

## Final Evaluation Report

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Your Details	
<b>Full Name</b>	Ezechiel Turikunkiko
<b>Project Title</b>	Assessing the factors leading to the frequent livestock killings towards the protection of carnivores in Gishwati-Mukura National Park and Biosphere Reserve
<b>Application ID</b>	40727-2
<b>Date of this Report</b>	23 <sup>rd</sup> August, 2024

**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
<p>To Identify carnivores that attack or kill livestock and other possible causes of livestock deaths.</p>				<p>In general, camera traps have recorded 5 species of carnivores. Those species are Side Striped Jackal (<i>Canis adustus/Lupulella adusta</i>), Serval (<i>Leptailurus serval</i>), Feral dog (<i>Canis lupus familiaris</i>), Large-spotted Genet (<i>Genetta maculate</i>), and African civet (<i>Civettictis civetta</i>).</p> <p>According to the results from this research, the most frequently attacked livestock types were sheep, followed by calves (second attacked), goats (third attached), large cows, and chickens (last attacked).</p> <p>The baits (carcasses and live livestock) as attractants were used with camera traps, and it was shown that aside from the Serval cat, other recorded species of carnivores eat on carcasses (meat baits) of large prey. One species of carnivore (feral dog) was captured attacking and killing live prey (live baits) of medium-large mammals like sheep.</p> <p>A total number of 8,921 animal pictures have been recorded by camera traps. there are 3 categories of photographed animals: carnivores with 51.4% of all captured pictures, other wild</p>

			<p>species with 0.6% of captured animals, and Livestock with 48% of all photographed images. This indicates that the recorded carnivore species share the same areas with livestock.</p> <p>This research project confirmed that the abandoned (feral) dogs, which have been released in the bushes are the best carnivores to kill livestock in the Gishwati-Mukura Landscape. This confirmation was shown by the data recorded through camera traps and community surveys. In fact, 39.9% of all camera traps recorded pictures were feral dogs (<i>Canis lupus familiaris</i>) and camera traps set through this project have captured feral dogs attacking, killing, and eating live livestock (live baited sheep), whereas 100% of respondents (with the high-level rank of 72.1%; the medium level rank of 17.9%; and with the low-level rank of 10%) have mentioned that dogs are expected to kill livestock, and there was no disagreement for feral dog involvement to kill livestock.</p> <p>The second carnivore shown by camera traps to attack carnivores is Side Striped Jackal (<i>Canis adustus</i>) with 8.8% of all pictures. From the community survey, 93.8% (high-level:59.7%; medium: 21%, and low:13.1%) of respondents have shown that side-striped jackals are involved in livestock deaths while 6.2% of respondents have disagreed with the involvement of side-striped jackals in livestock deaths. Side Striped Jackal was captured eating on carcasses/bait meats (no eating on live bait) in this research project.</p>
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			<p>are assumptions that since spotted hyena was recorded recently in Volcanoes National Park (Uzabaho et al.2023), and it is known to use a big home range in length and width (Mhlanga, 2018), we can assume that the same individuals from volcanoes National Park or Virunga massif can use Gishwati-Mukura Landscape because from some park edges, the Volcanoes National Park and Gishwati-Mukura Landscape are separated with a distance of below 40 kilometers. However, the studies should continue to explore the presence or absence of spotted hyenas in the Gishwati-Mukura Landscape.</p> <p>Aside from the park core zone, the other origin (hosts) of carnivores included forest and tea plantations, bushes, and mining holes and caves/rocks, and these hosts were found to be a cause of livestock deaths as the predator can opportunistically come from those hosts and kill livestock.</p> <p>Other no-carnivore causes of reportedly livestock deaths included theft, diseases, natural deaths (accidents, herd fights, while giving birth, and old ages), and thunderstorms. With average percentages, respondents have shown that the non-carnivores causes are the cause of reportedly livestock killing with 19.8% (high: 3.8%, medium: 6.2%, and low:9.8%), while an average of 80.2% of respondents mentioned that these non-carnivore cases are not the case for the reported livestock deaths.</p> <p>Illegal activities were found to be</p>
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			<p>among the reasons behind livestock predation, and can influence livestock killings in Gishwati-Mukura National Park because illegal activities aim to destroy wildlife habitat or use the same resources with wildlife, which can resulting in a lack of food for wild animals, extinction, or refugees for wild animals from one plane to another.</p> <p>Those major illegal activities include mining, tree cutting, grazing in the park, encroachment, and grass cutting. In average percentages, respondents mentioned that illegal activities are the case with 56.36% (High:13.42%, medium: 18.18%, and low: 24.76%) provoking livestock killings. In contrast, an average of 43.64% of respondents showed that illegal activities are not the case to cause livestock killings.</p> <p>Although there is now a carnivores-livestock conflict, participants in this research have reported that it is pleasing to see that the recovered areas of the Gishwati-Mukura Landscape as home to wild animals, which should not have been present in the previous years due to the experienced degradations of big parts of natural habitats for last decades in the Gishwati-Mukura Landscape.</p>
<p>To determine whether livestock predation is related to historical conservation and characteristics of the Gishwati-Mukura</p>			<p>The participants in this research project clarified that the conversion of land into multiple activities and priorities over the years in the Gishwati-Mukura Landscape has disturbed the wild animal distribution system in terms of presence or absence on an</p>

