Empowering Communities for Pangolin Conservation: Innovative Monitoring Techniques and Sustainable Practices

Mid-term activity report

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The Rufford Foundation

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Background information

Pangolins (Order: Pholidota) are a unique group of mammals characterized by their keratinized scaly skins. There are three species of pangolin in Cameroon: the giant pangolin *Smutsia gigantea*, the white-bellied pangolin *Phataginus tricuspis*, and the black-bellied pangolin *Phataginus tetradactilla* (Difouo, 2023; Simo et al., 2020; Simo et al., 2023). Pangolins hold the unfortunate record of being the "world's most trafficked wild mammal" (Challender et al., 2014) and have recently attracted attention as a flagship taxon in the bushmeat crisis due to the unsustainable volume of international trafficking (Heinrich et al., 2016; Ingram et al., 2018).

Main threats to pangolin species include illegal wildlife trade, deforestation driven by agriculture, logging, and infrastructure development which continues to erode the natural habitats essential for wildlife survival (Challender et al., 2020; Heighton & Gaubert, 2021; Ingram et al., 2018; Kumar et al., 2022). This habitat loss, combined with socio-economic pressures such as poverty and the reliance on wildlife for income, has led to unsustainable hunting practices in communities around protected areas. Subsistence hunting, exacerbated by the increasing demand for bushmeat from urban centers, further compounds this issue, putting various species at risk (Ingram et al., 2021). Pangolins face severe threats from large-scale trafficking, primarily driven by the high demand for their scales in traditional medicine and their meat as a delicacy, particularly in China and Vietnam (Heinrich et al., 2016). This illegal trade has made pangolins one of the most trafficked mammals globally, pushing them toward critical endangerment despite their legal protection under CITES. Survival of pangolin species is further jeopardized by weak enforcement of conservation laws due to corruption, lack of resources, and insufficient awareness of their ecological importance among local communities. This complex interplay of habitat loss, illegal trade, and socio-economic factors perpetuates the decline of pangolins, highlighting the urgent need for comprehensive conservation efforts.

As conservation interventions in rural communities can affect people's livelihoods, encroach on local property and rights, and compromise the current and future well-being of local people (Colchester, 2004), it is essential to encourage all stakeholders in participatory management that gives pride of place to local people. Conscious of this, we have initiated our project to limit the threats to pangolins and other threatened species. The implementation of this project combined several approaches including (1) increasing the commitment of local populations against abusive hunting, (2) reducing the dependence of local communities on bushmeat for consumption and trade through alternative livestock projects and diversification of income sources, (3) Conservation through Art and Education in Schools.

II. Study area and Methodology

II.1 The Mpem et Djim National Park

Mpem et Djim National Park (MDNP) lies in the Central Region of Cameroon, within the Mbam et Kim Division and the Yoko subdivision, covering an area of 976 km2 (5°–5°20' N / 11°30'–12° E; average altitude of 640 m), established in 2004 by Decree No. 2004/0836/PM (MINFOF, 2011). MDNP boundaries are delineated by the Mpem and Djim rivers along its eastern, southern, and western edges, with a 5-kilometer segment marking its northern boundary. Located approximately 300 km north of Cameroon's capital, Yaoundé, MDNP's rugged terrain and numerous rivers make access challenging, contributing to the preservation of its ecosystems. The climate is characterized by a Guinean climate with four distinct seasons: a long dry season lasting over four months, a short rainy season, a short dry season, and a long rainy season. Annual rainfall ranges between 1,800 and 2,000 mm, with temperatures averaging between 22–29°C annually (Tsalefac et al., 2003). The landscape features elongated mounds, peaks, and gently sloping slopes, with valleys exhibiting fewer steep gradients. Hydrographically, MDNP is defined by the Mpem and Djim rivers, which encircle the park, along with other smaller rivers like Meti, May, and Gimboon. The park is home to a variety of mammal species, including chimpanzees, elephants, African buffaloes, baboons, pangolins, various duiker species, and others (Simo et al., 2023). Surrounding the park are several villages inhabited by indigenous tribes like the Babouté and Baveck, as well as non-native groups engaged in agriculture, cattle rearing, hunting, and gathering (Difouo et al., 2020). Socio-economic activities in the area revolve around farming. Additionally, bushmeat hunting and trading constitute significant sources of income for local communities (Difouo, 2023; Simo, 2024).

