Final Evaluation Report

Your Details	
Full Name	Cristinan Pizzigalli
Project Title	Living on the Edge: Future Prediction for Conservation of the Unknown Guinea Baboons' Desert Populations in Mauritania
Application ID	36007-1
Date of this Report	07/02/23

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

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Discover new populations inhabiting the Tagant and Afollé massifs			■	We discovered 20 new localities where the species is present.
Collect non-invasive genetic material (e.g., faeces)			■	We collected 279 faecal samples, and one tissue sample from an individual of Guinea baboon found dead in the northernmost extreme of the species distribution.
Re-define the northern distribution of the species		■		Although we could not find any population north of the limit of the IUCN distribution polygon (Wallis et al., 2020), the finding of a dead individual on the border of the latter reinforces our hypothesis that there might be other populations north of the current distribution. Moreover, the discovery of new localities in the Assaba mountains extend the currently known local distribution of Guinea baboons in the Assaba about 50 km southwards, now approximately 70 km from the Senegal River populations.
Simulate the impact of climate change and anthropization on the suitable habitats for Guinea baboons' persistence			■	Preliminary insights on the potential corridors (i.e., temporary rivers) and habitat use have been addressed in our recent publication in African Primates (Pizzigalli et al., 2022). The results of our analyses to test the impact of climate change and anthropisation on suitable habitats for Guinea baboons will be published soon in our next scientific article (Pizzigalli et al., *in prep.*).
Identify the level of risk to populations from future environmental and climate change			■	The levels of risk to populations have been addressed in our recent publication in African Primates (Pizzigalli et al., 2022). A complete ranking of the most endangered populations of Guinea baboons will be published in a future paper

				assessing the genetic diversity, structure and connectivity of the species (Pizzigalli et al., *in prep.*)
Derive applied instruments for Guinea baboon conservation				We produced a poster on the importance of wetlands in Mauritania, in the specific on *gueltas* (mountain rock pools representing one of the few sources of water available in the region). The poster was divided into four sections addressing: i) the ecosystem services provided by *gueltas* to human populations; ii) the relevance of *gueltas* for wildlife; iii) the threats to *guelta* conservation (i.e., water overexploitation and contamination); iv) recommendations for the maintenance of *gueltas* (i.e., preventing domestic animals from defecating into water or not leaving trash in the proximity of *gueltas*). We designed the poster with graphic content to reach a broad range of age and literacy. We translated the poster to English, French, and Hassaniya (the local ethnic language), and printed 33 colour copies.
Disseminate the project results among local communities and local and international stakeholders				We contacted shepherds, laundry people, and other people encountered at *gueltas*. We distributed copies of our posters to every establishment which agreed to display it. We contacted five schools (three in the Tagant, one in the Assaba, and one on the border between Mauritania and Senegal). All the schools are located close to relevant areas for baboon conservation (*gueltas* used by baboons). While visiting the schools, we gathered information on the number of students and teachers, main academic topics taught, and challenges faced. All the outcomes of the project were disseminated among the international scientific community through three oral presentations at three different international congresses (please see point 7), and

				two publications (Pizzigalli et al., 2022 and Pizzigalli et al., *in prep.*). The results were also shared with the Mauritanian Ministry of the Environment and the Ramsar Secretariat through an official report (Pizzigalli et al., 2023).

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

Among all the great outcomes of this project (which include scientific publications and participation to international scientific congresses, please see point 7), the three most important ones were:

a). The positive feedback from our audience. We received great support and feedback from all the school directors, teachers and stakeholders met during our environmental education and dissemination activities. We had the chance to exchange ideas and information with local people, especially those visiting gueltas daily (i.e., shepherds and launderers). These interactions provide us the opportunity to learn more about the Mauritania Guinea baboons, their habitats, and the social pressures that are behind the overexploitation and degradation of the wetlands in Mauritania, from the prospective of the local communities.

b). The network we created during the project. Thanks to our local partners we were able to create a solid and promising network between our institutions (the universities of Nouakchott and Porto, and CIBIO-Biopolis), and local stakeholders like school directors, mayors, and local entrepreneurs. Moreover, after presenting our project to international congresses we have been contacted by international humanitarian associations which express their interest in collaborating with us in a future sustainable development and community-based conservation projects on Guinea baboons, their habitats, and Mauritanian wildlife in general.

c). The collection of the first tissue sample from Guinea baboon in the northernmost area of the species' distribution. The finding of a dead individual of Guinea baboon allowed us to collect enough genetic material to attempt the production of a whole genome sequence, the first in the history for Mauritanian Guinea baboon populations. This sample, together with the 279 faecal samples collected during our expedition, open the gates to a new frontier of research of the species in Mauritania. Future work will explore the genetic adaptation of the species to hyper-arid environments, its genetic diversity, and population connectivity.