<p>landscape/habitats.</p>			<p>irregular basis as well as disturbing the niche of wild animals that led to the migration or extinction of wild animals or extinction from one place to another due to the small sizes of scattered and fragmented forests in the Gishwati-Mukura Landscape.</p> <p>Also, the participants in this research commented that this long-term disturbance has led to the reduction or lack of food, habitat, and security for wild animals that might lead to the attacks of livestock being faced today.</p> <p>Nevertheless, the average equal to 22.95% of respondents have said that land conversion activities (agriculture, establishment of pastures, settlements, Illegal activities) over time are not a reason to lead to current predations or attacks on livestock, whereas an average of 77.05% (High: 25.2%, Medium: 27.5% and Low: 24.35%) of respondents have agreed that those land use activities have been among the long-term causes that indirectly contributed almost to the maximum use of wild resources in Gishwati-Mukura Landscape, increasing human-wildlife conflicts especially the current reportedly deaths of livestock.</p> <p>On the other side, the research has found the positive conservation efforts and best practices attributed to the</p>
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			<p>Gishwati-Mukura Landscape motivated and promoted carnivore recovery in the area. This led to current carnivore predation on livestock. Those efforts and best practices include reforestation and afforestation, creation of a national park, tea plantations, making terraces, protection of state-remnant forests, and protection of wild animals).</p> <p>However, with averages, it was shown by 18% of respondents that those above-mentioned conservation efforts and best practices do not contribute to livestock predation in Gishwati-Mukura Landscape; while 82% (High: 56%, Somehow:13% and low: 18%) of respondents stated that those conservation activities and best practices done for Gishwati-Mukura may contribute to the deaths of livestock as it was explained by respondents and other participants in this research that the number of carnivores kept increasing due to not only the aforesaid landscape restoration practices, but also the protection by laws of forests as well as prohibitions and punishment for killing wild animals.</p> <p>Moreover, the terrains, field features, and shapes of the Gishwati-Mukura Landscape were also found among the things that can channel the predators toward searching for prey in the local community's livestock. The key</p>
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			<p>identified things in this research project include forest fragments and the dis-connectivity of Gishwati and Mukura forests; the small size of the park and its irregular shape; and many forest plantations in the park neighborhoods. In this regards, the average results from respondents to the questionnaire in this research project have stated that the field characteristics are very enabling livestock predation at an average of 41.64% of respondents, and those characteristics enabling in the medium at an average of 23.3% of respondents, while the average of 35.06% of respondents confirmed that those field characteristics do not enable the predators for killing or attacking livestock.</p>
<p>To assess the responses and feedback from farmers/livestock producers in the matters of preventing livestock killings, and the level of community acceptance of human-wildlife coexistence.</p>			<p>In this research, responses have shown how farmers protect and prevent livestock deaths, how they show their fairness in reporting incidents of livestock deaths, and how they accept to coexist with wildlife in the Gishwati-Mukura Landscape.</p> <p>Regarding the protection of livestock and prevention of carnivore attacks, the following responses have been shared from participants: Construction of cow shelters/kraals; Watch over livestock/Living closer to livestock; Tolerance for predators when livestock are killed; Reporting the cases and claim for compensation; Killing the predator/retaliation; Chasing the predator. This research</p>

