Final Evaluation Report

Your Details	
Full Name	Cristina Argudin Violante
Project Title	Transformative Change in the Calakmul Biosphere Reserve: the honeybee and the jaguar as means and measure for sustainable livelihoods
Application ID	31803-2
Date of this Report	9/12/22

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
Perform camera trap and acoustic surveys to assess the ecosystem integrity				I ran camera trap and acoustic surveys in two of the three Calakmul Biosphere Reserve (CBR) communities described in my original workplan submitted in 2020. The COVID-19 pandemic impacted the time frame, costs, and the field arrangements for conducting the survey in one of the proposed sites. Despite this, the surveys performed in the other two communities were successful. High quality data was obtained from camera traps and acoustic devices, and additional indicators (not included in the 2020 workplan) were collected to achieve more robust assessments of ecosystem integrity.
Run interviews with farmer-hunters to explore how they use wild game in the context of their perceived social, economic and environmental conditions.				I conducted 120 interviews in three rural communities to explore the frequency of hunting and wild game consumption, along with hunters' strategies, methods, and preferred game species. I also explored their motivations in the context of their perceived socioeconomic and environmental conditions. In addition to these structured interviews, I conducted 17 semi-structured interviews with key informants that included hunters and game consumers from other rural communities, local authorities, and NGO in the area, to obtain a deeper knowledge of the topic and the broader regional dynamics of hunting practices.
Run workshops with farmer-hunters to identify prospects for long-term hunting sustainability.				I ran two workshops with a total of 43 farmer-hunters to identify their motivations for and their dependency on hunting. I also characterised their preferred hunting areas in the region.

				We evaluated alternative futures for hunting in an environment with diminishing prey availability and water distribution, assessing the prospects for long-term sustainability of hunting.
Workshop to support a group of women willing to start an enterprise in organic honey production.				My original plan was to travel to the CBR in 2020, a year after my first Rufford project (ID: 28146-1, Title: *Evaluating honey production as a sustainable complement to livelihoods for forest communities in the CBR*) took place. During this past project, I built capacities amongst farmer-ranchers and women in organic honey production enterprises. Due to the Covid-19 pandemic, I was not able to travel to the CBR until 2022, when it proved logistically unfeasible to follow-up the women-honey enterprise as planned due to an ongoing reluctance amongst community leaders and inhabitants, largely still unvaccinated against COVID, to meet with outsiders.

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

a). *Robust and integral datasets on the ecologic and social conditions in the CBR.* I obtained strong data to evaluate the abundance and state of wildlife species in the CBR through camera trapping. In addition, we strived to achieve a more complete analysis of the environmental conditions in the area sufficient to assess its ecosystem integrity and the sustainability of rural livelihoods. For this, we collected qualitative indicators of ecosystem integrity, adapting to the project's aims two methodologies developed specifically for Mexican ecosystems (Botello et al, 2022 and CONABIO, 2017). We also obtained acoustic data using AudioMoth sensors. The acoustic data will complement the ecosystem integrity assessment by providing a spatio-temporal soundscape of the area, including hunting distribution and frequency. Apart from the information obtained by wildlife/acoustic surveys, we obtained a rich and detailed dataset on the socioeconomic and cultural conditions in the area related to hunting. Moreover, we have recorded rich narratives of the hunting practices in communities with different ethnic and cultural backgrounds. We also obtained information on the perceived impacts of hunting on the ecosystem, which we will ground truth against the acoustic data. By jointly analysing the ecological and social datasets, we will obtain a holistic and more complete understanding of the interactions of nature and people in the CBR for contributing to well informed decisions in the area.

b). *Awareness raised on the environmental impacts of hunting*. Through participatory processes, the researchers on this project along with community leaders and experienced hunters, have created a process to raise awareness of the impacts of hunting amongst the youngest generations of hunters in the CBR. Prior to and during the 120 interviews, leaders identified two main problems with hunting in their communities: 1) a loss of traditional knowledge on hunting and on the ecology of the forest amongst young hunters (15–29-year-olds); and 2) a lack of awareness on the impacts of overhunting from hunters in general. Both issues were also identified during the interviews. Together with the community we raised awareness on the impacts of unsustainable hunting on the ecosystem and species and its negatives effects on the food security of the community amongst 43 hunters, young and experienced, in these communities.

c). *Capacities built for long-term monitoring and management by communities of their own resources in sustainable ways.* A total of 39 members of the rural communities of the CBR were trained in the use and deployment of camera traps and acoustic devices. This training was the first step needed to empower communities to monitor their own wildlife and resources. During the workshops, moreover, communities identified best practices to manage their wild game in more sustainable ways. This consensus was achieved through participatory processes that included men, women, and youths. Both outcomes will strengthen self-governance by the communities towards more sustainable resource management.