The most significant achievement was the establishment of a promising network between our academic institutions (CIBIO-Biopolis, the University of Nouakchott, and the University of Porto), and local stakeholders (i.e., municipalities, school directors, and local authorities). This network will be at the base of future collaboration on environmental education activities in schools, and sustainable development and community-based conservation projects on Guinea baboons, their habitats, and Mauritanian wildlife in general.

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

There were two main difficulties during the project development. Due to several punctures in the tires and the remoteness of the area we could visit just two of the areas we planned: the Tagant plateau, and the south of the Afollè massifs. We then decided to explore less remote and more accessible localities in the Assaba where we discovered new populations of Guinea baboons and extended the local distribution 50 km further south than previously known.

Due to an unpredictable delay in the laboratory work we could not finish the genotyping of the samples collected in time to came out with our paper on the genetic diversity, structure and connectivity of the population of Guinea baboons in Mauritania. The study is now in preparation, and we aim to submit it to a peer-reviewed scientific journal before the end of the year.

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

We contacted five schools, three in the Tagant, one in the Assaba, and one on the border between Mauritania and Senegal. All the schools were located close to gueltas where baboons are present, or to relevant conservation areas for baboon population connectivity (e.g., the Tagant plateau or the area between the Senegal River and the southern Assaba). We had meeting with school directors and teachers which allowed us to give a brief workshop on the importance of gueltas for human communities and wildlife. A MSc student (ATD) from the University of Nouakchott was included in the team after the acceptance of the project. ATD played a crucial role in the rising awareness activities through the translation and transmission of the project in Hassaniya. ATD provided also great logistic support in loco, and thanks to his collaboration it was possible to take contact and meet with the local authorities (i.e., mayors and chief of the police).

In every school visited we distributed our posters and other educational material (i.e., pencils, notebooks, and crayons) and provided free lecture on biodiversity conservation. During our last field trip, we hired local people to guide us to gueltas or areas where Guinea baboons could be found. All the credits on the intellectual outcomes of this projects were share with our local team members which were (and will be) included in our publications on peer-revied scientific journals and oral presentation to international congresses.

5. Are there any plans to continue this work?

We plan to continue this project in collaboration with all the parties included in the network described above (please see point 3). In the next months a series of meetings between our team, humanitarian associations, local stakeholders (i.e., schools directors, city councils), and national policy makers (the Ministry of Environment) will take place. In these meetings we will discuss future collaboration and the implementation of community-based conservation projects to decrease the

pressure on local wetlands increasing social conditions and environmental education.

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

Our work has been shared among different kind of audiences.

With local communities by:

- The production of a poster in three different languages distributed in schools and local points of interest in Mauritanian villages.

- A series of small workshops in the schools visited.

With the international Scientific community through the following publications in peer-reviewed scientific journals and oral communications at international congresses:

- Pizzigalli, C., Diop, A. T., Sow, A. S., Dieng, H., Razgour, O., Giachello, S., Ferreira da Silva, M. J. & Brito, J. C. (2022). Updates on the Guinea Baboon Populations from the Remote and Arid Areas of Southern Mauritania. African Primates, 16, 45-58.

- Cristian Pizzigalli, Andack Saad Sow, Hamidou Dieng, Orly Razgour, Raquel Godinho, Maria Joana Ferreira da Silva, and José Carlos Brito (2022). Living on the edge: Preliminary results on the genetic diversity and population connectivity of Guinea baboons' desert populations in Mauritania. Oral Presentation at the VII Iberian Primatological Conference (Barcelona, Spain).

- Maria J Ferreira da Silva & Cristian Pizzigalli (2022). Threats to the conservation of the Guinea baboon Papio papio, assessed using a multidisciplinary Framework. Invited speakers at the European Association of Zoos and Aquarium (EAZA) annual meeting (Faro, Portugal).

- Cristian Pizzigalli, Andack Saad Sow, Hamidou Dieng, Maria Joana Ferreira da Silva, Orly Razgour, Raquel Godinho, and José Carlos Brito (2022). Living on the edge: Updates on the distribution of the Guinea baboons' desert populations in Mauritania. Oral presentation at the Sahel & Sahara Interest Group (SSIG) annual meeting.

With the Mauritanian Ministry of the Environment and Ramsar Secretariat through an official report:

- Pizzigalli, C., Diop, A.T., Sow, A.S., Dieng, H., Razgour, O., Giachello, S., Ferreira da Silva, M.J. & Brito, J.C. (2023). Statut des Populations de Babouins de Guinée au Mauritanie. Biodeserts Report. CIBIO-InBio, BIOPOLIS, Université du Porto.

