

Darwin Initiative Main and Post Project Annual Report

To be completed with reference to the “Writing a Darwin Report” guidance: (<http://www.darwininitiative.org.uk/resources-for-projects/reporting-forms>). It is expected that this report will be a **maximum** of 20 pages in length, excluding annexes)

Submission Deadline: 30th April 2019

Darwin Project Information

Project reference	24-029
Project title	Enabling Baka attain food security, improved health and sustain biodiversity
Host country/ies	Cameroon
Lead organisation	Manchester Metropolitan University
Partner institution(s)	Zerca y Lejos (ZyL), CIFOR
Darwin grant value	£301,768.00
Start/end dates of project	2017-09-01 - 2020-08-31
Reporting period (e.g., Apr 2018 – Mar 2019) and number	Apr 2018 – Apr 2019, Annual Report 2
Project Leader name	Prof. John E. Fa
Project website/blog/Twitter	In progress
Report author(s) and date	John E. Fa, 26 April 2019

1. Project rationale

Wildlife in tropical rainforests of SE Cameroon is increasingly under pressure from overexploitation driven by a burgeoning human population, as well as by uncontrolled outside commercial interests. In this region, rural poor as well as indigenous peoples, Baka Pygmies, live precarious lives. The latter group are at an even greater social and political disadvantage since many have been displaced from the forest to settlements along the main roads. The health as well as livelihoods of these people is at risk.

The relationship between the use of forest products, subsistence agriculture and human health remains largely unstudied. Often, assessments of the links between biodiversity and wellbeing centre upon single issues e.g. how bushmeat hunting affects people’s nutrition or income, without considering other intervening factors. A better understanding of the multiplicity of issues that affect people and wildlife will help generate interventions that result in long-term benefits for both.

In 10 Baka villages (Fig. 1), along the Djoum-Mintom road in SE Cameroon, in this project we gather data on the use of domestic crops and wild foods to determine their importance in satisfying the target populations’ nutritional needs. In parallel, we assess the human health status of villagers to determine levels of malnutrition and disease, and establish links with foods consumed. On the basis of the evidence collected, we propose solutions by encouraging families to produce local foods more efficiently, so that it can bridge nutrient gaps unmet by natural resources. By enabling better domestic food production and encouraging sustainable extraction of wild resources (animals and plants) we aim to improve the general health of the study

populations. We will achieve this by: 1) harmonising local production and consumption of domestic and wild foods across seasons, 2) generating domestic produce surpluses which can generate income to replace an over-reliance on wild meat trade, and this information will feed into 3) enabling hunting systems that encourage sustainable wildlife extraction as well as 4) understand the state of and pressures on threatened species. We aim to generate a system that can serve a model that can be rolled out to other Baka villages in the region to improve agri-food systems, and as a result reduce the impact on wildlife.

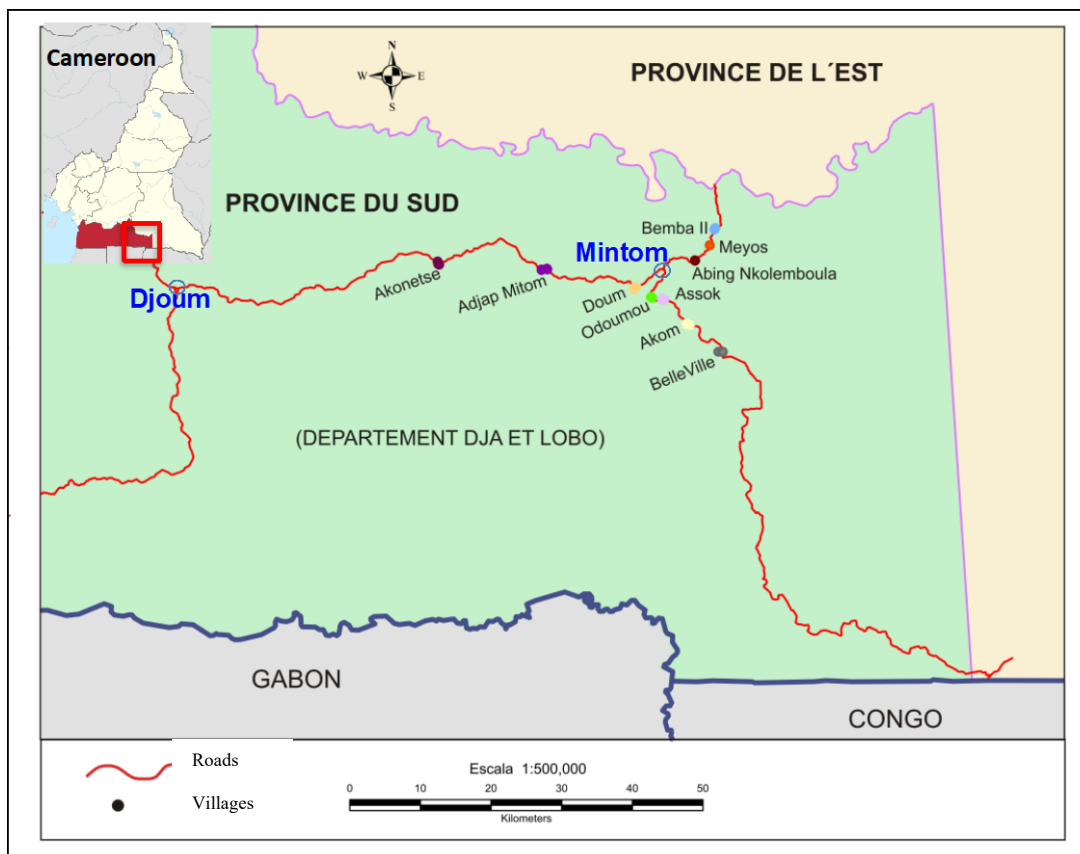


Fig. 1. Map of the 10 Baka villages involved in the present Darwin project.

Our ultimate interest in this project is to **alleviate poverty** and **improve general health** of the Baka in our study area. We will achieve this by helping our target communities attain sufficient nutritional and economic autonomy and attain food security. In so doing, these populations will become less dependent on commercial wild meat trade; hence reducing the impact of our Baka population on threatened wildlife. We will also encourage sustainable extraction of the more common hunting-resilient bushmeat species so as to enable a relative constant source of animal protein. Resulting also from this, we will generate scientific evidence that can support our understanding and encourage the resolution of the problems at hand, whilst also communicating and disseminating our findings as peer-reviewed journal articles and as informal communiqués with clearly identified stakeholders (Cameroon government officials, Baka community members).

In the current report we comment on the updated LogFrame resulting from the interactions with Ms. Victoria Pinion, during her time with us in Cameroon during 25-29 February, 2019.

2. Project partnerships

Our project is a collaboration between the international development NGO, Zerca y Lejos (ZyL), an international forestry research institution (CIFOR), the Cameroonian government body responsible for protection of forests and wildlife (MINFOF) and Manchester Metropolitan University (MMU). The partnership between MMU and CIFOR was in place by the time the project started, and was formalized with the signing of a memorandum of understanding in Manchester in Feb. 2017. Under this MOU, the Darwin project was presented by CIFOR to MINFOF as part of their umbrella collaboration accord. Meetings between our in-country leadership and MINFOF headquarters in Yaoundé will be held at regular intervals throughout the duration of the Darwin project to update the national authorities of our progress.

The ZyL/MMU partnership has permitted the smooth functioning of the project on the ground without any serious obstacles. A main achievement has been the integration of a variety of activities such as the health and agricultural extension work, which are directed by ZyL, and the ecological and wildlife use studies carried out by our in-country team. This collaboration has advanced through a clear and regular interaction between our In-Country Project Coordinator (ICPC) and the Project Leader (PL), with the support from ZyL headquarters in Madrid and various MMU departments (Head of School of Science and the Environment, Accounts) in Manchester.

Our project is based on the clear commitment to the rights of Indigenous Peoples to fully participate in decision making of matters that affect their rights. Thus, all our work incorporates the perspectives, opinions and ideas of most Baka villagers involved in our project, and therefore we facilitate direct involvement in all planned research and interventions. At the start of the project we organised a first meeting with village leaders, in the ZyL-Djoum headquarters (Mission Catholique de Djoum) to introduce the aims and aspirations of the Darwin project. This was followed by the formal launch of the project on 2 Dec. 2018, in which a total of 29 village representatives attended. This meeting was also held in Djoum.

We continue in regular contact with *Mr. Richard Eba'a Atyi*, Coordonnateur Regional, CIFOR Afrique Centrale, and with the following authorities: 1) Madame the Ministre de la Recherche Scientifique et de l'Innovation in Yaoundé; 2) Préfert du Departement du Dja et Lobo in Sangmelima; 3) Sous-préfert de l'arrondissement de Djoum; 4) Sous-préfert de l'arrondissement de Mintom; and 5) the department delegate MINFOF of Dja et Lobo, Sangemelima, conservator of the Dja Biosphere Reserve.

As part of our commitment to enabling a functioning Community of Practice around our project, we have regular meetings with international organisations (ZSL, Forest Peoples) operating around the Dja Landscape (DL), as well with our sister Darwin project (#24005) working on bushmeat with communities along the NW periphery of the DL. We have also initiated research collaborations with the University of Bertoua in Cameroon.

3. Project progress

3.1 Progress in carrying out project Activities

The following narrative follows the agreed baseline timetable for the project. Here, we also report progress on outputs. We include information on activities undertaken during the reporting period and where relevant, a summary of outputs and performance for the previous year.

a) Overall

We continued gathering data on use of wildlife resources undertook health assessments and supported agricultural activities. We were able to integrate additional team members facilitated by the generation of new funds, and have collaborated with Cameroonian experts and students in support of our work. As planned, our data gathering phase was completed this year. The information obtained will form the evidence base for the next phase of the project in which hunting management and wildlife use plans will be developed together with our communities. Preliminary analyses of all data have been undertaken but further analyses and preparation of publications is still ongoing.

All activities undertaken within our Baka communities continue to follow a very clear FPIC process. Any involvement of community members is accompanied by a written or oral declaration of consent. Regular meetings were regularly held with community members, local authorities and other organisations involved in our project (Appendix 1).

Two important stakeholder meetings were held in March 2019, one with members of our COP in Yaoundé where we presented a summary of our findings and discussed the next phase of the project (see below). The second stakeholder meeting was organised to update hunters and village reporters from the Baka communities involved in the Darwin project on the results obtained with their participation. This meeting was held in Djoum (see below). Here, we presented our findings and discussed how the Darwin project will engage with the communities to build upon the information gathered and use this to organise clear community-based resource management plans in the third year of the project.

Team composition and new initiatives

We continue with our full Darwin field team without any changes (Appendix 2).

