

Final Evaluation Report

Your Details	
Full Name	Munib Khanyari
Project Title	Developing evidence-based understanding and management of disease transmission between wild and domestic ungulates in the Indian Trans-Himalayas
Application ID	24486-2
Grant Amount	£4943
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Date of this Report	18-11-2019

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
Mapping annual distribution and abundance of wild and domestic ungulates				We were not able to get any data for the wild ungulates for the winter months as the weather was extremely bad so that remains a knowledge gap.
Delimiting critical factors governing stakeholder decision making in implementing targeted treatment for disease management				We completed all the interviews with the herders and other officials as was intended. In fact, we have also analysed this data and are currently also writing a manuscript as well.
Understanding the distribution, abundance and overlap in parasites between wild and domestic ungulates				We collected and analysed more samples than we initially set out to do and hence achieved this objective. This data is also feeding into a new manuscript that we are writing.
Assessing the effectiveness of targeted disease treatment in improving livestock health and wildlife conservation				As intended all the workshops and group training for TST and 5-point check were done. Our engagement resulted in five different herders across the sites using the 5-point check to assess their herds’ health and treat individuals. Nonetheless, only one herder used structured TST methods to treat his herd. This was mainly because it was extremely hard to get anti-helminthics to the remote locations and due to severe impact immediate diseases such as CCPP and PPR caused, resulting in more of a concern for the herders.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

We found out that working across four sites was particularly challenging as weather, travel between sites, and lack of capacity in some sites made it hard to work well across all four. To this end, we dropped working in the Hangrang valley and optimised working across the other three sites. This was because in all the other three sites we had built capacity well and the work was going on even without the PI needing to be there. However, we weren’t able to do so in Hangrang valley and hence took the decision to drop it.

We found it hard to replenish and provide adequate amounts of 10% formaldehyde for the local staff to collect and store the faecal samples in. During the first quarter of the project we lost several samples in Pin valley and Lingti as we didn't have enough formaldehyde to store samples (We had enough in Kibber-Langza). This was tackled by building more local capacity subsequently in analysing the samples and providing equipment like microscope to do so in the field itself (saving the time and effort to transport the samples). In this way, most of our samples didn't need storing and were analysed in the field by the local staff.

Herders across all the sites took a while to really understand the concept of targeted treatment. This was mostly because impacts of gastro-intestinal nematodes (GINs) are hard to detect and are often sub-clinical. Additionally, we found disease like contagious caprine pleuropneumonia (CCPP) and peste de petits ruminants (PPR) to be the major cause of health issues and death in livestock. To this end, the herders were keen on engaging in interventions like vaccination against these over working with GINs for instance. This restricted us to not having as many herders on board trying selective treatment as we would have hoped for. We worked around this reality by: i) showing the herders through our work that GINs do exist in their herds and through various workshops and presentation, explained the impacts of these GINs on their sheep and goat, and ii) acknowledging and suggesting that going forward we will also try and tackle the issues of CCPP and PPR by engaging more with the local and state governments in ensuring effective vaccination coverage.

3. Briefly describe the three most important outcomes of your project.

1. We found that GINs are present across herds of wild and domestic ungulates in these sites at levels that from literature are known to clinically impact their fitness. The burdens increase with increasing livestock numbers and migratory livestock have the highest burdens. Both interestingly and worryingly though, a majority of herders don't engage in any form of interventions to deal with these burdens. This provides a basis for cross-transmission to occur. Nonetheless, once we showed the herders that GINs are indeed present both in their herds and that of wild ungulates and discussed their production and fitness related impacts, they were interested in engaging with targeted interventions.
2. Alongside GINs, for the migratory herders, disease like contagious caprine pleuropneumonia (CCPP) and PPR (peste de petits ruminants) are present and affecting herds. If conservation interventions don't deal with this proactively there is a risk that cross-transmission to wild ungulates can cause health impacts, including deaths. The fact that (as alluded by point 1) GINs are also present and aren't dealt with, predisposes the herds to these diseases even more. However, our engagement ensured us that these herders are willing to engage in interventions that deal both with GINs and such diseases. This provides an opportunity to align herder livelihoods with wildlife conservation.

