not be the best eco-friendly model for frog exploitation but his approach adds value through proper and healthier processing and packaging of the frogs for sale.

5. Are there any plans to continue this work?

There are plans to continue this work to explore sustainable ways of frog harvesting within the sub-region using conservation farming where rice farmers practice organic farming to create a better ecological environment for amphibian species that will be harvested by hunters. This will be a collaborative work with CIFOR-ICRAF, University of Oxford and Frogs and Friends – Germany headed by the world-renowned herpetologist, Dr. M-O Rodel. This idea was birthed at the World Congress of Herpetology when the project leader presented findings of the research. Furthermore, the success of EcoLeap is an indication of local people willing to accept farmed frogs except, the approach should be ecologically friendly, viable and beneficial to multiple stakeholders including the hunters and rice farmers whose fields the frogs are collected from.

6. How do you plan to share the results of your work with others?

There has already been sharing of results and the proper acknowledgement of the Rufford Foundation, especially at conferences. At least, there have been six national and international conferences where the project has been presented, including:
Students Conference on Conservation Science (2024) – University of Cambridge
LEAP Conference (2024) – University of Oxford
World Congress on Herpetology (2024) – Malaysia
Herpetological Association of Africa (2024) – South Africa
ICCS (2024) – University of Oxford

A paper has also been drafted and currently resubmitted to Ecology and Evolution.

7. Looking ahead, what do you feel are the important next steps?

It is important to explore further empirical studies, particularly those that provide evidence of the ecological contributions of Hoplobatrachus occipitalis within rice field ecosystems. Such findings could strengthen the conservation argument and support the promotion of organic rice farming practices within the landscape.

This research, sponsored by The Rufford Foundation, highlights the potential decline in the population of H. occipitalis. Therefore, it is crucial to design and establish a long-term monitoring protocol for H. occipitalis and other exploited species across both harvested and control sites. This approach would generate valuable data to inform local policy development aimed at regulating amphibian harvesting in the area.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Logo was certainly featured on all PowerPoint and poster presentations nationally and globally and has likely reached an estimated audience of over 1,000.

9. Provide a full list of all the members of your team and their role in the project.
Dr. Hannah Sackey – Data analysis
Frederick Abendiba – Field data collection (Socio-economic and relative abundance)
Bismark Adiok – Field data collection (Socio-economic)
William Atiru – Field data collection (Socio-economic)
Aboya David – Field data collection (relative abundance)
Abuuyuri Mathew – Field data collection (relative abundance)
Amwarinsa Clement – Field data collection (relative abundance)
Kwabena Anininyeya – Field data collection (relative abundance)
Waidam Anininyeya – Field data collection (relative abundance)

10. Any other comments?

I would like to express my gratitude to The Rufford Foundation for sponsoring this important project, which has produced the first record of harvesting pressures on frogs in West Africa. It positions me to better solicit and work closely with some of the important research and conservation organisations to further explore ways of injecting sustainability in frog exploitation within the sub-region.

ANNEX – Financial Report

[Intentionally deleted]