Collaborations

i) Links with Zyl's Autonomía project

We were able to incorporate two extra staff members as a result of funding obtained by Zyl. A total of 40,000 Euros was awarded by the Grupo de La Rioja Alta, S.A., Spain, in a competitive bid for funds within their Ayuda al Desarrollo 'Viña Ardanza Solidario' funding program (proposal available on request).

This new community project is part of Zyl's on-going 'Autonomia y Derechos Humanos' program (hereafter 'Autonomía'); the NGO's overarching platform of agricultural support and assurance of human and land rights for the Baka people. This program will continue beyond the lifespan of the Darwin project. The 'Autonomía' project is totally aligned with our project.

The Darwin team spearheaded the process of the selection of the Autonomía team members. First, the job description was posted in relevant departments (Anthropology and Sociology) at the universities (University of Yaoundé I, University of Yaoundé II) in the capital. A total of 54 applications were received, out of which 11 were shortlisted. Mr. Hevé Freedy Mpand and Ms. Zibi Obe Marie were chosen. All interviews were conducted with the collaboration of Ms. Trinita Irombre (Project Coordinator, Zyl-Cameroon), Mr. Mabou Delors (Coordinator, Strategic Alliances of Zyl-Cameroon) and Mr. Chintouo Bachir (Volunteer Collaborator Zyl-C) at the Zyl-Cameroon headquarters in Yaoundé. Mr. Pablo Simón prepared the questionnaires used during the two series of interviews. Mr. Guillermo Ros took part in all interviews via Skype.

Project activities started in September 2018 and will end in May 2019. The Autonomia team will work in the Mintom region with various Baka and Bantu villages, including the 10 Darwin Baka villages. After an initial introductory period to get to know the communities and to introduce the project, their starting point has been to determine the communities' needs and resources. These initial assessments have helped identify the communities' strengths and weaknesses so as to inform the project's planned activities.

The Autonomia project's main outcome will be the reinforcement of self-determination rights of the Baka by capacity building activities that support the communities' legal access to agricultural and natural land, as well as to strengthen their knowledge and understanding of territorial and legal rights. The team will also work closely with the target communities to: 1) found local farming cooperatives where farmers can pool their resources; 2) improve community savings and the management of economic resources, as well as allow these communities to: 3) understand the roles and obligations of public administrations and 4) their rights and obligations as national and indigenous citizens.

ii) Incorporation of Spanish PhD agronomy student

Ms. Consuelo Farina joined our team in Cameroon (Agronomist and PhD student in Rural Planning and Sustainable Project Management, Universidad Politécnica de Madrid) in September 2018. Consuelo will be supporting and training our agricultural ground team, FF and RL and systematically assessing the agricultural outputs within our Darwin project. This will also include the development of an agricultural plan for the recovery of abandoned cacao plantations. Consuelo's results will add to the work IITA will be undertaking within our project (see below).

iii) Traditional use of medicinal and food plants by Darwin Baka communities

Alongside wild meat, a number of other non-timber forest products (NTFPs) are crucial sources of food, fodder, fibre, fertilizers, herbal potions, construction materials and cosmetic and cultural products for the Baka communities in our study area. Various NTFPs also support village-level artisan and craft activity providing raw material for internationally important commodities used in food products and beverages, confectionary, flavourings, perfumes, medicines, paints, polishes and more. Of particular importance is the use of plants in pharmacopoeia. Traditional healers practise specialized pharmacopoeia, whereas a more popular or general pharmacopoeia is commonly used for self-treatment of less complicated ailments such as fever, malaria and diarrhoea.

Given the importance of wild plants for food and medicinal purposes for the Baka communities was important, we enlisted the support of Prof. Jean Lagarde Betti at the University of Bertoua and his team. Prof. Betti is a Cameroonian ethnobotanist who has carried out extensive research on the use of plants by Pygmy communities in Cameroon and the Republic of Congo. Prof. Betti is also the Regional Coordinator of the CITES tree species Program for Africa.

We signed a collaborative research agreement between the Darwin project and the University of Bertoua for Prof. Betti to lead four postgraduate students to gather data on the traditional use of plant species in four Darwin villages (Assok, Bemba I and Bemba II, Nkolemboula and Doum). Fieldwork for this part of the project was undertaken during January to March 2019. Prof. Betti's team will also conduct market chain analyses of all NTFPs (i.e. wild plants as well as wild meat) used by both Baka and Bantu communities. This work will take place during April and May 2019.

Before the start of the NTFP project, meetings were organized in each village with the aim of presenting the aims of the project and obtain the consent of villagers. RO and Prof. Betti organized meetings on the 22th January 2019 in the four villages during which the objectives of introducing the project and the students involved to the villagers.

A guide selected among villagers assisted each student. The role of the guide was to assist the student to ease the communication (interpretation) between the student and the respondents. For each respondent who accepted to participate to the study, the student asked questions on the traditional usage of edible plants, medicinal plants, service products, and wild yams. Before starting the interviews, the student would count the total number of households in the village, and from these select a number of households to interview. Every member of the household could answer our questions. Interviews were conducted in 75 households: Bemba (24 households), Nkolemboula (17), Assok (19) and Doum.

A total of 4,448 citations of plants used as food, medicinal, service or yams were recorded during the study. An average of 59.31 citations per household was recorded, the highest in Nkolemboula (70.24). Edible plants were the most cited (37% of all citations) followed by medicinal plants (34%). Additionally, as many as 91 ailments were reported as being treated with medicinal plants, with malaria being the most commonly cited (6.47% of citations), followed by diarrhoea (3.35%) and coughs (2.20%). As many as 180 plant species were cited as medicinal plants with more than 20 different plant parts used as medicine. Bark (60% of citations) were the plant parts most commonly used, followed by leaves (22%).

All plants and plant parts mentioned by the informants were collected (where possible, and/or photographed) and plant voucher specimens prepared. Identification of all plants was undertaken with the help of Mr. Victor Nana at the Cameroon National Herbarium in Yaoundé. Around 75% of the plants mentioned in the interviews have already been identified, at least to the genus level. A database of all used NTFPs is now available, containing information on traditional usages, species names and biological characteristics. A scientific paper aimed for publication is planned, as well as another one on the market chain analysis of the NTFPs in the study area.

Our study illustrates not only the high richness of the area in terms of NTFPs, but also the knowledge of forest products still available within the Baka communities.



Fig. 2. Team photo of the Darwin project team (and including Ms. Victoria Pinion from LTSI, third from the left) and the ethnobotanical team led by Dr. Jean Lagarde's (first on the right) from the University of Bertoua.

iv) *3D projection augmented landscape models*

3D Projection Augmented Physical Landscape Models (3DPALM) is a form of geographic visualization to help people develop a greater understanding of spatial and temporal patterns. 3DPALM has been used with indigenous and rural communities in Northern Australia, Alberta Canada and the Costa Grande region of Mexico to achieve landscape process simulations to support participatory planning, learning and cross-cultural knowledge exchange.

We obtained funding from CIFOR headquarters to engage the support of an expert on 3DPALM to travel to our study site in Cameroon to demonstrate the potential applicability of this approach for our Darwin project. Our collaborator, Mr. Rohan Fisher, from the Research Institute for the Environment and Livelihoods at the Charles Darwin University, Darwin, Australia joined our Darwin team in Cameroon for 10 days (4-14th March, 2019).

3DPALM are used to project spatial data, spatial data animations and spatial simulations onto 3D printed landscapes. Creating a 3D terrain surface to display landscape data helps participants identify their place in the landscape and the topographic effects on landscape interaction. The projection-augmented landscapes look spectacular, something like an animated hologram, are multi-sensory and interactive, and therefore pull people into learn and teach by providing a stage to illicit share local stories from the land. This innovative technology is currently being used by CDU in a variety of teaching and cross-cultural and inter-generational knowledge exchange contexts primarily in Northern Australian remote Indigenous community contexts.

Before travelling to Cameroon Mr. Fisher produced a 3D printed landscape at CDU as a 20-tile mosaic using 30-m global elevation data. The total dimensions of the final model produced was approximately 105cm x 84cm. A second smaller version of the model (~ 55 x 40cm) was printed to enable more detailed interaction with the landscape models.

A custom interface for projecting and animating key spatial datasets was created using Netlogo open source agent based modelling software. Netlogo enables the viewing of multiple GIS through a very simple interface, requiring no GIS skills, allowing multiple spatial data overlays and visualisations, as well as interactive animation of spatial data, adding a temporal dimension to otherwise static data and making the display 'alive'. The Netlogo interface and code is open-source and easily modified to include further spatial data visualisations. Through standardising

the display format it simplifies the process of aligning the projected display to the printed landscape.

The following maps were prepared: 1) Base map 1, Shaded hill relief maps showing villages and primary roads; 2) Base map 2. Grey scale relief map with village locations marked; 3) Satellite image – Cloud free sentinel 2 satellite imagers and 4) Hunting Areas – Participatory mapping of hunting areas as produced through discussions with Baka hunters at each village.

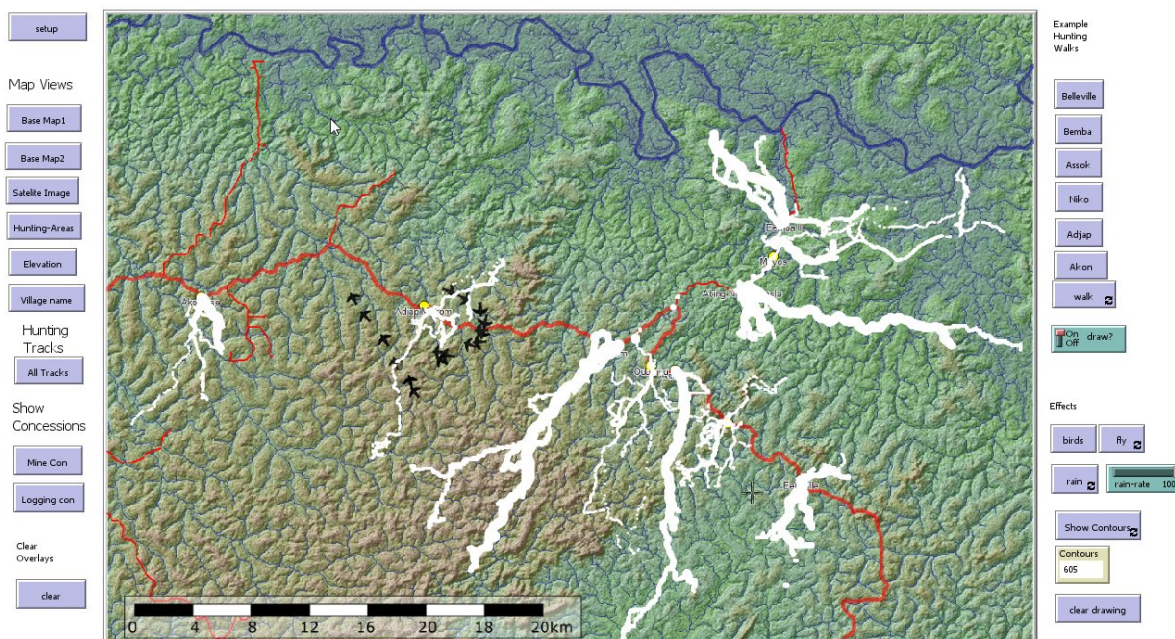


Fig. 3. Screen image showing the interface set-up used to display onto the 3D terrain surface.