II.2 Method

II.2.1 Community mobilization

To promote pangolin conservation and raise awareness about their plight, a comprehensive community mobilization plan was implemented in the communities surrounding the Yoko Council Forest and the Mpem et Djim National Park (MDNP). This plan combined environmental education and entertainment to engage local communities, reaching at least 100 families across key villages in the study area. Workshops were organized in collaboration with community leaders, featuring PowerPoint presentations and wildlife conservation films focused on the ecological, economic, and cultural importance of protecting pangolins. These workshops served as platforms for intra-community dialogue, encouraging open discussions on pangolin poaching and conservation, and promoting community participation in their protection.

Local artists were engaged to create informative artwork specifically promoting pangolin conservation, which was displayed in schools. Regular visits to MDNP schools were conducted, offering interactive lessons about pangolins and their role in biodiversity. A quiz competition centered on pangolins and conservation practices was organized, with educational materials as prizes to encourage learning and engagement.

Following the workshops, community-led meetings were held to allow members to express their concerns, share insights, and propose solutions related to pangolin conservation. These meetings ensured that conservation efforts were aligned with the local context, strengthening community ownership and fostering a sense of responsibility toward safeguarding pangolins. By incorporating community feedback, this approach built lasting support for pangolin conservation and encouraged sustainable practices to protect this endangered species.

II.2.2 Wildlife Conservation Awareness in Schools

To enhance wildlife conservation awareness among students, we deliver a 30-minute interactive education session. This course was conducted during school hours with the collaboration of educational staff and teachers, aiming for at least 70% of students to demonstrate improved knowledge of wildlife conservation. The interactive session included a 15-minute PowerPoint presentation on the importance of conserving endangered species, followed by a 15-minute Q&A exchange in the form of a conservation quiz competition centered pangolin species to further reinforce the students' learning. All participants in the quiz were rewarded with school materials to encourage their active participation and continued interest in conservation.

Conservation clubs were established and revitalized in each target school, composed of motivated secondary school students eager to promote the protection of endangered species within their schools and communities. To support their efforts, awareness-raising materials such as pens, T-shirts, and reams of A4 paper were offered for the club activities. These clubs will serve as platforms for students to lead conservation initiatives, raise awareness among their peers, and foster a culture of environmental stewardship in their schools and villages. A local artist also created an informative artwork promoting pangolin conservation in primarily school of Linté.

II.2.3 Alternative to Bushmeat Program

We introduced and expanded an animal husbandry program as a sustainable alternative to wildmeat consumption in the study area. Our immediate focus was on monitoring the farming progress of the

first cohort of livestock recipients to assess their success and challenges. Additionally, we also proceeded to the donation of breeding animals to new families, ensuring that at least two additional families per village adopt sustainable farming practices. Through a tripartite agreement involving beneficiary families, CWCI, and the Yoko Council/the Conservation Service of the MDNP, breeding pairs of animals such as pigs, goats, or sheep were donated based on community preferences and religious considerations. The agreement specifies that once the animals reproduce, the first beneficiary family will pass on a female offspring to a second family, creating a continuous cycle of livestock distribution and community benefit. By implementing this program, we aim to reduce reliance on wildmeat by providing ethical, sustainable protein sources while fostering economic resilience and self-sufficiency within the villages. As animal populations grow, this initiative will enhance food security, promote income generation, and strengthen community ties, thereby contributing to long-term conservation efforts and improved livelihoods.

III Results

Between January 31 and February 5, 2025, and again from July 11 to 14, 2025, animal donations were carried out in nine villages surrounding the Mpem et Djim National Park, targeting hunter families to promote alternative livelihoods. Each participating household received a couple of animals as part of the initiative to encourage a shift away from hunting. Additionally, from February 13 to 25, 2025, education and awareness campaigns focused on the conservation of pangolin species were held in primary and secondary schools across these villages. Seven of these villages were located in the southern sector of the park and adjacent to the Yoko Council Forest, including Ngouetou, Nyem, Mankim, Mekoassim, Mbembeing, Dong, and Guervoum, while two villages, Linté and Yangba, were situated in the northern sector.