Figure 1. Left) interview with a hunter in the CBR; Middle) training for field guides to use and deploy equipment and Right) A survey station from the camera trap and acoustic devices monitoring in the CBR.

Figure 2. Workshops developed to evaluate the hunting practices and to design best practices to achieve a more sustainable practice.

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

My Rufford Small Grant related to this project was awarded in 2020, during unfolding uncertainties of the Covid-19 pandemic. This situation, combined with personal circumstances, generated difficulties for developing my project in the timeframe originally planned and proposed.

In late 2020 and summer 2021, I made plans to travel to my field site. On both occasions, the COVID-19 travel restrictions were constantly changing for Mexico, and ultimately frustrated my plans. By the time the pandemic measures were relaxed, my PhD programme had passed the final milestone for fieldwork without me having the chance to finish my research. I therefore applied to extend my PhD, which also required applying for a new visa for myself and my family to remain based in the UK at the University of Southampton. Both processes were long and time consuming but successful in the end.

Serendipitously, the pandemic-induced delays provided a window of opportunity to identify and establish in-country collaborations with Mexican researchers that had not been considered in my original Rufford grant application. With this augmentation of the team, I was able to collect more robust data when I was in the field and to organise much of the in-field logistics prior my travel.

In 2022, I was finally permitted to travel to southern Mexico and run my project. However, the new timing of my project affected its budget, and impacted on the relationships I built with community leaders and inhabitants during previous years (2018 and 2019). As post-pandemic costs of flights and goods/services arose, the budget obtained in 2020 proved insufficient to cover all project activities. To tackle this problem, I decided to use my University of Southampton studentship money to cover the price differences (see the budget section for more details). Once in the field, I tried to re-build the relationship and trust among the rural communities in my three field sites. Despite this, the wildlife surveys could only be developed in two sites due to the reluctance of some communities to have contact with outsiders for long periods of time.

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

Local communities participated in and benefited from the two phases of this project. In phase I (camera-trap and acoustic surveys), members of two communities supported and benefited from the project. A total of 28 men and 11 women of two villages in the CBR, were trained in the use and deployment of camera traps and acoustic devices. The aim of the training was to build capacities so that these communities can self-monitor their own lands and resources. Three members of each community, designated by the whole community through a democratic process, accompanied me and the team during the deployment and revision of the equipment. These six guides received further training and guidance on the matter. When the surveys concluded, a meeting with each community took

place to share with them the pictures collected and to decide how and in which format, the analysis of this information would benefit them.

During phase II (evaluation and uptake of sustainable livelihoods), a process of co-creation with the community occurred prior to, during and after the interviews and workshops. Since the start of the project, community leaders had emphasised the importance of hunting for food security and the need to regulate this activity. Community needs were set as part of the goals and processes of this project aiming to achieve transformative changes in the way they manage their resources. Leaders described the increasing difficulties that hunters are experiencing to find game over the last decade. They attribute this problem to overexploitation of wild game and a lack of regulations at community and regional levels. We raised awareness among young people in the communities, who were the group that benefited the most from the workshops and interviews. Through the whole process, communities identified and designed best practices to reduce the impacts of hunting in their lands. This will benefit the food security of villages in the CBR in the long-term.

5. Are there any plans to continue this work?

I have plans to continue researching the links between people and wildlife and exploring different pathways to sustainability. After completing my PhD programme, I aim to expand my knowledge and experience in the topic by increasing the scope of my work to encompass other tropical regions, through postdoctoral research. This will allow me to have a more complete and broader understanding on how humans and nature can coexist in sustainable ways.