A number of overlays – datasets that can be displayed over base maps - were also made available: 1) Village names; 2) Hunting Tracks – these are all of the hunting tracks recorded through GPS tracking conducted by Baka hunters; 3) Mining Concessions; 4) Logging Concessions; 5) Animated layers – these layers are ‘set’ and ‘run’ and add temporal dynamics; 6) Hunter tracks. Example hunter tracks for each village were incorporated into the model to illustrate movement through the forest to ‘hunting grounds; 7) Birds flying. Adding dynamic dimensionality. Birds flock across the landscapes; 8) Rain, water flows through over the landscape filling valleys and illustrating wet-season inundation; 9) Show Contours, shows elevation contours moving up and then down the elevation dataset.

Whilst in Cameroon, Mr. Fisher trained country staff in using and altering the models. All 3D prints, projector mounting gear and landscape visualisation software and source code were left with project staff. All models were used in engaging stakeholders in the Community of Practice meeting and hunter meeting in Djoum (see below for more details).

During discussions related to the model development it was clear that the agent-based modelling application used to develop the spatial data visualisation interface could also be applied to illustrating the complex ecological system dynamics of the Baka hunting communities. A forest hunter agent-based model was developed to describe key hunting prey species dynamics. The model has been uploaded to the Modelling Commons web resource site: http://modelingcommons.org/browse/one_model/6014#model_tabs_browse_info

b) Stakeholder meetings

i) Community of Practice

During the Project Leader’s visit to Cameroon in March 2019, we organised two significant stakeholder meetings to present our findings.

The first meeting was a whole-day Community of Practice session in which 24 participants of over six partner organisations (including Zerca y Lejos, Forest People Program, Zoological Society of London, University of Douala and our partner Darwin project in the Dja) assisted. The meeting was held at the Mount Febe monastery in Yaoundé on the 11th March 2019. The aim of this meeting was to present the results of our data gathering phase and initiate discussions on the next phase of the Darwin project (see attached pdf of the meeting presentations).

The day was divided into more formal presentations during the morning session during which we had 10 talks on working with the communities, food and health, wildlife use, using projected augmented landscapes, agriculture and traditional use of plants. We ended the morning with an update on the theory of change of the Darwin project and general discussion. During the afternoon, we divided the participants into working groups that tackled the following questions:



Fig. 4. Photo of participants in the Community of Practice meeting, held on 11 March 2019, at Mount Febe Monastery, Yaoundé.

- How do we rollout our work to inform future work in other similar communities?
- How do we involve national and international entities in directing further work towards securing the rights of indigenous peoples in Cameroon?
- How do we engage extractive industries (mining, logging, industrial agriculture) in supporting the rights of indigenous peoples?
- What opportunities exist within NGOs and other volunteer sectors in helping indigenous communities achieve greater political representation and a greater constitutional power within the Cameroonian state?
- How can we ensure a constructive interaction between Bantu and Baka societies to confront the environmental and political challenges facing both communities?
- How can we engage the conservation sector to work with indigenous communities to resolve potential conflicts between use of wildlife resources and protection of biodiversity?

ii) *Hunter community meeting*

We organised a meeting with hunters and village reporters (30 in total) who have been participated in the hunting data-gathering phase of the Darwin project. The meeting was held in Djoum on 13th March 2019. The main aim of the meeting was to present the results of the data acquisition phase of the project, and engage with the participants in discussing the information gathered via the use of the 3DPALM system.

The meeting commenced with an introduction to the aims of the meeting by RO, our faunal assistant, in Boulou. Robert provided the context for the meeting. The 3DPALM was then presented to the participants by Mr. Rohan Fisher (Fig. 5) to visually describe the information gathered (hunting tracks, hunter movements, logging and mining concessions, roads etc.) so as to discuss issues facing land management in the Baka forests.



Fig. 5. Photo showing Baka community members participating in our hunter community meeting, held on 13 March 2019, at the Zerca y Lejos headquarters in Djoum.

All discussions were led by RO in the local language. The response to the model was very positive and several of those in attendance were keen to see this approach used in other local community resource management contexts. The way the visualisation technique facilitated communication between local communities and ‘out-side’ resource planners was seen as an extremely important and powerful function of the approach.

The model was used extensively by RO and will be used by him in his discussions with the communities in which we work. Although some assistance was provided in changing spatial layers RO was able to provide detailed commentary and to elicit comments and discussion from the Baka. A significant moment was when the Baka hunting GPS tracks were animated across the landscape. The tactile projection of the 3D landscape onto which the images were projected assisted in engaging with the community and in communicating project information and land use threats.

Brief description of progress by outputs

Output 1: *Research outputs developed and shared with target audiences (local government, villagers and international development community)*

A paper on body mass index (BMI) of Baka residents in our Darwin villages and on the application of WHO child growth standards to Pygmies has been completed from the health screening data gathered by our team of medics. This paper is now under review in the journal PLOSone. The main aim of the paper is to highlight the importance of using ethnic-specific growth standards to assess malnutrition in distinct human groups like the Pygmies of Central Africa. The outcome of our paper will be useful in the proper assessment of the nutritional status of the inhabitants of our Darwin villages and elsewhere. A second paper on the health status (including the incidence of disease) in the 10 Darwin villages is also been prepared to be sent for publication by May 2019. Although all these data are being analysed and written for scientific publications, the underlying analyses and results are used by our team to better understand the relationship between the health of our study populations, nutrition, and use of agricultural and wildlife food resources in our Darwin villages.

We still plan to deliver at least four articles by the end of the project on: 1) hunting and hunting sustainability by the Baka; 2) dietary and nutrition intakes of the Baka; 3) linkages between wild and domestic foods and human health in the Baka and 4) faunal status and changes over time in community areas inhabited by the Baka.

Output 2: *Databases created and made available for use by nutrition practitioners and field managers.*

All data generated by this project will be distributed freely amongst the relevant authorities in Cameroon, and with colleagues and partners working in development and conservation issues. In our project, we have placed particular emphasis on assembling nutritional composition of foods grown and collected by the Baka, particularly to understand the contribution made by wild foods to their nutritional wellbeing. Analytical data and information on macro- and micronutrients of domestic and wild foods in Central Africa is available, principally for the more common foods. However, there is still a lack of data on wild foods. The addition of data on the use of wild plants to be collected by our Cameroonian colleagues, especially Dr. Jean Lagarde Betti (see above), will complement the information gathered by our team on wild meat. These joint databases together will allow us to develop a more complete picture on how and what uses Baka communities make of NTFPs.

Output 3: *Hunting use zones maintained with hunters across 10 communities.*

3.1. Participatory mapping of hunting zones

As for our 5 villages (Phase I) in Y1 we will develop participatory maps detailing hunting areas used by each community for the Phase II villages. We will generate maps, aided by remote sensing land cover analysis, involving focus groups with key informants from each village.

Phase II of the participatory cartography was carried out between 20/09/18 and 15/10/18. During these meetings we first allowed participants to present any issues and problems they were facing with regards to use of resources and their understanding of their current living conditions. Following these discussions, we carried out the participatory mapping exercise. A total of 239 villagers (women, men and children) participated in these meetings.

The resulting maps allow us and the community to identify forest areas that can provide wild meat and also other wild products. These maps will also permit better monitoring of these against non-community hunters and illegal use. The maps show that the hunting areas vary in size, most of them start relatively close to the settlements. Further analysis of these hunting areas will be conducted once we have repeated the process in the five villages of Phase II.

3.2. Hunter offtake and hunter follows

Hunting information gathered from the 10 Darwin villages will be used to understand the use of wildlife resources by villages and assess their impact. We divided our hunting data-gathering program into two phases of 5 months (5 villages per phase), as explained in our YR1 report.

a) Hunter offtake

We gathered hunting data in the Phase I villages (Bemba II, Nkolemboula, Doum, Assok, Belle-Ville) for the period 12/03/18 – 10/07/18, and during 17/10/18 – 27 /02/19 for the Phase II villages (Akonetge, Adjab-Mintom, Oudoumu, Meyos-Mimton and Akom). All data collected have been collated and are currently stored and available for further analyses in the project's Google Drive.

A total of 133 hunters participated in this data collection phase, more than anticipated at the beginning of the project (see YR1 report). We now have close to 12,000 hunting records (Table 1), comprising information on the hunting of 44 different game taxa; reptiles (n = 6), birds (n = 5) and mammals (n = 33). Ungulates (10 species) made up the largest proportion of species and biomass hunted in all villages. The blue duiker (*Philantomba monticola*) was by the far the most commonly hunted animal, followed by the brush-tailed porcupine (*Atherurus africanus*). Preliminary analyses indicate significant differences in offtake between villages as well as clear contrasts in individual hunter extraction rates and hunting effort. More elaborate analyses are currently being undertaken towards the preparation of at least two scientific publications.

Table 1. Number of hunters participating and hunting records obtained on hunting offtake in the 10 villages in the Darwin project.

Village	Hunters	Hunting records	Total Species
Assok	17	747	11
Adjap	9	1,005	18
Akom	9	1,265	31
Akonetye	13	1,301	13
Belle-Ville	13	1,084	20
Bemba	27	2,472	27
Doum	12	1,234	38
Meyos	10	1,306	39
Nkolemboula	15	928	35
Odoumu	8	59	11
Total	133	11,401	

b) Hunter follows

From hunters who agreed to wear a wrist-held GPS to self-monitor their hunting ranges we have obtained a total of 479 hunting tracks. We gathered hunting territory data for 23 Phase I hunters, between April and July 2018, resulting in 240 hunting itineraries (Table 3) and another 239 GPS tracks from 24 hunters in the five Phase II villages between October 2018 and February 2019 (Table 2).

Table 2. Number of hunting trips self-monitored by participating hunters in Phase I and Phase II villages in the Darwin project.

