

Conservation Leadership Programme: Final Report

CLP ID: F03203614

Project : Conserving Livelihoods and *Semnopithecus Ajax*: Resolving Conflicts Around Khajiar-Kalatop Sanctuary-Chamba

Country: India

Site: Chamba District, Himachal Pradesh, India

Field Dates: Team stationed at the field site from May 2012 to present.

Names of the institution involved in organising the project: Wildlife Information Liaison Development.

Overall aim: Holistic conservation for the Endangered *Semnopithecus ajax* , through a concerted stakeholder run Conflict Mitigation and Conservation Monitoring (CM²) System, and serve as a model for other such conservation initiatives in the region.

Author: Vishal Ahuja

Contact details:

Office:

Praveen Vishal Ahuja

Wildlife Information Liaison Development

12, Thiruvannamalai Nagar, Saravanampatti – Kalapatti Road,
Saravanampatti, Coimbatore, Tamil Nadu 641 035, India

Phone: +91 4222665298, 2665450

Residence:

Praveen Vishal Ahuja

Adarsh Nagar, P.O. Hardaspura

Distt. Chamba, Himachal Pradesh, 1763178

Mobile: +91 9459075888, +91 7018264519, + 91 8894833999

Date of Report Completion: 27 March, 2017

Contents

Project partners and collaborators.....	3
Section 1:	4
1.1. Summary.....	4
1.2. Introduction.....	4
1.3. Project Members.....	5
Section2:	6
2.1. Aim and objectives.....	6
2.2. Changes to original plan.....	7
2.3. Methodology.....	7
2.4. Outputs and Results.....	8
2.5. Communication and application of results.....	10
2.6. Monitoring and Evaluation.....	11
2.7. Achievements and Impacts.....	11
2.8. Capacity Development and Leadership capabilities.....	12
Section 3:	12
3.1. Conclusion.....	12
3.2. Problems encountered and lessons learnt.....	13
3.3. In the future.....	14
3.4. Financial report.....	15
Section 4:	16
Appendices.....	16
Bibliography.....	25

Project Partners & Collaborators

Our thanks go to the Conservation Leadership Programme fund and Mohamed bin Zayed Species Conservation Fund for helping us to initiate a project on Himalayan Langur conservation in Chamba. We would like to thank the members of the Himalayan Langur Project team who have been dedicated for making this project a great success. We are thankful to Brenda de Groot, a long time volunteer and education associate of the project to work on illustrations for Achamba!: an Educational Magazine produced by the project. We sincerely extend our gratitude to Dr. Sanjay Molur, Founder secretary Wildlife Information Liaison Development for his constant support and guidance through all these years. Our special thanks goes to Forest department Himachal Pradesh for giving us permission to carry out study in Khajjiar-Kalatop Wildlife Sanctuary. The field-work would not have been possible without the requisite permission granted by the PCCF and other officials of Himachal Pradesh Forest Department. We also thank the Prince Bernhard Nature Fund for support to the project.