			<p>project found the average from those items/responses that strongly being done with 36.7%, weakly being done with the average of 28.1%, and nothing is being done with the average of 35.2%.</p> <p>Regarding the fairness in reporting incidents of livestock deaths, the research found that there are 3 categories of responses include Reporting exact information on predation case; Cheating and exaggerating the cases for compensation; Ignorance/lazy in reporting predation cases. It was shown that 84.6% (54.3%: most happening and 30.3%: happening) of respondents agreed that there is fairness in reporting exact information on predation cases; 16.6% (4%: most happening and 12.6%) of respondents confirmed that there can be cheats and exaggerations in reporting predation cases to get more compensations; while 21.3% (10.2%: most happening and 11.1%: happening) agreed that there is fail (laziness and ignorance) in reporting predations cases once the predations do kill or injury their livestock.</p> <p>Regarding the community acceptance of human-wildlife coexistence, an average of 57.9% (strong willed:27.9%; and weak willed:29.9%) of respondents have shown that local communities are willing to coexist with wildlife while 42.1% responded that they are not</p>
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				willing to coexist with wild animals.
To find out the suggestions on what can be done to ensure the long-term management of carnivores – livestock conflicts and coexistence between humans and wildlife.				<p>The results of this research, with the exclusion of the level of not needed, but by adding together the results of 3 levels (high needed, medium needed and low needed) the following items (with their percentages) were suggested to keep the coexistence between humans and wildlife in the Gishwati-Mukura Landscape. Those suggestions include:</p> <p>Strengthening compensation for damaged properties(100%); Improving and enforcing laws and regulations on wildlife and land use(100%); Staying close to the livestock (98.5%); Fencing the pastures (97.4%); Improving education and mobilization on wildlife protection(96.7%); Offer to farmers incentives and training on the protection of predators and livestock(96.5%); Continue research and monitoring on solutions to coexistence between humans and carnivores or wildlife in general(95.5%); Reinforcing the construction of shelters/kraals(92.8%); Involving local communities in all processes of management of wildlife (planning, implementation, monitoring)(91.1%); Relocating wild animals that cause conflicts(90.6%); Fencing the park(85.6); Killing the suspected carnivores(68.5%); Connectivity corridor of forest patches(53.8%); Expanding the size of the park area and corridor connecting forest fragments(49.2%); Moving livestock production away from the park boundaries(29.9).</p>

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

**a) People are well informed about the factors causing deaths to livestock and they took actions for the protection of livestock:**

- ❖ Before this research project, many reported that spotted hyena (*Crocuta crocuta*) and unknown animals were the major animals that killed livestock around Gishwati-Mukura and Biosphere Reserve. Now, this research project helped people to know that feral dogs (*Canis lupus familiaris*) are the main carnivores that cause livestock attacks, injuries or deaths, whereas, wild carnivores including side-striped jackals (*Canis adustus*) come in second.
- ❖ The research project helped local communities in avoiding misreporting facts. At the end of the project, people (park staff, local leaders, and communities) informed us that the non-predator causes of livestock deaths like cattle natural deaths or theft are not being reported as part of cases caused by carnivores as they used to be.
- ❖ The project assisted the local people in maintaining their self-confidence in the face of carnivores. They are aware of basic information to give, and measures to take for safeguarding cattle, and they are increasingly acting appropriately around carnivores.

**b) The results from this research project became a tool to guide wildlife and livestock management, decision-making, monitoring of wild animals outside the park, and guidance for further research activities**

- ❖ The management of Gishwati-Mukura National Park continues regular monitoring of wild animals outside the park. An example is a recent follow-up of golden monkeys, carnivores, and other biodiversity located in state forest plantations located outside the boundaries of Gishwati-Mukura National Park.
- ❖ Other stakeholder institutions for livestock husbandry and wildlife management improved the management of domestic and wild animals outside the park. This commitment was pledged while presenting the preliminary findings until today, for example, the board in charge of animal husbandry in Rwanda is enforcing the management of feral dogs as well as helping the local communities to manage those free-ranging dogs.
- ❖ Local communities raised their initiatives in protecting livestock and wildlife. For instance, a group of locals around Mukura Reserve are attempting to catch feral dogs using the traditional capture-release live trap technique. In collaboration with relevant stakeholders, park management, and local authorities are finding ways to support this community initiative, because the local communities do not have adequate means to carry out this project.

- ❖ The results of this research project have made it possible to better understand the issues of livestock deaths versus carnivore protection and how they need to be investigated going forward to sustainably strengthen the management of cattle and wildlife in the Gishwati-Mukura Landscape. The results also serve as a doorway to encourage research partners and other scholars to fund studies on human-wildlife conflict resolution to promote the conservation standards for the newly established Gishwati-Mukura National Park and Biosphere Reserve.