III.1 Alternative Livelihoods through Animal Donation

Animal donations were conducted in two phases: the first from January 31 to February 1, 2025, in seven villages surrounding the southern sector of the Mpem et Djim National Park and adjacent to the Yoko Council Forest (FCY), and the second from July 11 to 15, 2025, in two villages located in the northern sector. These donations, following consultations with the local communities, aimed to provide sustainable alternatives to hunting. A total of five couples of goats, three couples of pigs, and one couple of sheep were distributed in the southern sector, while in the northern sector, one couple of goats and one couple of sheep were donated. Beneficiaries who expressed the desire to receive couple of pigs were put on standby for a while because the is a necessity to do a training before that donation as pigs are somehow not easy to care of. This will be done in next phasis

providing that we get the necessary funding. This decision was made cautiously due to previous incidents in which pigs had died from mismanagement, as beneficiaries lacked experience with pig farming.

In both sectors, a tripartite agreement was signed between CWCI, the beneficiaries, and the respective municipalities, ensuring that beneficiaries would care for the animals, allowing them to breed and eventually pass on offspring. Beneficiaries in the southern sector, such as those in Mekoasim and Ngouetou, had constructed enclosures, while others were still working on theirs. In the northern sector, beneficiaries who met the criteria, including prior experience with sheep and goat farming and readiness to construct proper enclosures, were donated a male and female each. The donations were accompanied by guidance on maintaining the enclosures and caring for the animals to ensure successful breeding and sustainable livestock management.

Animal donation in the northern and southern sectors of the Mpeme et Djim National Park

III.2 Education and awareness campaigns on pangolin species

III.2.1 Conservation Lesson

In the villages of Linté and Yangba, the educational sessions were leaded by the Cameroon Wildlife Conservation Initiative (CWCI) in close collaboration with multiple partners, including the Conservation Service (CS) of the Mpem et Djim National Park, the Tikki Hywood Foundation (THF), the Park's Technical Assistant (TA), researchers from the University of Yaoundé. The session began with an introductory presentation by the CS and the TA, focusing on general wildlife conservation, the ecological role of protected areas, and an overview of the Mpem et Djim National Park. Children were introduced to basic cartographic elements, including key zones within the park, and were encouraged to reflect on the importance of preserving biodiversity.

Education section by the CS and the TA of the Mpem et Djim national Park

The THF team followed with a short video showcasing their role in pangolin protection, offering students tangible examples of conservation in action. They highlighted their efforts in the rescue, rehabilitation, and release of orphaned, injured, or displaced wildlife, including several successful release cases of pangolins carried out earlier this year. Researchers from the University of Yaoundé 1 presented on the various threats posed by human activities to wildlife and outlined practical steps that can be taken to reduce these impacts.

Education section by the THF and researchers in the primarily school of Yangba

CWCI closed the session with a 20–25-minute interactive PowerPoint presentation. This presentation introduced students to pangolin species, highlighting their biology, ecological significance, and the threats they face. Using colorful visuals, storytelling, and participatory questioning, the session was designed to be both engaging and educational.

Interactive educational section in primarily schools by the CWCI team

Notably, both schools in Linté and Yangba host a Friends of Nature Club "*Club des Amis de la Nature*" (CAN), and club members actively participated in the educational activities. These students received educational materials and outreach tools, including factsheets, to support peer-to-peer learning and awareness-raising within their schools and communities. Students expressing interest in joining the conservation clubs were provided with school supplies such as notebooks and pens, as well as conservation-themed flyers to aid in their advocacy efforts.