3. We worked with four focal herders and their groups for targeted selective treatment. For them, we saw that the 5-point check was an effective strategy in assessing their herd's health and then only targeting treatment to individuals that were diagnosed as unhealthy based on this check. Data shows that herders that employed this approach had an overall reduction in GINs burden. This is promising and suggests that such an approach when scaled up can actually be effective in aligning improved livestock health (i.e. herder livelihoods) with wild ungulate conservation, giving us a future avenue to work towards.
4. **Briefly describe the involvement of local communities and how they have benefitted from the project.**

The local community was a central part of this project across the three sites we worked:

1. For each site we trained an interested local in both collecting and analysing the faecal samples. This builds local capacity in the region and provides them with the skill sets to be conservation leaders in their own communities.
2. All our work was done in collaboration with the livestock herders of these sites. We did multiple workshops with their herders, both theoretical ones explaining the role of GINs and practical showing how to identify and diagnose GINs. The herders are the ones that are using techniques like the 5-point checks to assess their livestock's health and engaging in targeted treatment based on that. This makes the interventions sustainable and cost-effective. In the long run this helps improve herder livelihoods by improving livestock health and aligning it with wildlife conservation.
3. The project logistics and operations were only finalised after discussions with the local forest department, animal husbandry department, the herders and villagers. This resulted in them not only knowing the project, but also, they were able to give their inputs on how to conduct this effectively. By doing so, the project aimed to be inclusive and reflect the needs and opinions of the local community and address challenges felt by them with the hope of building an equitable partnership.

4. Are there any plans to continue this work?

Yes, definitely. As seen from our results. Migratory herders in Pin valley had significantly higher burdens of GINs and with their arrival resulted also in spikes in GINs for wild ungulates. (though we can't entirely decouple cross-transmission from potential seasonal related highs in GINs burden, however the differences with high livestock numbers and increased GINs is stark). In addition to this, across various areas in the Indian Trans-Himalayas, migratory herders are known to extensively hunt wild ungulates like Ibex and engage in killing of carnivores like snow leopard in retaliation of their depredation of livestock.

Going forward, I would like to work closely with multiple migratory herders and governments agencies like the animal husbandry across the landscapes of Lahual-Spiti and Chamba districts of Himachal Pradesh on co-managing issues around diseases like CCPP and PPR, and GINs. Over 75% of Trans-Himalayan Himachal Pradesh is grazed by migratory livestock. The ideas are yet to be formalised, nonetheless, I think awareness building and then working with migratory herders to reduce threats like poaching in return for health benefits for their livestock is a potential avenue to build work into.

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

1. We have already published a popular article about this work on a reputable online conservation magazine (<https://round.glass/sustain/conservation/pink-health-herding-himalayas/>).
2. We have prepared and submitted a report about our work to both the Forest and Animal Husbandry department.
3. We also are in the process of publishing 1-2 papers from this work in international peer-reviewed scientific journals.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

We initially planned for a 12-month project. However, due to a few logistical challenges we were delayed in starting the project. The grant was used from May 2018 till September 2019. We hoped to finish the project by May 2019. The reason why we had to extend till September was because the first 3-4 Months had patchy data given the issues, we had with hiring a local person in Hangrang valley. This also resulted in a bit of compromise in data collection across the other sites during this time. By August-September we had decided to drop Hangrang and had similar parallel structures operating in the other sites. This resulted in us taking the decision to extend till September 2019 to get a full year's data.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
2 Airfares between Bangalore and Chandigarh (source: https://www.makemytrip.com/ ; 76 *2)	152	176	+24	
Bus transport from Chandigarh	275	425	+150	The additional amount came