Phase I Villages		Phase II Villages	
Village	Total	Village	Total
Assok	28	Adjap	44
Belle-Ville	51	Akom	32
Bemba	24	Akonetye	45
Doum	92	Meyos	79
Nkolemboula	45	Odoumu	39
Total	240	Total	239



Fig. 3. Examples of hunters in Darwin villages wearing wrist-held GPSs to monitor their hunting trails and hunting areas.

All hunter GPS tracks have been transferred to our GIS platform and currently undertaking spatial analyses on these data. By overlaying all tracks, we will be able to generate use maps and from these demarcate areas of importance for hunters in each of the Darwin villages.

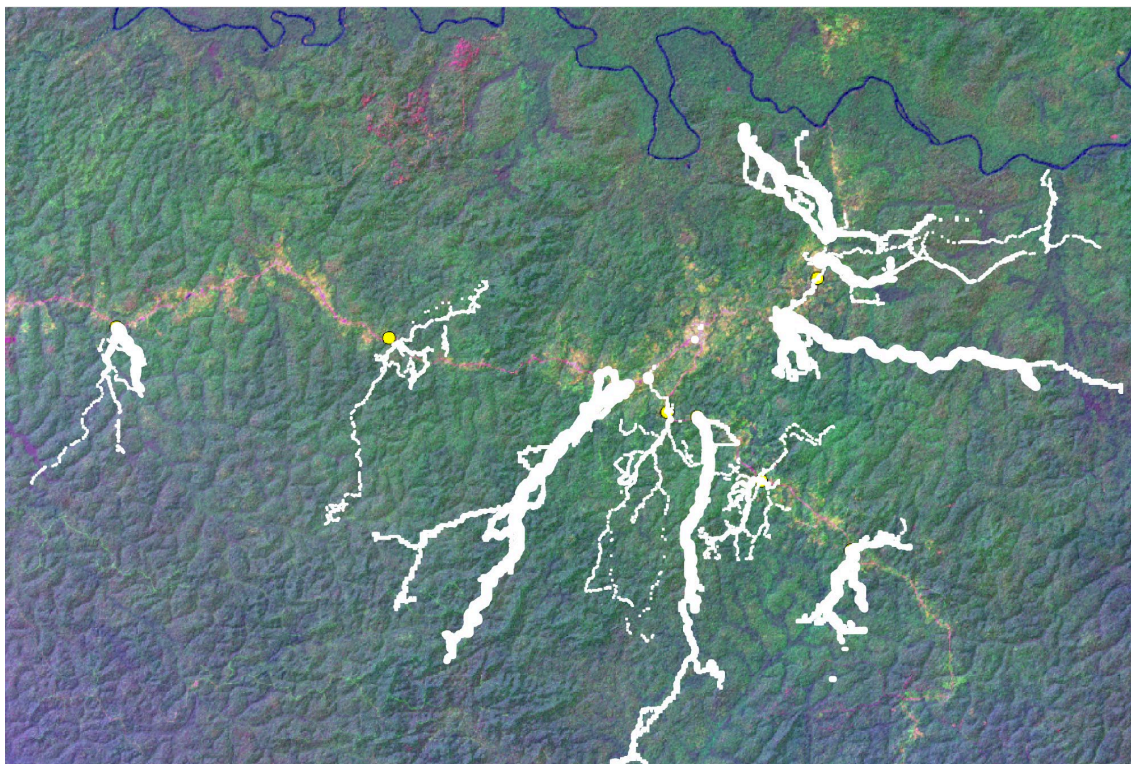


Fig. 2. Map showing hunter tracks (in white) obtained from wrist-held GPSs carried by hunters participating in the Darwin project. The thickness of the tracks indicates the frequency of use of the different tracks.

c) Reproductive cycles of game species

With the support of Dr. Pedro Mayor (University of Barcelona) and Mr. Hani El Bizri (Manchester Metropolitan University), scientists working with the Project Leader’s research team on hunting and reproductive biology of Amazonian game species, we have now prepared protocols for collection of data on reproductive cycles of the main prey species in our study area. Funding for this is being sought, and when available we will engage again with the University of Bertoua to train Cameroonian students to perform this work in the field.

Output 4: *Independent [i.e. not linked to wild meat offtake] measures of population status of protected fauna available for management purposes.*

4.1. Camera trapping grids in identified hunting zones

Camera trapping has been used to record medium to large mammals and terrestrial birds in the hunting areas defined by our study communities. We will use the data gathered to determine the state of hunted fauna in these sites by determining whether there has been selective local extinction of large-bodied species or populations (defaunation).

We removed camera traps laid out in the first three grids in Y1 between the 6/7/2018 and 13/6/2018. We lost only 4 traps out of a total of 37 placed (36 in grids and one extra one along an old elephant path). Trap removal was carried out by Mr. Kentatchime Fabrice, a collaborator working for the Zoological Society of London (ZSL) under the supervision of Robert Okale (RO). All images are now with our MMU Faunal Analysts (FAN), Dr. Selvino De Kort and Dr. Bradley Cain for post-hoc analysis.

Preliminary analyses of the 18 Gb of images obtained from the 33 camera traps recovered, have detected the presence of at least 41 different taxa in the three grids (2 reptiles, 8 birds, 31 mammals). Threatened species such as giant pangolin, leopard, mandrill and chimpanzee occur in the area, some of them in high numbers. Occupancy analyses, which will be completed by the end of 2018, will determine relative abundance and distribution of the more common species.

Placement of another three camera trapping grids around the Phase II villages’ hunting areas is planned for early 2019. These grids will be positioned according to the maps generated through participatory mapping for the Phase II villages. We intend to employ Kentatchime Fabrice to set up the trap grids and then collect traps on completion. Our MMU Faunal Assistants will be involved remotely in advising our ground team on the setting up of the three new grids. They will not be travelling to the field to do this, due to costs.

4.2. Hunter and fisher perception surveys

Hunter and fisher surveys have been completed in the five Phase I villages. A total of 45 fisher and 51 hunter questionnaires have now been applied among the five villages (Table 3). All data were gathered using hand-held devices, using the program Open Data Kit (<https://opendatakit.org>). We have started applying fisher and hunter surveys in the Phase II villages but were not completed by February 2019 as planned. We aim to finish these by the end of this year.

Table 3. Number of households, fisher and hunter surveys applied within the five Phase I villages in the Darwin project.

Village	Households	Fishers	Hunters
Assok	12	6	11
Belle-Ville	8	7	9
Bemba II	12	10	12
Doum	12	9	12
Nkolemboula	9	13	7
Total	53	45	51

Output 5: Improvement of human health and livelihoods achieved through an increase in dietary intake, nutritional status, and medical interventions.

5.1. Household income and wealth surveys

We were able to apply household surveys (HHS) in 53 households within the Phase I villages (Table 3). All surveys were undertaken by RO. We will be performing another large sample of HHSs in the five Phase II villages. We aim to obtain data on at least another 50 households for this next Phase.

5.2. Baseline survey of health status of Baka population

The results of the first health campaign in March 2018 are now being analysed, with a paper sent for publication. The database on anthropometrics and disease will allow us to determine malnutrition levels in all our study populations. We will analyse the health of these communities against a background of access to wild and agricultural products. Although we are aware that these correlations are to be interpreted with caution, we are confident that we have the expertise and sufficient sample sizes to triangulate between health and food production and access.

5.3. Baseline survey of agricultural production and activity

We continue our work with ZyL in supporting the improvement of cultivation of food crops. Led by our agronomist, FF, we work regularly with the participating families through focus groups and specific instruction sessions. Data on crop production are currently being gathered so as to determine the success of our initiative.

Additionally, through the suggestion made CIFOR-Cameroon, we contacted the International Institute for Tropical Agriculture (IITA), based in Yaoundé, to advise us and to review our current agricultural practices to improve these, increase knowledge of participating families, and overall ensure a sustainable agriculture and the food self-reliance of our study communities. Together with IITA, we will develop indicators to help our team better monitor the work being carried out.

We have signed a contract for an IITA consultant to start work in the field in Nov. 2018.

5.4. Food consumption and nutrition surveys

A photographic catalogue of all food items consumed by the Baka communities has been completed.

After translation into French, we tested the use of the USAID Household Food Insecurity Access Scale (HFIAS) during April and May 2018 in our study villages. We concluded that this method was not directly applicable to the reality on the ground (questions are too abstract, and people did not understand their meaning) and therefore could not be used to represent the actual nutritional situation of our study population. Given these shortcomings, we adapted the questionnaire, and sought advice from Prof. Barrie Margetts (Southampton University) and Dr. Amy Ickowitz (CIFOR), both experts in the field of human nutrition. Their feedback was most useful. We will be applying the new questionnaire in Feb. 2019. The information gathered with this questionnaire will give us a broad understanding of whether our Baka population are compromised in terms of availability of meals.

We collected food consumption data from 31 households in Phase I villages during August-October 2018. Information from another 30 will be gathered from the Phase II villages

Information on daily caloric intake and dietary diversity within each household will be analysed through the application of the "24-hour recall" method. This method consists in collecting information on all foods cooked and consumed inside the house, as well as the amount of each in a period of 24 hours. EA, our Health Officer, with our Baka assistant Susana undertook this work.

We plan to conduct a protein consumption survey, applied to schoolchildren. This method has been applied before in Africa and South America by Dr. Nathalie van Vliet¹, a CIFOR colleague, and has been particularly successful in generating cross-sectional data on types and frequency

¹ van Vliet, N., Nebesse C., Nasi, R. (2015). Bushmeat consumption among rural and urban children from Province Orientale, Democratic Republic of Congo. *Oryx*, **49**, 165-174.

of consumption of different meats. This study aims to obtain information on the importance of animal protein in the diets of the populations studied, including meat and fish. The subjects of study are students aged 8 to 12, Baka and Bantu that currently attend the Catholic schools of Djoum and Mintom; Zyl runs these schools. The study consists of a questionnaire combining open and typical questions about the type of meat and fish eaten the day before at home, as well as the child's preference for one type of meat or another. This study includes a prior informed consent process overseen that will be approved by the Ethics Committee in CIFOR; we will inform parents and guardians of children about the purpose and conditions of the questionnaire, so that we can obtain their voluntary consent on a voluntary basis.

Since some villagers spend time in the forest to carry out various activities, part of their diet is consumed informally outside the home. In order to document this intake, we have recruited a sample of Baka men and women, volunteers from our study villages studied, to record foods eaten outside the house (but also in the house), over a period of several weeks.

3.2 Progress towards project Outputs

Output 1: *Research outputs developed and shared with target audiences (local government, villagers and international development community).*

At this stage of the project, the focus has been on ascertaining baselines for all outputs. Papers planned for publications are currently in preparation, with one already being sent for publication. All preprints of papers are shared with our Community of Practice members before publication. Results of our work has been shared during stakeholder meetings in March 2019 (see above).