« *Club des amis de la nature* » of the primarily school of Linté celebrating with Tshirst of the 2025 World Pangolin Day

a. Screening of educational films and group discussions

Prior or after conservation lessons, educational documentaries and animations were screened to students to develop their sense of curiosity and to illustrate the importance of wildlife conservation. The screening consisted of 4 short films (less than 5 min each) entitled "Save our pangolins", "Kung-Fu Panda conservation message", "Pangolin feeding habit in the nature" and "Disease transmission from wildlife to humans". In the film "Save our pangolins" from WildAid, Jackie Chan, a famous Chinese actor is shown learning kung-Fu skills to Chinese pangolins with a message to viewers alerting on the high illegal trade affecting these animals and highlighting that if the purchase from

poachers stops, the killing will stop too. In the film "Kung-Fu Panda conservation message", Kung-Fu panda, a famous animated character from DreamWorks Animation Studios, shared a message with viewers about the poaching activities and main animal targets (lions, pangolins, rhinos, elephants and buffalo). He also asked to students to refuse any gift that was produced from poached animals, helping to curb the hunting pressure on vulnerable animals by reducing the demand on the market. In the film "Pangolin feeding habit in the nature" from National Geographic, a real Temminck pangolin is recorded during its feeding routine on termites and ants. The pangolin behavior is described highlighting how it uses its strong claws to break into the termite mound, how it uses its long tongue to catch and swallow hundreds of termites, and how it is protected from ant bite by its shielding scales. The film "Disease transmission from wildlife to humans" is an animated video highlighting the sanitary risks of getting in contact with wild animals, especially the transmission of deadly zoonotic diseases such as Covid-19, Ebola and HIV. The narrator urged the assistance to keep a social distance with wild animals for their own safety and wildlife conservation. After each film was screened, a group discussion of 5 min was held with students to collect their thoughts, to answer their questions and to reflect on the film's messages in their local context.

Film screening in the primary school of Linté

b. Drawing Workshops and Contests

After conservation lessons and education film screening, we organize a drawing contest between students to stimulate their creative imagination and uncover their artistic talent. Students were invited to illustrate pangolins in different positions and aspects upon their feeling. Drawing samples were

distributed to all students to help them seize the shape and perspectives of pangolins. Students were given 15 min to draw a pangolin on a white paper using pencils. At the end of the time, drawings were collected and examined by a jury constituted of a school teacher and a CWCI staff member. After examination, the three/four best drawings were selected and their authors received rewards constituted of books, pens, pencils, t-shirts and erasers. For younger students (Class I-II), a coloring activity was led with black and white drawing samples distributed to them with colored pencils and they were invited to color the drawing following their feelings. Colored drawings were examined by the same jury and the best ones were rewarded with books and pencils.

Drawing of pangolins by students in the primary school of Yangba during the Drawing workshop

c. Coloring activity

As part of the conservation education initiative, a dedicated coloring session was organized for the students. Participants were provided with outlined drawings of pangolins, allowing them to express their creativity while engaging with the species' unique features. This hands-on activity helped reinforce their understanding of pangolins and their ecological importance in a fun and interactive way. The coloring session also served as an opportunity to discuss key conservation messages, such

as the threats pangolins face and the role of communities in protecting them. The students enthusiastically participated, and their artwork reflected both their creativity and their growing awareness of wildlife conservation. At the end of the activity, the most outstanding students were recognized and rewarded with educational materials, further encouraging their engagement with conservation efforts.

Coloring activity with children in the primarily school of Yangba

d. Conservation Quiz competition

During this session, a conservation quiz competition was organized between students to reinforce key conservation messages and assess students' understanding. Students were first separated per classroom and each classroom proposed one competitive group of three students with respect to gender equity. A total of four to five groups were constituted in each school and they underwent the competition. Five questions were asked based on conservation lessons received and education films viewed, and were related to pangolins, and general wildlife conservation topics. After each question, competitive groups were given 20 sec to write down their answer on a piece of paper and at the end of the fifth question, papers were collected and a jury was constituted to review their answers. The best group was rewarded with books, pens, pencils, t-shirts and erasers.