**c) Coexistence approaches of humans and wildlife in the way of improvement:**

- ❖ The project enabled the local community to understand the importance of coexistence with wild animals by avoiding harming them, and destroying their habitats. Local communities witnessed that they need and promote coexistence through:
  - Sharing the landscape with wildlife and hosting wildlife in community land/forests
  - Accepting the loss of livestock/property in favor of wildlife existence by requesting compensation instead of retaliation
  - Received benefits (tangible and intangible) received due to the wildlife hotspot area
  - Considering that killing or eating carnivores as taboo in the culture
  - Recognizing the presence of animals in the vicinities as a neighbor for a long term ago
  - Ongoing community initiatives on established community groups for the protection of livestock

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

- Nature of terrain and availability of respondents to the research: The terrain was not easy to walk due to its remoteness, hills, rain, and slippery. These caused difficulties in reaching the sampling units (trapping points or individual respondents) as well as missing some respondents because people moved from one place to another. This challenge was addressed by adding more days for data collection than anticipated. We have ensured that data collection is done in a representative way.
- Amounts of some items that were allocated but did not fit the initial plan (Discrepancies): This was addressed by adjusting the amounts of some items, and reallocating some amount of money from one item to another one to make sure that each activity was well achieved.
- Minor damage to camera traps: 2 camera traps were damaged by children in the field. No data was lost. There was a rise in community mobilization, and

until the data collecting was completed, no other cameras suffered damage.

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

Local communities were involved in the meetings during inception meetings, workshops, field training and visits, and responding to the questionnaires. Each participant received meals to subsist during participation. Locals with specific tasks, including field assistants in data collection, field surveys, and camera trapping, were also involved through casual employment and received subsistence allowances while in the field.

**5. Are there any plans to continue this work?**

Yes, because the participants in the research project recommended that further assessments towards the protection of livestock and carnivores are needed. In fact, there is a need of empowering research to find more solutions on carnivores – livestock conflict by combining action research/experimental researches and exploratory research that aim at strengthening the coexistence of humans and wildlife in Gishwati-Mukura National Park and Biosphere Reserve.

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

The preliminary results were shared with multi-disciplinary people with any direct or indirect relationship with wildlife management, and people affected by livestock deaths or the presence of carnivores in their vicinity. Those included members from conservation public and private institutions, local leaders, local cooperatives, NGOs, and local communities.

Specifically, the final and detailed report will be shared with the Rwanda Development Board/Gishwati-Mukura National Park, the institution that manages wildlife in Rwanda so that the board can make any management decisions or interventions for the management of wildlife and conflict resolutions in Gishwati-Mukura Landscape. In addition, the report will be given to Rwanda Agricultural Board which is in charge of managing domestic animals and livestock husbandry so that they can advise on ensuring the safe management of livestock in the Gishwati-Mukura Zones. Moreover, the report will be published in peer review journal for being read and referred by the public.

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

From the points of view, the most important things in the next step should be the following:

- Keep reinforcing the protection of both livestock and wildlife
- Strengthening the involvement of local community and promoting their conservation initiatives in the matters of human-wildlife conflict resolution.
- Park stakeholders to continue conducting field works and hold local evaluation sessions to monitor the implementation of this research's recommendations
- Continue more training to cattle keepers/farmers on wildlife behavior and how to protect livestock and live with wild animals.
- Provide scientific backing and reinforcement for the community research effort aimed at utilizing traditional live-capture-release traps for wildlife monitoring, as the local communities lack the financial and technical resources to execute this endeavor.

**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?**

Yes, the Rufford Foundation Logo was used in the preliminary report and point power presentation for initial results.

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

No.	Names	Role
1	Ezechiel Turikunkiko	Project Manager
2	Aimable Thierry Inzirayineza	Advisor and Supervisor
3	Anaclet Budahera	Advisor
4	Methode Majyambere	Technical Advisor
5	Anselme Tuyisabe	Field Assistant
6	Clement Karangwa	Field Assistant
7	Jean Pierre Ntibabarira	Training technical support
8	Philbert Ndahayo	Training technical support
9	Peter Ndayambaje	Veterinary Supports
10	Agnes Nyinawumuntu	Field Assistant
11	Liliane Umutoni	Field Assistant
12	Dr. Sylvain Nyandwi	Advisor
13	Dr. Richard Muvunyi	Research Advisor
14	Norbet Karegire	Community Mobiliser
15	Placide Nkurunziza	Community Mobiliser
16	Jean Paul Bizimana	Field supervision (camera traps)
17	Annet Mutesi	Field Assistant
18	Florah Mutesi	Field Assistant

**10. Any other comments?**

As a recently established protected area with the status of both a national park and a biosphere reserve, Gishwati-Mukura still needs more funding to support solving conservation issues.