Output 2: *Databases created and made available for use by nutrition practitioners and field managers.*

All information collected during this year has been entered into specific databases and are currently shared between project partners in Google Drive.

Output 3: *Hunting use zones maintained with hunters across 10 communities.*

Hunting use zones have been delimited for Phase I and Phase II villages and mapped. These hunting zones, alongside information gathered on wildlife offtake and hunter movements in our 10 Darwin villages will be used in Y3 to generate sustainable hunting management plans.

Output 4: *Independent [i.e. not linked to wild meat offtake] measures of population status of protected fauna available for management purposes.*

Images resulting from the camera trapping undertaken in Y1 are still being analysed. This process has taken longer than planned. Preparations are under way for a second camera trapping campaign to be undertaken in January-February 2020.

Output 5: *Improvement of human health and livelihoods achieved through an increase in dietary intake, nutritional status, and medical interventions.*

This output will result from the interlinking of all data gathered within the different aspects of the project once available.

3.3 Progress towards the project Outcome

We are satisfied that the indicators set during the project application phase (and revised with the help of Victoria Pinion from ITSI during our mid-term review, for which we are grateful) remain relevant for monitoring progress towards achieving the project outcome and that we are on track with achieving this by the end of the project. As described in Section 3.1, Y2 activities have progressed well. Importantly, we have kept all communities adequately informed and motivated and this has resulted in a significant participation by all villages in the Darwin project. We have equally involved national staff and have taken steps towards opening up opportunities for Cameroonian students to work with us.

It is too early to determine whether the outcome of the project will be attained. However, we are confident that on the basis of our advancement in the first and second year the outcome can be achieved if we are able to: 1) sufficiently engage with the communities so that a significant number of hunters control offtake of fast-breeding species to sustainable levels²; 2) convince

² Measures of hunting offtake and effort, hypothesised to track underlying changes in prey population densities, have been suggested as an alternative method for monitoring sustainability. One commonly mentioned example is Catch
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hunters to reduce their dependence on the trade of large amounts of wild meat (and especially the sale of larger, more lucrative, protected taxa); 3) demonstrate that by generating alternative income sources from farming practices (to which women are active contributors), commercial hunting is less important for the household; and 4) prove that there is a positive link between nutritional returns from an adequate production of domestic crops and regulated wild meat extraction and better human health. We are aware that these are most challenging aims, but there is every indication that we are moving in the right direction. The learning generated by the project will provide valuable lessons in terms of balancing local human development with broader conservation concerns against the backdrop of entrenched poverty.

3.4 Monitoring of assumptions

Assumption 1: System is in place to allow continuous data analyses to disseminate project learning before publications appear.

Comments: No issues. Analyses of all datasets are being undertaken, and results communicated to the relevant partners.

Assumption 2: Written papers are used to disseminate results of project and used to further discussions with appropriate authorities.

Comments: We are well on the way of producing the planned number of publications. These will be made widely available to the international conservation and development communities. Equally, results contained in our publications will be communicated to Cameroonian authorities and scientists.

Assumption 3: Nutrient composition database supervised by the project's Food and Nutrition expert, Dr. L.O'Connor at MMU. Our nutritional work has been supported by Prof. Barrie Margetts (Univ. of Southampton).

Comments: Dr. O'Connor is no longer involved in our project since she has relocated to Ireland. Nutritional support has been given by Prof. Margetts and Dr. Amy Ickowitz from CIFOR.

Assumption 4: CIFOR-C intervention consultant supports the project to better understand outcomes and future prospects.

Comments: CIFOR-C has supported our project in different ways. However, CIFOR-C's recommendation was for us to engage with IITA to undertake research on ways of improving subsistence agriculture in the Darwin villages.

Assumption 5: MINFOF is able to send ecoguards to attend the training workshops.

Comments: We are currently in discussions with MINFOF so they can engage with us in the end-of-project training sessions. We are hopefully that a number of ecoguards, especially from the Dja area, can attend.

Assumption 6: Local research assistants employed to support data gathering.

Comments: This assumption can now be discarded. The participation of local hunters and villagers in our project has been more than expected.

Assumption 7: Hunters motivated to contribute to the project.

Comments: As in Assumption 6, a large number of hunters have participated and continue participating in our project.

Assumption 8: Conditionality of no hunting of protected species created in line with health and agricultural support provided via Output 5.

Comments: We are confident that hunters in our Darwin villages will be able to comply with this requirement as part of their commitment to supporting sustainable hunting plans agreed by all communities. Future reporting will explore how this will be carried out through the project and beyond.

Per Unit Effort (CPUE) of hunters. Instead of setting a hunting quota by estimating production, hunting quotas can be modified on a trial-and-error basis, guided by changes in CPUE, with managers aiming to keep CPUE at a constant. The advantages of this method are that hunting data are relatively easy and cheap to collect, and can be recorded by the local communities and hunter groups themselves with minimal training requirements. While CPUE may be correlated with species population densities, measuring CPUE on its own cannot provide accurate assessment of species population densities, unless combined with population surveys at various intervals of time. In addition, self-reporting relies on local hunter engagement, and if changes in CPUE result in lower, enforced, quotas, hunters may become less willing to supply this information.

Assumption 9: Hunting information obtained can estimate level of protected species offtake. Use of indirect methods to determine veracity of reports. Use of targeted interview techniques can verify if hunters participating in the project are taking protected species.

Comments: We are still in the process of undertaking these assessments. However, from our data, we infer that the levels of protected species offtake are considerably low.

Assumption 10: Increase in populations of protected species can be linked to the project's activities.

Comments: This assumption is still valid, though means of verifying this will

Assumption 11: Food security measured as "physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life".

Comments: This has been done and supported by the data obtained on nutritional intake and access to food sources.

Assumption 12: Baseline information on health available from ZyL medics. Ethical premises of use of persons' medical records are clear.

Comments: We now have health data on all Darwin villages for 2018 and 2019, and ZyL has allowed us to access data from health campaigns going back to 2007 when these started.

Assumption 13: Agricultural extension programmes and training of women farmers will continue to be operated by ZyL.

Comments: Our discussions with ZyL confirm that the NGO will continue these activities in the Darwin villages beyond the lifetime of our project. ZyL has received new funding from Rioja Alta for their Autonomia project (see above).

Assumption 14: Information of food production by families gathered at the start of the project.

Comments: This has been done.

3.5 Impact: achievement of positive impact on biodiversity and poverty alleviation

During the first and second year of the project we have focused on undertaking a detailed assessment of conditions on the ground, fully engage and support the communities and prepare the conditions to work on the establishment of a working model for sustainable wild meat extraction for subsistence. Equally we have advanced in improving domestic food production. Better nutrition of domestic and wild products will have a positive impact on human health. We will be able to measure the contribution our project has made towards this aim.

4. Contribution to the Global Goals for Sustainable Development (SDGs)

Our project is working towards Goals 1 (No Poverty), Goal 2 (Zero Hunger), Goal 3 (Good Health and Well-being), Goal 5 (Gender Equality) and Goal 15 (Life on Land).

5. Project support to the Conventions, Treaties or Agreements

The project will, through the promotion of a working model for sustainable wild-caught meat trade, contribute to the implementation of Articles 8c, 8d, 8i, 8j, 10a, 10c, 17.1, 17.2 of the CBD.

6. Project support to poverty alleviation

Our target communities are Baka groups in southeastern Cameroon that have been displaced from their traditional hunter-gatherer lifestyles to live in roadside villages. In socio-economic and political spheres, the Baka are underprivileged in comparison to the more prevalent Bantu peoples in the country. Thus, our project is directly aimed at improving the lives of these rural indigenous peoples by working towards mechanisms that ensure a sustainable supply of domestic and wild foods, and by so doing better their health. We also aspire to raise farm incomes as a main element of an antipoverty effort, providing safety nets and building opportunities for self-sufficiency.

7. Project support to gender equality issues

Our project encompasses a vehicle for women's empowerment given that many women in our target villages are involved in agricultural activities led by ZyL. On the other hand, as household and food managers, women work closely with our HO on nutritional issues providing essential information on food insecurity issues, foods consumed and their preparation. This results in their empowerment and encourages their active participation in our project. Moreover, the recruitment of a female Baka assistant to assist us with our work in the villages engenders further trust in our project. This also promotes active participation in community group discussions and makes sure that their points of view are considered.

8. Monitoring and evaluation

The validity of our output indicators set during the design phase of the project has been further confirmed during the second year of our project as well as the specific milestones set for each. These milestones are incremental and easily evaluated as having been achieved or not. All our indicators are measurable, achievable and relevant, and can be done within a specific period of time within the project.

Baseline data on socioeconomic, health and biological variables for our project have been successfully gathered during the second year. After an initial period of consultation with experts and discussions within the team, we regularly monitor the way information is being gathered in the field as well as the quality of all information resulting for each milestone. Of particular importance has been the attention paid by us to preparing adequate and realistic protocols for collecting the needed data. Once these protocols have been in place, all data gathered has been discussed with our partners and colleagues.

Although we will be including other experts as our project evolves, during the second year we have relied primarily on our team to monitor and evaluate progress (Table 4).

Table 4. Description of M & E strategy used in Y2 of the project.

Monitoring needed	Evidence/data available	Data sources	Regularity of monitoring	Person/s responsible	Resources
1. Socioeconomic status of households	Demographics, assets, income, wealth, livelihoods	Interviews	Weekly	ICPC, FA, PL*	Covered by project
2. Use of wildlife	Number/type of animals hunted, hunting effort, number sold or kept for own consumption	Village reporters	Weekly	ICPC, FA, HO, PL	Covered by project
	Geolocation of tracks used by hunters in forest	GPS records	Weekly	FA, HO, ICPC, PL	Covered by project
3. Village hunting zones	Participatory mapping process with hunters	Maps	Reviewed by team for accuracy of locations mentioned by villagers during the mapping process	FA, ICPC, PL	Covered by project
4. Faunal status in	Camera trapping	Photos	Procedures	FA, HO, ICPC,	Covered by

village hunting zones			checked by MMU FANs	PL	project
5. Household nutrition	Food consumption patterns	Food lists	Once at the end of information gathering period	HO, ICPC, PL	Covered by project
	Food insecurity measures	Modified HFIAS Questionnaires	Weekly	ICPC, HO, PL	Covered by project
6. Human health		Medical examination records	Once at the end of each medical campaign	ICPC, HO, PL	Covered by ZyL and volunteers

*PL = Project Leader

9. Lessons learnt

In the first year and part of the second year of the project we have concentrated on generating information from different activities that will allow us to understand the issues affecting the health and food security of displaced hunter-gatherer communities in Africa. We are increasingly confident that our system of data collection and interaction with the target communities and national authorities will permit us to respond to the challenges facing our project.