Section 1

1.1. Summary

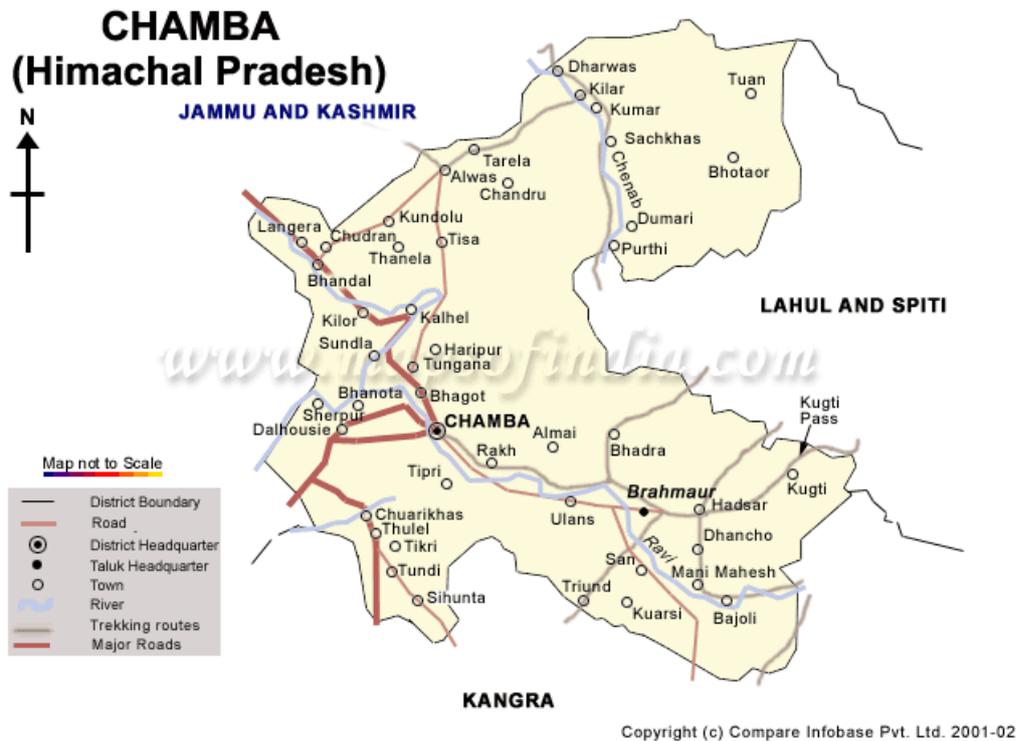
The project was initiated in 2014 to mitigate human-langur conflict due to crop raiding in Chamba by methodological study of conflict situation, implementation and evaluation of site-specific crop raid deterrents to control and/or reduce crop loss due to crop raiding—through concerted stakeholder run HWCx Programme. In conducting the first phase of studies the CLP team had to spend a lot of time building a rapport with the communities and eventually conduct questionnaire surveys through frequent visits. The results indicated that langur raids were inconsistent and not the primary threat to crop loss in most cases. The results of the study show an increase in trend to crop damage and negative tolerance towards langurs. Four farmers agreed to participate in mitigation strategies, but due to lack of basic biological data on raiding behaviours, native food plant preferences and migrations, adequate strategies could not be developed for mitigatory actions. This was a major drawback which resulted in two of the four objectives not being met. However, womens' participation in the surveys were ensured. In addition informal outreach programmes were carried out.

1.2. Introduction

The Chamba Sacred Langur (*Semnopithecus ajax*) is one of the little known and highly threatened primates of the Indian subcontinent. The species was described in 1928 by the famed British naturalist, Reginald Innes Pocock, in his article to the Journal of Bombay Natural History Society titled 'The Langurs, or Leaf monkeys, of British India'. Little was known of the species, its ecology and conservation status, warranting immediate research and conservation action (Molur et al. (2003). The Himalayan Langur Project was thus established in 2012 to implement field research and conservation for the little known Chamba Sacred Langur.

Human-primate conflict is burning issue in Chamba with 76 of the 244 surveyed sites reporting conflict with langurs due to their crop raiding practice. No crop-protection system in place in any of these sites. In certain sites, farmers report extreme helplessness in controlling langur crop raid. The helpless attitude spurs antagonism and has adverse conservation implications. The project seeks to address the conservation issue through methodological study of temporal and spatial dynamics influencing raiding, raider behavior, quantifying damage suffered post raiding events. The information would help in designing and evaluating site specific crop-raid deterrents and explore alternatives to reduce loss. The identified stakeholders will be involved in the project in every step and

will be partners in building Conflict Mitigation and Conservation Management System. This stakeholder system will be empowered to sustain a conflict-free environment in Chamba and a sustainable future for *Semnopithecus ajax*.



1.3 Project Members

Member throughout the CLP continuation project (2015 & 2016):

Praveen Vishal Ahuja

Holds MSc in Botany, BSc in Life Science and Bachelors in Education. Vishal has 4 years of experience in conservation and is currently working in Himalayan Langur Project with Wildlife Information Liaison Development as a researcher. Vishal was responsible for coordination of project activities, field data collection, data analysis, report writing, engaging the local communities and training them during project implementation.