Moreover, the data collected during our expedition were also included in the meta-analyses on land mammals of Mauritania published in:

- Brito JC, Sow SA, Vale CG, Pizzigalli C, Hamidou D, Gonçalves DV, Martínez-Freiría F, Santarém F, Rebelo H, Campos JC, Pleguezuelos JM, Ferreira da Silva MJ, Naia M, Tarroso P, Godinho R, Silva TL, Macedo T, Boratyński Z, El Abidine Sidatt Z, Álvares F (2022) Diversity, distribution and conservation of land mammals in Mauritania, North-West Africa. PLoS ONE 17: e0269870

Lastly, we aim to present our project and its outcomes at the next International Congress for Conservation Biology from July 23-27, 2023, in Kigali (Rwanda).

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

The next most important step would be to improve the environmental education activities in schools and lay the groundwork for a community-based conservation project on Mauritanian populations of Guinea baboons. The collaboration between our scientific institutions, the local stakeholders and policy makers will be pivotal to implement such activities. Our local team members are currently working on the officialisation of this partnership. The involvement of local and international humanitarian associations would also boost the success of such projects and guarantee its implementation in a sustainable way. We already took contact with one humanitarian association (the UkClub; http://www.ukclub.it/), which expressed the interest in providing support in future project on the sustainable development of the Mauritanian communities.

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

We used The Rufford Foundation logo and/or state the financial support in the all the outputs of the project:

- The poster produced for our environmental education activities and outreach distributed in schools and local points of interest in Mauritanian villages.

- During our workshops in the schools visited.

- In all the following publications in peer-reviewed scientific journals and oral communications at international congresses:

I. Pizzigalli, C., Diop, A. T., Sow, A. S., Dieng, H., Razgour, O., Giachello, S., Ferreira da Silva, M. J. & Brito, J. C. (2022). Updates on the Guinea Baboon Populations from the Remote and Arid Areas of Southern Mauritania. African Primates, 16, 45-58.

II. Brito JC, Sow SA, Vale CG, Pizzigalli C, Hamidou D, Gonçalves DV, Martínez-Freiría F, Santarém F, Rebelo H, Campos JC, Pleguezuelos JM, Ferreira da Silva MJ, Naia M, Tarroso P, Godinho R, Silva TL, Macedo T, Boratyński Z, El Abidine

Sidatt Z, Álvares F (2022) Diversity, distribution and conservation of land mammals in Mauritania, North-West Africa. PLoS ONE 17: e0269870

III. Cristian Pizzigalli, Andack Saad Sow, Hamidou Dieng, Orly Razgour, Raquel Godinho, Maria Joana Ferreira da Silva, and José Carlos Brito (2022). Living on the edge: Preliminary results on the genetic diversity and population connectivity of Guinea baboons' desert populations in Mauritania. Oral Presentation at the VII Iberian Primatological Conference (Barcelona, Spain).

IV. Maria J Ferreira da Silva & Cristian Pizzigalli (2022). Threats to the conservation of the Guinea baboon Papio papio, assessed using a multidisciplinary Framework. Invited speakers at the European Association of Zoos and Aquarium (EAZA) annual meeting (Faro, Portugal).

V. Cristian Pizzigalli, Andack Saad Sow, Hamidou Dieng, Maria Joana Ferreira da Silva, Orly Razgour, Raquel Godinho, and José Carlos Brito (2022). Living on the edge: Updates on the distribution of the Guinea baboons' desert populations in Mauritania. Oral presentation at the Sahel & Sahara Interest Group (SSIG) annual meeting.

- In the official report delivered to the Mauritanian Ministry of the Environment and Ramsar Secretariat:

VI. Pizzigalli, C., Diop, A.T., Sow, A.S., Dieng, H., Razgour, O., Giachello, S., Ferreira da Silva, M.J. & Brito, J.C. (2023). Statut des Populations de Babouins de Guinée au Mauritanie. Biodeserts Report. CIBIO-InBio, BIOPOLIS, Université du Porto.

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

Dr. José Carlos Brito, PhD: Principal Investigator of BIODESERTS research group: coordinate fieldwork activities, supervise multivariate and ecological analyses, and participate in the dissemination of projects results.

Dr. Hamidou Dieng, PhD: participation in the dissemination of projects results, via transfer of scientific results to the Ministry of Environment and local communities, ensured the success of the activities.

Dr. Maria Joana Ferreira da Silva, PhD: supervise molecular lab analyses and dissemination of project results.

Dr. Andack Saad Sow, PhD: participation in the dissemination of projects results, via transfer of scientific results to the Ministry of Environment and Ramsar Secretariat, logistic support, ensured the success of the activities.

Ahmed Tidjane Diop, MSc student: participation in the dissemination of projects results, logistic support, organised the meeting with local authorities and stakeholders.