What worked well was the rapport we have been able to establish with our target communities. This is primarily due to the long-term relationship that our partner organization, ZyL, has cemented in its 17 years of support to the Baka in the region. Because of this, engendering trust for the Darwin project by the communities has been relatively easy. The main lesson learnt here is that links with local partners, a fact which is made explicit in Darwin project, is a fundamental launchpad for achieving results in any project. We deliberately chose to work ZyL particularly because of its long track record of activities on the ground.

In this second year report, as we have done in our first year report, we allude to the significant contribution made by our national staff members, RO and FF cannot be underestimated. They have been stalwart contributors to the success of the project in Y1. Their professionalism and rapport with our communities have enabled us to generate a level of information that, in our opinion, is unprecedented. Selecting good professionals from the project country not only will ensure that the project is successful but also that knowledge and expertise remains in the host country.

10. Actions taken in response to previous reviews (if applicable)

Not applicable

11. Other comments on progress not covered elsewhere

None.

12. Sustainability and legacy

In terms of sustainability and exit strategy, at this stage, the project has focused on carrying out feasibility, assessment and baseline activities. The data collected, and sustainability considerations, will shape the model implemented beyond the life of the project.

The establishment of a Community of Practice ensures that lessons learned from the project are able to inform the wider conservation community in Cameroon.

13. Darwin identity

The project partners have referenced the Darwin Initiative at the project launch event and at project presentations to beneficiaries and key stakeholders and the Darwin logo has been displayed on all published material. The partners have explained the aims and objectives of the Darwin Initiative more fully to government stakeholders, the British High Commission in Yaoundé, as well as national and local conservation actors working in Cameroon.

14. Project expenditure

Table 1: Project expenditure during the reporting period (1 April 2018 – 31 March 2019)

Project spend (indicative) since last annual report	2018/19 Grant (£)	2018/19 Total Darwin Costs (£)	Variance %	Comments (please explain significant variances)
Staff costs (see below)				
Consultancy costs				
Overhead Costs				
Travel and subsistence				
Operating Costs				
Capital items (see below)				
Monitoring & Evaluation (M&E)				
Others (see below)				
TOTAL				

Annex 1: Report of progress and achievements against Logical Framework for Financial Year 2018-2019

Project summary	Measurable Indicators	Progress and Achievements April 2017 - March 2018	Actions required/planned for next period
<p>Impact: Hunting and agriculture are managed sustainably to improve food security and health of rural populations through the effective and sustainable management of domesticated and wild food resources.</p>		<p>This project can provide us with unprecedented insights in the linkages between food production, wildlife use and human health.</p>	
<p>Outcome Food security and health improved in Baka settlements (around 2,000 inhabitants) in southeastern Cameroon, through the sustainable use of wildlife resources, and implementation of environmentally friendly agricultural systems. We will focus on 10 representative villages during the project to roll out lessons learnt to the others in the region.</p>	<p>0.1 By end of Y2, at least a 10% increase in food security, 15% increase in dietary diversity in monitored households.</p> <p>0.2 By end of Y3 there is a 10% reduction of revenues from the hunting of resilient species in catchment areas and a 10% decrease in number of protected species hunted.</p> <p>0.3 By end of Yr3, a 10% decrease in anaemia rates in pilot Baka communities from a current 60%³, as a result of encouraging adequate nutrition.</p> <p>0.4 At least 50% of target communities involved in agricultural extension work are participating in project (against baseline of e.g. 13%).</p> <p>0.5 By end of Y3, there is a 10% increase in income from agriculture in 10 study villages.</p> <p>0.6 Cameroonian practitioners and university students trained on how to generate evidence for better decision-making when dealing with</p>	<p>In this second year we have completed all data collection on wildlife use, wildlife status and farm production. Data collection has been undertaken in two Phases (5 villages per phase) for variables that are less time sensitive, e.g. household surveys, hunter perception surveys. Hunter offtake data was gathered in all 10 villages and hunter follows have also been achieved in these villages. We have again this year mobilised a team of 11 doctors and dentists to perform baseline medical examinations in all 10 villages to determine malnutrition levels. Observations on food access and consumption by assessing food insecurity and undertaking 24-h recall are in progress and will be completed by May 2019. The success of our project will be judged by our ability to interlink all data gathered and use this as the basis for informing village-led initiatives to improve food production and sustainable wildlife use.</p>	<p>Continuation of data collection for hunter offtake, hunter follows, participatory mapping of hunting zones and camera trapping. We will start gathering quantitative information on food consumed and nutritional intake. Focus groups meetings with hunters on ways of regulating their offtake. Continuation of support of subsistence crop farmers.</p>

³ZyL health data of Baka populations in the study region (see <http://zercaylejos.org/proyectos/health-en/?lang=en>) indicate that 78%, 79% and 60% of children (6 months – 12 years) suffer from high intestinal parasite loads, malaria and anaemia, respectively.

	conservation-development interphases at the end of Y3.		
Output 1. 1. Research outputs developed and shared with target audiences (local government, villagers and international development community)	<p>1.1 Hunting offtake data and faunal abundance shared with MINFOF and other local and international conservation partners to increase uptake of results. COP meetings organised to disseminate and discuss results of project.</p> <p>1.2 Journal article of hunting pressures and hunting sustainability of bushmeat species submitted to open access journal by end of Y2.</p> <p>1.3 Journal article on dietary intakes and food sources of key nutrients prepared by end of Y2.</p> <p>1.4 Journal article on links between forest, domestic crops and general health, especially of vulnerable groups (children, aged <5) completed by end of Y3.</p> <p>1.5 Journal article on differences in large mammal abundance in community hunting areas vs non-hunted areas submitted by Y3.</p> <p>1.6 Report on land use and landscape analysis presented to project partners (Community of Practice, COP, collaborating universities, MINFOF) to understand conflict areas between extractive industries and livelihoods of study communities.</p>	<p>Two papers produced, one sent for publication and another two in preparation.</p> <p>All planned scientific outputs will be shared with our collaborators before publication.</p>	

<p>Activity</p> <ul style="list-style-type: none"> 1.1 Assembling project resources (in-country). 1.2 Project launch meeting (in-country) for partners and target communities. 1.3 Identification and establishment of agreed parameters. 1.4 Establishment of Community of Practice (COP). 1.5 Partnership agreements between project, communities, CIFOR-C, MINFOF representatives. 1.6 Ongoing monitoring of data collection by communities and local partner with monthly reports. 1.7 Monthly reports published on website and dissemination of project newsletter. 1.8. Six-monthly review (data collection) of biological indicators and socio-economic surveys. 1.9 Six-monthly analysis of data by MMU. 1.10 Annual meetings of COP. 1.11 Six monthly project review meetings with local communities, hunters and traders and local game guards to enable feedback from beneficiaries. 1.12 Development of publication drafts and circulation for internal peer-review. 1.13 Submission of final publications to peer-reviewed journals. 	<ul style="list-style-type: none"> 1.1 Achieved in Sept. 2017. 1.2 Achieved (see Annex 4.1). Reports of meetings available on request. 1.3 Achieved 1.4 Informally completed through meetings with different partners (see Annex 4.2). 1.5 Partnership agreements between project, communities, CIFOR-C, MINFOF representatives. 1.6 Ongoing monitoring of data collection by communities and local partner with monthly reports. 1.7 No specific website for the project developed since it was not considered high priority. Instead, popular articles prepared in its place. 1.8. Review of data collection procedures for all surveys undertaken throughout the year. 1.9 Regular review of data gathered by PL and MMU staff. 1.10 No regular meeting organised. Partners have met <i>ad hoc</i> but COP meeting organised with all partners on March 2019. 1.11 Weekly meetings held with all project collaborators in Phase I and Phase II villages. 1.12 Publication drafts sent to collaborators before sent to journal. 1.13 Expected in Y2 and Y3. 	
<p>Output 2. Databases created and made available for use by nutrition practitioners and field managers.</p>	<ul style="list-style-type: none"> 2.1 Electronic nutrient composition database of consumed foods in study area made available from MMU server and disseminated widely to potential users by Y3. [note creation of the database itself is activity 2.1] 2.2 Spatial data on wildlife extraction patterns stored in GIS shapefiles by end of Y2. 2.3 Wildlife use and extraction data stored in electronic database for use by project partners [by when?]. 2.4 In Y3, final workshop organised to train practitioners (e.g. MINFOF, Forest Peoples, Centre for Environment and Development, others) and Cameroonian university students on how to gather relevant data to understand 	<ul style="list-style-type: none"> 2.1 Nutrient composition database from other sources have been started, and discussions with MMU and CIFOR to plan for bromatological analyses to be performed in laboratories in the UK and/or Cameroon; 2.2 All participatory hunting maps for Phase I and Phase II villages stored as GIS shapefiles as available in the project's Google Drive; 2.3 Gathered hunting data (offtake and hunter follows) during Y1 and Y2 stored in Excel datasheets and deposited in the project's Google Drive; 2.4 Practitioners' workshops planned for Y3, no action needed in Y2. 2.5 Regular workshops organised by the PL in Djoum. 2.6 Four MSc projects started with University of Bertoua in the Darwin project. Field work completed and publication prepared.