to Kaza and within Spiti (from site to site)				in because of the extended field timings which required us to make extra visits.
Field Assistant Salary (80 per month * 2 * 11)	1760	1760		This was predetermined.
Field stay in all sites Spiti for c.3 people (Using NCF field bases for food and accommodation at the standard monthly rates) (95*11*4)	1680	4180	+2500	This amount was predetermined and followed as per agreement
Refreshments for community meetings/focal group discussions (c. 2 discussion per site across the project = 8 * 35)	280	225	-55	
Parasite analysis equipment: microscope (source: www.amazon.com Radical 20x-40x electronic microscope 152), 5 mini-flotacs (need to be shipped from University of Naples who make them and are EM's collaborators 55), tubes, vials, gloves etc. (source: www.amazon.com 100)	307	455	+148	The shelf-life of the mini-flotacs in the trans-Himalayan landscape was much shorter than we expected. This needed us to import more flotacs that we initially intended.
Consumables (formaldehyde, distilled water, etc.)	165	225	+60	We ended up having to get more formaldehyde that we thought because some got wasted during travelling
Miscellaneous	324	160	-164	We ended up not needing to spend as much money as we thought for first aid and medication as the forest department in many instances provided us with these
Totals	4943	7606	+2663	£ 1 = Rs. 93.35 conversion.

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

Going forward it is imperative that we work with migratory herder towards mitigating priority diseases like CCPP and PPR. This will require us to work with the head herders in their villages as that is where all the livestock congregate. To have effective and long sustaining interventions such as vaccination we will need to collaborate with multiple stakeholders which include the animal husbandry department (who have the resource such as the vaccination against diseases however lack the on-ground presence and relation with the herders), forest department (for permissions to get to certain areas), and the local herder governing systems.

Nonetheless, before we do anything, we need to have very structured and clear conversations with the herders about this intended intervention and have their buy-in.

Design a study that will evaluate the impact both for the socio-economic of herders and wildlife conservation of the above intervention.

10. 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?

No, I didn't use the Rufford Foundation logo in any material. I have written a popular article about my work that is published in a reputed magazine based out of India. In that I made sure I acknowledged the support of the Rufford Foundation for the work. Alongside, we are in the process of writing a scientific paper about our work where we will also acknowledge Rufford's support. My team and I always ensure that when we do community workshops and meetings, in a very polite manner, we also communicate to the locals the support and role of Rufford's Foundation in making the project a reality.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Project Supervisor: **Dr. Kulbushansingh Suryawanshi** (KS; Nature Conservation Foundation/Snow Leopard Trust), **Dr. Eric Morgan** (EM: Queen's University) and **Dr. EJ Milner-Gulland** (EJ: Oxford University). KS has over 10 years' experience of work in the Indian Trans-Himalayas, primarily with factors that affect populations of wild ungulates and ungulate-habitat relationship. EM has conducted pioneering work in TST across the globe, especially with resource poor herders (e.g. Botswana), while EJ has over two decades of work weaving together the natural and social sciences to provide more holistic conservation ideas. They supervised this project, and provided key feedback on the activities, methods and challenges. The data collected supplemented over 10 years of data collected on wild ungulates and livestock by KS and team in this area.

Principal Investigator: **Munib Khanyari** (MK). MK was responsible for planning (along with KS, EM and EJ), setting in place the logistics (e.g. training individuals), conducted data collection, analysed, and is now writing up the work.

Field Guides and Assistants: **Padma Sonam** (a resident of Sagnam village in Pin Valley) and **Rinchen Togbe** (a resident of Kibber village in Spiti Valley) were our field guides and assistants. They each have over 15 years of working in Trans Himalayas both in the field and with communities. They know the valleys extremely well. They were key in engaging with the herders as well.

12. Any other comments?

A sincere thanks to all the team and members at Rufford for trusting me with this project. Working in this landscape, on these topics, with these people has become the calling of my life.