Quiz competition at the primary school of Linté

e. Pangolin Walk

As part of the educational activities, students participated in a fun and engaging "Pangolin Walk" challenge, designed to mimic the unique movement of pangolins. This activity aimed to create a playful yet informative experience, allowing students to connect more deeply with these fascinating creatures. Participants were instructed to curl their arms in front of their bodies, imitating a pangolin's curved posture, and to walk with a gentle swaying motion, just as pangolins do in their natural habitat. The event sparked laughter and excitement among the students while reinforcing key messages about pangolin behavior and conservation. At the end of the challenge, those who best replicated the pangolin's movement were rewarded with small prizes to further encourage their engagement in conservation education.

Pangolin walk challenge with student of the primarily school of Yangba

f. Dancing Competition

To maintain an interactive and lively atmosphere, a free dancing contest was organized at the conclusion of all activities. All students were invited to participate, but due to space limitations in the classroom, only the first 20 students to reach the stage were selected for the competition. A 30-second music clip was played, and after each round, participants were progressively eliminated based on audience cheering. The contest continued through several rounds until two finalists remained. The best dancer and the runner-up were rewarded with books, pencils, and erasers, recognizing their enthusiasm and participation. This activity provided an opportunity for students to celebrate their engagement in conservation through music and movement while maintaining a fun and energetic mood. Additionally, a ball was given to each school as a symbolic gift, serving both as entertainment and as a continual reminder of their commitment to conservation.

Dancing challenge with student of the primarily school of Yangba

f. Sculpture exposition

The Primary School of Linté was selected to host the pangolin sculpture exposition. The site was chosen for its cultural relevance to the local community. The sculpture provides a permanent learning tool to promote awareness and reinforce the importance of pangolin conservation among students and community members.

Sculpture exposition of the African a white bellied pangolin and curb at the Government secondary school of Ngouetou.

Detailed outreach information per school

School name	Outreach date and time	Number of attending students	Observations
Government secondary school of Ngouetou	February 13 2025 9h-12h	55 students of Form I-IV	All activities led and unveiling of the pangolin status
Primary school of Ngouetou	February 13 2025 12h-14h	35 students of Class I-VI	Conservation lessons, drawing workshops and quiz competition
Primary school of Mankim	February 14 2025 9h-11h	25 students of Class III-VI	Conservation lessons, drawing workshops and quiz competition
Primary school of Mekoassim	February 14 2025 11h-13h30	26 students of Class II-VI	Conservation lessons, drawing workshops and quiz competition
Primary school of Mbembeing	February 14 2025 14h-16h30	39 students of Class I-VI	All activities led
Primary school of Dong	February 15 2025 9h-11h	25 students of Class I-VI	All activities led
Primary school of Guervoum	February 15 2025 11h-13h30	20 students of Class III-VI	Conservation lessons, drawing workshops and quiz competition
Primary school of Nyem	February 15 2025 14h-16h30	13 students of Class V-VI	Conservation lessons, drawing workshops and quiz competition
Primary school of Linté	February 24 2025 13h-16h30	+200 students of Class I-VI	All activities led
Primary school of Yangba	February 25 2025 10h30-13h30	72 students of Class III-VI	All activities led

Difficulties faced during the mission

- Road uncertainty due to frequent breakdowns of the ferries transporting vehicles on the river mbam
- Poor communication with the school administrative staffs some of who were sometimes informed of the outreach schedule very late due to absence of network in some villages
- Bad road condition for sculpture transportation to Linté

Conclusion

The mission successfully integrated alternative livelihood activities and educational outreach to promote both wildlife conservation and community well-being. Through the distribution of livestock, including goats, pigs and sheep, to hunter families, the initiative provided sustainable alternatives to hunting, supporting local livelihoods and reducing pressure on wildlife. These efforts

were complemented by a comprehensive education and awareness campaign focused on wildlife conservation, particularly pangolin species. The campaign, which reached nine villages around the Mpem et Djim National Park and the Yoko Council Forest, engaged students in primary and secondary schools through conservation lessons, educational films, group discussions, drawing workshops, quiz competitions, artwork, and dancing contests. Together, these initiatives are helping to foster a deeper understanding of conservation, reduce hunting dependence, and strengthen community support for long-term environmental sustainability.

Family pictures at the end of activities at primary schools of Dong (a) and Nyem (b)

Family photo to mark the end of awareness-raising activities around the Yoko Council Forest and the Mpem et Djim National Park.

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