	<p>conservation/development issues using our project area as a model.</p> <p>2.5 In Y1 and Y3, baseline and post-project review workshops respectively, organised with project partners and other stakeholders.</p> <p>2.6 At least 4 Master's student projects, a minimum of 2 from Cameroon, resulting from research undertaken for Outputs 3-5 completed by end of Y3.</p>	
<p>Activity</p> <p>2.1 Development of an electronic nutrient composition database of wild and domestic foods consumed in study area.</p> <p>2.2 Collection of samples for nutrient composition database of foods</p> <p>2.3 Preparation of nutrient composition database of foods for use in planned diet studies.</p> <p>2.4 Spatial data on wildlife extraction rates, and areas hunted stored in GIS shapefiles and analysed (cross ref. Activity 3.4)</p> <p>2.5 Spatial analyses of hunting areas and hotspots undertaken by MMU.</p>		<p>2.1 In progress.</p> <p>2.2 Not yet started. Foods identified and catalogued for</p> <p>2.3 Not yet started.</p> <p>2.4 Spatial data on hunting zones and hunter follows stored in GIS platforms. Data shared between field team and MMU.</p> <p>2.5 To be performed after all data gathered for Phase I and Phase II villages.</p>
<p>Output 3. Hunting use zones maintained with hunters and meat traders across 10 communities respecting agreed quotas.</p>	<p>3.1 By Y2, 70% of households in study communities (approx. 190 total families) participate in monitoring of wild species offtake. [note due to FPIC procedure followed, full participation cannot be guaranteed]</p> <p>3.2 By mid-Y3, community-based management plan for hunting resilient, fast-breeding species established in conjunction with at least 80% of participating hunters</p> <p>3.3. By end Y3, all participating hunters commit to complying with the community-based management plan developed between them and the Darwin project</p>	<p>3.1 Our meetings with all households in Phase II have been positive and there is a tacit willingness to participate in a collaborative scheme to monitor wild meat offtake to be developed by the end of Y3.</p> <p>3.2 Discussions with hunters on setting hunting goals and manage hunting practices started in Y2 but will be completed during Y3. An agreement of way forward to be signed by hunters by end of Y3.</p> <p>3.3 Offtake data on hunting of protected species collected during Y2.</p> <p>3.4 A total of 51 hunters from Phase I villages are currently participating in our hunting data collection scheme and another 50 have expressed interest in working with us in Phase II villages to commence in Y2.</p> <p>3.5 Hunting quotas discussed by the end of Y2, after all hunting data has been analysed.</p>

<p>Activity</p> <p>3.1 Focus group discussions with hunters to establish working practices (cross ref. Activities 1.4 and 1.8)</p> <p>3.2 Hunter interviews to establish hunting volumes and intensity</p> <p>3.3 Training of village reporters to document hunted prey volumes and frequency.</p> <p>3.4 Monthly village reports of animals hunted and numbers.</p> <p>3.5 Participatory mapping of hunting zones around target villages.</p>		<p>3.1 Achieved (see Annex 4.2).</p> <p>3.2 Continued in Phase II villages.</p> <p>3.3 Achieved. All village reporters in Phase II villages collecting hunting data.</p> <p>3.4 All data in Excel sheets are reviewed regularly and preliminary analysed done.</p> <p>3.5 Participatory mapping of hunting zones successful in Phase II villages.</p>
<p>Output 4. Independent [i.e. not linked to wild meat offtake] measures of population status of protected fauna available for management purposes</p>	<p>4.1 Abundance and distribution of hunted and protected species determined through analysis and interpretation of camera trapping data throughout Y1 and Y3.</p> <p>4.2 Status of fauna determined using traditional ecological knowledge (TEK) methods through hunter perception surveys undertaken during Y1 and Y2.</p>	<p>4.1 No camera trapping undertaken in Y2.</p> <p>4.2 Application of questionnaires not undertaken during Y2 due to other commitments. Plans to resume these in Y3.</p>
<p>Activity</p> <p>4.1 Baseline survey of wildlife status from hunter interviews.</p> <p>4.2 Capacity-building training for local members of monitoring networks.</p> <p>4.3 Camera trapping grids operational in identified hunting zones in Activity 3.4.</p> <p>4.4 Camera trapping data analysed by MMU to detect changes in presence and abundance large-bodied/protected analysed.</p>		<p>4.1 Hunter/fisher surveys not undertaken in Y2. Further interviews planned for early Y3.</p> <p>4.2 To be undertaken in Y3.</p> <p>4.3 No camera trapping undertaken during Y2</p> <p>4.4 Photos resulting from Phase I trapping grids being analysed in MMU.</p>
<p>Output 5. Improvement of human health and livelihoods achieved through an increase in dietary intake, nutritional status, and medical interventions.</p>	<p>5.1 By Y3, food security in households participating in agricultural scheme has improved from initial baseline estimates in Y1.</p> <p>5.2 By Y3, at least 30 women farmers trained in agricultural improvement and farming techniques.</p>	<p>5.1 Baseline estimates of human health, food consumption and nutritional intake and background wealth and income surveys started in Y1;</p> <p>5.2 Baseline data on anaemia rates achieved.</p> <p>5.3 Currently, 59 farmers (30 women) linked to project, another 30 expected to be trained in Y2.</p>

	<p>5.3 Number of households producing their own food and commercial crops will increase by 10% compared to baseline.</p>	<p>5.4 Baseline information of number of households producing their own crops obtained.</p>
<p>Activity</p> <p>5.1 Training of household and farming survey assistants.</p> <p>5.2 Baseline survey of home-produced foods and trade in sample households,</p> <p>5.3 Socioeconomic surveys of sample households.</p> <p>5.4 Baseline survey of health status in sample households</p> <p>5.5 Nutritional assessment of sample households based on dietary recalls.</p> <p>5.6 Baseline survey of agricultural production and activity in sample households.</p> <p>5.7 Training of women farmers</p>		<p>5.1 R.O. trained to apply household and hunter perception surveys. F.F. trained to record food production in farms associated with project.</p> <p>5.2 Home produced foods (e.g. livestock) is proving difficult to measure. Information on trade of foods produced or wild products extracted can be obtained from household surveys.</p> <p>5.3 Household wealth surveys will be applied in all households in all villages. Phase II village surveys to be completed in Y2</p> <p>5.4 Achieved in Y1. Second health survey planned for end of Y2.</p> <p>5.5 Understanding of foods consumed and dietary customs revealed from qualitative surveys in Y1. Insecurity questionnaires and 24 recalls to be undertaken in Y2.</p> <p>5.6 Surveys of food crops planted has been done in Y1 for Phase I villages. Data on quantities produced is challenging (see Section 5.3. above).</p> <p>5.7 Over 30 women training in agricultural techniques in Y1.</p>

Annex 2: Project’s full current logframe as presented in the application form (unless changes have been agreed)

Project summary	Measurable Indicators	Means of verification	Important Assumptions
Impact: Hunting and agriculture are managed sustainably to improve food security and health of rural populations through the effective and sustainable management of domesticated and wild food resources. (Max 30 words)			
Outcome: (Max 30 words) Food security and health improved in 10 Baka settlements (~190 households) in southeastern Cameroon, through the sustainable use of wildlife resources, and implementation of environmentally-friendly agricultural systems. (Note that these 10 settlements are representative of the overall Baka population in the Djoum-Mintom area of 2,000 inhabitants).	<p>0.1 By end of Y2, at least a 10% increase in food security, 15% increase in dietary diversity in monitored households.</p> <p>0.2 By end of Y3 there is a 10% reduction of revenues from the hunting of resilient species in catchment areas and a 10% decrease in number of protected species hunted.</p> <p>0.3 By end of Yr3, a 10% decrease in anaemia rates in pilot Baka communities from a current 60%⁴, as a result of encouraging adequate nutrition.</p> <p>0.4 At least 50% of target communities involved in agricultural extension work are participating in project (against baseline of e.g. 13%).</p> <p>0.5 By end of Y3, there is a 10% increase in income from agriculture in 10 study villages.</p> <p>0.6 Cameroonian practitioners and university students trained on how to generate evidence for better decision-making when dealing with conservation-development interphases at the end of Y3.</p>	<p>0.1 Household surveys in 50% of the 190 households (around 700 persons) of the 10 study villages. Description of food consumed, analyses of food types and nutrient intake (using 24-hour recalls), and food-insecurity questionnaires, undertaken in around 25% of all households (total 50 households).</p> <p>0.2 Hunting zones from hunter participatory mapping exercises, direct hunter offtake data and hunter territory maps.</p> <p>0.3 Medical records from all ZyL clinics. Consumption rates of macro- and micronutrients from dietary records. Impact of parasite reduction and malaria suppression.</p> <p>0.4 Surveys of fields dedicated to agriculture. Analysis of detailed records of agricultural production of all managed fields determined in Y1 as baseline, and production records kept during Y2 and Y3. Minutes of meetings.</p> <p>0.5 Income change from different sources calculated from data obtained in baseline household survey in Y1 and from two</p>	<p>Relevant government authorities support project interventions.</p> <p>Government authorities have sufficient authority and presence in the area to control the exploitation of protected species, but allows hunting of fast-breeding taxa.</p> <p>Improvement in anaemia rates result from both better nutrition from the project’s intervention and lowering of disease. The latter currently being undertaken by ZyL.</p> <p>Supply chains are open and supported by local institutions.</p> <p>Local markets are open to surplus subsistence crops (e.g. cassava, peanuts) and cash crops (e.g. cacao) cultivated in study communities.</p> <p>Rates of protected species bycatch (due to indiscriminate snaring technique of hunting) are not significant.</p> <p>Published evidence⁵ shows that among the poorest households, reliance on wild meat income is inversely related to domestic</p>

⁴ZyL health data of Baka populations in the study region (see <http://zercaylejos.org/proyectos/health-en/?lang=en>) indicate that 78%, 79% and 60% of children (6 months – 12 years) suffer from high intestinal parasite loads, malaria and anaemia, respectively.

⁵Nielsen, M.R. et al. (2018). The importance of wild meat in the global south. *Ecological Economics* 146, 696–705.

		<p>subsequent follow up surveys, at the end of Y2 and Y3.</p> <p>0.6 At least 10 MINFOF and university students trained on conservation/livelihoods methods.</p>	<p>animal income and revenue from agriculture. This is the basic tenet and assumption in our project.</p>
<p>Outputs:</p> <p>1. Research outputs developed and shared with target audiences (local government, villagers and international development community).</p>	<p>1.1 Hunting offtake data and faunal abundance shared with MINFOF and other local and international conservation partners to increase uptake of results. COP meetings organised to disseminate and discuss results of project.</p> <p>1.2 Journal article of hunting pressures and hunting sustainability of bushmeat species submitted to open access journal by end of Y2.</p> <p>1.3 Journal article on dietary intakes and food sources of key nutrients prepared by end of Y2.</p> <p>1.4 Journal article on links between forest, domestic crops and general health, especially of vulnerable groups (children, aged <5) completed by end of Y3.</p> <p>1.5 Journal article on differences in large mammal abundance in community hunting areas vs non-hunted areas submitted by Y3.</p> <p>1.6 Report on land use and landscape analysis presented to project partners (Community of Practice, COP, collaborating universities, MINFOF) to understand conflict areas between extractive industries and livelihoods of study communities.</p>	<p>1.1 Reports presented to MINFOF and other stakeholders. Meeting minutes and participant lists attending COP meetings.</p> <p>1.2 Data analyses and project records on hunting and faunal abundance made available to MINFOF before publication.</p> <p>1.3 Draft versions of papers made available for national and international peer review before being sent to relevant journals.</p> <p>1.4 Draft versions of paper, letters/emails showing stakeholders have been consulted, evidence of submission to journal.</p> <p>1.5 Draft versions distributed to stakeholders and partners for comments and analysis of implications.</p> <p>1.6 Draft versions distributed to stakeholders and partners for comments and analysis of implications. 3D Augmented Landscape analyses, undertaken in conjunction with Rohan Fisher from Charles Darwin University, Australia, to be made available to COP members.</p>	<p>System is in place to allow continuous data analyses to disseminate project learning before publications appear.</p> <p>Written papers are used to disseminate results of project and used to further discussions with appropriate authorities.</p>