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

The results of this project will be shared with different audiences in diverse formats. I will continue sharing my findings with staff and students at the University of Southampton and at the National Autonomous University of Mexico (UNAM) through presentations and lectures. I will write scientific papers for publication in peer-reviewed journals such as *Human Dimensions of Wildlife*, *Conservation Biology*, and *Human-Wildlife Interactions*.

After fieldwork, I shared the pictures obtained by our camera traps with staff of UNAM's Institute of Biology responsible for their photographic library. This allows the biggest scientific institution in Mexico to hold a register of the wildlife species found at the CBR during 2022.

I also shared and will continue to share our results with community leaders in two different ways. First, a technical report containing information on the ecosystem health and the status of wildlife populations will be prepared and delivered to them through a local NGO. This was agreed at the end of the project since community leaders manifested need of technical reports for negotiating with the protected area managers and local and regional government on various topics, including the establishment of voluntary conservation areas and receiving subsidies for preserving wildlife. Communities in the CBR usually lack documents that prove their awareness of the state of the natural resources they legally own and manage. Second, some of

the pictures of wildlife obtained by camera traps were shared with the authorities of the rural communities as a means of visualisation for children in local schools and libraries.

Lastly, I will share the results with the protected area managers so they can make informed management decisions, and so they can have a baseline on the ecosystem integrity of the CBR.

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

In my opinion, an important next step is to ensure continuity of this project to realise its long-term vision of empowering and supporting resilient communities to live in healthy forests. This involves organising the human resources and finding the necessary funding to continue ecosystem monitoring in the CBR, run and managed by rural communities. This will not only empower the communities with information but will give them a place on the reserve board of managers and will provide the means necessary to manage their own resources in an informed way. Since 2018 (the year I started working in the CBR), capacities have been built amongst rural communities for monitoring the wildlife and natural resources of which they have stewardship. Moreover, in-country research collaborations have been developed. With further help in planning, logistics, and financing, a monitoring programme can be set so communities can continue obtaining data, which can be retrieved and analysed by UNAM researchers working close with the inhabitant of the CBR.

Another important step is to investigate the interactions between people and nature in other tropical areas that present similar environmental and socioeconomic conditions as those in the CBR. This will allow a comparison between different regions and will allow the possibility to share experiences and lessons learnt in the management of resources.

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 Foundation logo has been used in various presentations amongst different audiences. These include the Climate Exp0 virtual conference from the 2021 UN Climate COP26 Universities Network, lectures given to PhD and undergraduate students at the University of Southampton, and virtual lectures for postgraduate students at UNAM. The logo was also used in presentations given on all meetings during fieldwork with stakeholders (rural communities, NGO, protected area managers, local authorities, and local universities).

9. Provide a full list of all the members of your team and their role in the project.

Cristina Argudin Violante – Project leader. I oversaw the design, data collection, planning/logistics, fieldwork activities, and dissemination of the project.

Julio Alberto Carrillo Gonzalez – Contributed to the design and development of interviews and workshops. Played a key role in building relationships with key

stakeholders and informants on hunting matters; in collecting and analysing the social datasets; and in strengthening the social aspects of the project.

Prof Patrick Doncaster – He supervised the project, from its design to its products. He provided valuable advice on the project's planning, analysis of data, and fieldwork activities. He sustained my motivation to continue the project despite the difficulties that arose.

Dr Francisco Botello* – Researcher at the Biology Institute of UNAM. Contributed to adapting the ecosystem integrity indicators to the local context and needs of the project. He also contributed during fieldwork activities, including checking monthly the camera traps and collecting data, dealing with community leaders and local institutions.

Dr Lon Grassman* – Contributed to the project survey design, deployment of equipment, and other field activities. He played a key role in training local field guides in the use and set up of cameras and acoustic devices for monitoring wildlife.

***** Dr Botello and Dr Grassman were not included in the original application submitted in 2020. The relationship with these researchers started and developed during the Covid-19 pandemic. Both supported the fieldwork and will support the analysis of results and further research.

10. Any other comments?

I appreciate the support and patience of The Rufford Foundation on this project. Particularly, I want to extend my gratitude to Jane Raymond who always provided quick advice and support when needed.

Figure 3. Dr Botello (left picture) and Dr Grassman (right picture) with Cristina Argudin during the deployment of camera traps.