<p>2. Databases created and made available for use by nutrition practitioners and field managers.</p>	<p>2.1 Electronic nutrient composition database of consumed foods in study area made available from MMU server and disseminated widely to potential users by Y3. [note creation of the database itself is activity 2.1]</p> <p>2.2 Spatial data on wildlife extraction patterns stored in GIS shapefiles by end of Y2.</p> <p>2.3 Wildlife use and extraction data stored in electronic database for use by project partners [by when?].</p> <p>2.4 In Y3, final workshop organised to train practitioners (e.g. MINFOF, Forest Peoples, Centre for Environment and Development, others) and Cameroonian university students on how to gather relevant data to understand conservation/development issues using our project area as a model.</p> <p>2.7 In Y1 and Y3, baseline and post-project review workshops respectively, organised with project partners and other stakeholders.</p> <p>2.8 At least 4 Master's student projects, a minimum of 2 from Cameroon, resulting from research undertaken for Outputs 3-5 completed by end of Y3.</p>	<p>2.1 Nutrient composition database, dissemination statistics..</p> <p>2.2 Copies of shapefiles stored by MMU and ZyL, and made available to COP members. All non-sensitive spatial data will be shared via Google Drive.</p> <p>2.3 Copies of databases open to use by all project partners and shared via Google Drive. All hunter data will be anonymised.</p> <p>2.4 Training manual produced on conservation/livelihoods data generation methods and analyses. Workshop proceedings and list of attendants.</p> <p>2.5 Reports on baseline analysis in Y1, and future directions reports produced at the end of Y3.</p> <p>2.6 Research proposals, Master's theses.</p>	<p>Nutrient composition database supervised by the project's Food and Nutrition expert, Dr. L.O'Connor at MMU. [Note: this has not held true as LOC no longer involved in project. She was involved at the start] Our nutritional work has been supported by Prof. Barrie Margetts (Univ. of Southampton).</p> <p>CIFOR-C intervention consultant supports the project to better understand outcomes and future prospects.</p> <p>MINFOF is able to send ecoguards to attend the training workshops.</p>
<p>3. Hunting use zones maintained with hunters across 10 communities.</p>	<p>3.1 By Y2, 70% of households in study communities (approx. 190 total families) participate in monitoring of wild species offtake. [note due to FPIC procedure followed, full participation cannot be guaranteed]</p>	<p>3.1 List of participating hunters in project. Datasheets. Database. Hunting zone maps. Data reports.</p> <p>3.2 Community based management plans, reports/participation lists/photographs</p>	<p>Local research assistants employed to support data gathering.</p> <p>Hunters motivated to contribute to the project.</p>

	<p>3.2 By mid-Y3, community-based management plan for hunting resilient, fast-breeding species established in conjunction with at least 80% of participating hunters</p> <p>3.3. By end Y3, all participating hunters commit to complying with the community-based management plan developed between them and the Darwin project</p>	<p>3.3 TBD depending on the community-based management plan (likely to include e.g. offtake data)</p> <p>3.4 Data reports, electronic databases. Graphical representation of trends. Hunting zone maps. Written accounts of hunter workshops. Signed declaration by hunters.</p>	<p>Conditionality of no hunting of protected species created in line with health and agricultural support provided via Output 5. [future reporting should explore how this will be carried out through the project – including when and how]</p> <p>Hunting information obtained can estimate level of protected species offtake. Use of indirect methods to determine veracity of reports. Use of targeted interview techniques can verify if hunters participating in the project are taking protected species.</p>
<p>4. Independent [i.e. not linked to wild meat offtake] measures of population status of protected fauna available for management purposes.</p>	<p>4.1 Abundance and distribution of hunted and protected species determined through analysis and interpretation of camera trapping data throughout Y1 and Y3.</p> <p>4.2 Status of fauna determined using traditional ecological knowledge (TEK) methods through hunter perception surveys undertaken during Y1 and Y2.</p>	<p>4.1 Faunal status survey reports which determine changes in fauna during project.</p> <p>4.2 Reports of status of hunted and non-hunted prey species including analyses of depletion zones derived.</p>	<p>Increase in populations of protected species can be linked to the project's activities.</p>
<p>5. Improvement of human health and livelihoods achieved through an increase in dietary intake, nutritional status, and medical interventions.</p>	<p>5.1 By Y3, food security in households participating in agricultural scheme has improved from initial baseline estimates in Y1.</p> <p>5.2 By Y3, at least 30 women farmers trained in agricultural improvement and farming techniques.</p> <p>5.3 Number of households producing their own food and commercial crops will increase by 10% compared to baseline.</p>	<p>5.1 Reports of food types consumed and origin of foods. Nutritional intake data. Household surveys of income and expenditure to assess links between food security and wealth status.</p> <p>5.2 Agricultural extension programme reports and manuals. Testimonials from people involved in the project (stories of change) to capture e.g. increased participation.</p> <p>5.3 Crop production records for all farmers participating in agricultural expansion programme.</p>	<p>Food security measured as “physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”.</p> <p>Baseline information on health available from ZyL medics. Ethical premises of use of persons' medical records are clear.</p> <p>Agricultural extension programmes and training of women farmers will continue to be operated by ZyL.</p> <p>Information of food production by families gathered at the start of the project.</p>

Activities (each activity is numbered according to the output that it will contribute towards, for example 1.1, 1.2 and 1.3 are contributing to Output 1)

Output 1. Research outputs

- 1.1 Assembling project resources (in-country).
- 1.2 Project launch meeting (in-country) for partners and target communities.
- 1.3 Identification and establishment of agreed parameters.
- 1.4 Establishment of Community of Practice (COP).
- 1.1 Partnership agreements between project, communities, CIFOR-C, MINFOF representatives.
- 1.2 Ongoing monitoring of data collection by communities and local partner with monthly reports.
- 1.7 Monthly reports published on website and dissemination of project newsletter.
- 1.8. Six-monthly review (data collection) of biological indicators and socio-economic surveys.
- 1.9 Six-monthly analysis of data by MMU.
- 1.10 Annual meetings of COP.
- 1.11 Six monthly project review meetings with local communities, hunters and traders and local game guards to enable feedback from beneficiaries.
- 1.12 Development of publication drafts and circulation for internal peer-review.
- 1.13 Submission of final publications to peer-reviewed journals.

Output 2. Database creation and sharing

- 2.1 Development of an electronic nutrient composition database of wild and domestic foods consumed in study area.
- 2.2 Collection of samples for nutrient composition database of foods
- 2.3 Preparation of nutrient composition database of foods for use in planned diet studies.
- 2.4 Spatial data on wildlife extraction rates, and areas hunted stored in GIS shapefiles and analysed (cross ref. Activity 3.4)
- 2.5 Results of all information gathered by the project presented to COP members and communities at end of Y1 and end of Y3.
- 2.6 Presentation of completed Masters' theses by the end of Y3.

Output 3. Hunting use zones

- 3.1 Focus group discussions with hunters to establish working practices (cross ref. Activities 1.4 and 1.8)
- 3.2 Hunter interviews to establish hunting volumes and intensity
- 3.3 Training of village reporters to document hunted prey volumes and frequency.
- 3.4 Monthly village reports of animals hunted and numbers.
- 3.4 Participatory mapping of hunting zones around target villages.

Output 4. Protected fauna

- 4.1 Baseline survey of wildlife status from hunter interviews.
- 4.2 Capacity-building training for local members of monitoring networks.
- 4.3 Camera trapping grids operational in identified hunting zones in Activity 3.4.
- 4.4 Camera trapping data analysed by MMU to detect changes in presence and abundance large-bodied/protected analysed.

Output 5. Human health and livelihoods

- 5.1 Training of household and farming survey assistants.
- 5.2 Baseline survey of home-produced foods and trade in sample households,
- 5.3 Socioeconomic surveys of sample households.

- 5.4 Baseline survey of health status in sample households
- 5.5 Nutritional assessment of sample households based on dietary recalls.
- 5.6 Baseline survey of agricultural production and activity in sample households.
- 5.7 Training of women farmers
- 5.8 Six monthly monitoring of agricultural production changes.

Annex 3: Standard Measures

Table 1 Project Standard Output Measures

Code No.	Description	Gender of people (if relevant)	Nationality of people (if relevant)	Year 1 Total	Year 2 Total	Year 3 Total	Total to date	Total planned during the project
2	Number of people to attain Masters qualification (MSc) –		Cameroonian		4			2
6A	Number of people to receive other forms of education/training	30	Cameroonian	50	50		100	50
11A	Number of papers to be published in peer reviewed journals				1		1	4
12A	Number of computer based databases to be established and handed over to the host country				3		3	3
14A	Number of conferences/seminars /workshops to be organised to present/disseminate findings				2		2	3
15A	Number of national press releases in host country(ies)						2	2
18A	Number of national TV programmes/features in host country(ies)						1	1
20	Estimated value (£'s) of physical assets to be handed over to host country(ies)							

Table 2 Publications

Title	Type (e.g. journal, manual, CDs)	Detail (authors, year)	Gender of Lead Author	Nationality of Lead Author	Publishers (name, city)	Available from (e.g. weblink or publisher if not available online)
WHO child growth standards for Pygmies: one size fits all.	journal	Funk, S.M., Palomo Guerra, B., Ickowitz, A., Afoumpam Poni, N., Aminou Abdou, M., Hadam Sibama, Y., Penda, R., Ros Brull, G., Abossolo, M., Ávila Martín, E., Okale, R., Ango Ze, B., Moreno Carrión, A., García Sebastián, C., Ruiz de Loizaga García, C., López-Romero Salazar, F., Amazia, H., Álvarez Reyes, I., Sánchez Expósito, R., Fa, J.E. (2019)	M	German	PLOSone	Preprint available at: bioRxiv 591172; doi: https://doi.org/10.1101/591172

Annex 4 Onwards – supplementary material (optional but encouraged as evidence of project achievement)

Checklist for submission

	Check
Is the report less than 10MB? If so, please email to Darwin-Projects@ltsi.co.uk putting the project number in the Subject line.	
Is your report more than 10MB? If so, please discuss with Darwin-Projects@ltsi.co.uk about the best way to deliver the report, putting the project number in the Subject line.	X
Have you included means of verification? You need not submit every project document, but the main outputs and a selection of the others would strengthen the report.	X
Do you have hard copies of material you want to submit with the report? If so, please make this clear in the covering email and ensure all material is marked with the project number. However, we would expect that most material will now be electronic.	
Have you involved your partners in preparation of the report and named the main contributors	X
Have you completed the Project Expenditure table fully?	X
Do not include claim forms or other communications with this report.	