Members who were part of the project through year 1 of the CLP continuation project (2015)

Martina Aandam

Holds MSc in Primate Conservation and Bachelors in Advanced Zoology and Biotechnology . Marina has experience in project planning and report writing. Martina is currently working with Dakshin Foundation, Bengaluru.

Brawin Kumar

Holds MSc in Biotechnology and Bachelors in Biotechnology. Braveen has experience in data compilation and GIS mapping. Braveen is currently studying for a doctoral programme with Chinese Academy of Sciences, Beijing.

Section 2:

2.1. Aim and objectives

The project aims to contribute towards a holistic conservation initiative in Chamba for the Endangered *Semnopithecus ajax*, other threatened fauna and flora and the Himalayan ecosystem, through a concerted stakeholder run Conflict Mitigation and Conservation Monitoring System currently called Human Wildlife Coexistence (HWCx) Programme, and serve as a model for other such conservation initiatives in the region. The project purpose is to mitigate human-langur conflict due to crop raiding in Chamba by methodological study of conflict situation, implementation and evaluation of site-specific crop raid deterrents to control and/or reduce crop loss due to crop raiding—through concerted stakeholder run HWCx Programme.

Objectives:

1. Analyze cause of crop raiding, community's perception of raiding, defination of loss, community's attitude towards crop raiding langurs and their solution to the issue. Understand raider behavior and quantify damage due to crop raiding langurs.
2. Plan, implement and evaluate site-specific crop raiding deterrents through a stakeholder run HWCx programme.
3. Gender inclusive approach to conflict mitigation: Involve all members of the community in the system to promote gender equality and an unbiased evaluation of intervention.

4. Establish, monitor and contribute to HWCx programme to promote and strive for sustainable living and therefore benefit conservation of *Semnopithecus ajax*.

2.2. Changes to original project plan

After these two years long extensive study we understood that a lot of parameters need to work upon before planning and implementing crop raiding deterrents. The extreme weather conditions and harsh terrains all year is one of the main reasons for the objective not completed yet. We need more time to study the raider behavior during crop growth, erratic raiding pattern of animals, farm entry and exit points, animal movement inside the farm and to analyze the distribution and abundance of food for Langurs in and around Khajjiar-Kalatop Wildlife Sanctuary. Such Information is important to design suitable raider specific deterrents. We already have started the ground work for such study. We have identified the various forest patches where we soon will be collecting plant samples and continue studying raiders behavior alongside.

2.3. Methodology

Objective 1 : Analyze cause of crop raiding, community's perception of raiding, definition of loss, community's attitude towards crop raiding langurs and their solution to the issue. Understand raider behavior and quantify damage due to crop raiding langurs.

Methodology: Semi-structured questionnaire surveys and informal interviews were conducted in conflict prone villages surrounding the sanctuary to understand people's perception of crop loss and damage, crop raiding and their suggestions for mitigation. Introductory workshops were conducted to discuss the project's objectives with the community and seek their cooperation and support for the project. Behavioural data for the raiding animals was collected through focal scan sampling during random field surveys in the villages surrounding sanctuary. Crop damage assessment was done using questionnaire surveys in the villages where we got the approximate results after comparing the actual yield with the expected yield.

Objective 2: Plan, implement and evaluate site-specific crop raiding deterrents through a stakeholder run HWCx programme.

Methodology: This was not conducted as the crop raider behavior was collected during these years. Although four specific farms were identified and the landlords were interested in participating in this aspect, the uncertainty of raiders, especially of other more conflict species such as Black Bear, Rhesus Macaque and Porcupines deterred the ability to understand and implement deterrants for langurs in those farms.

Objective 3: Gender inclusive approach to conflict mitigation: Involve all members of the community in the system to promote gender equality and an unbiased evaluation of intervention.

Methodology: Ensured participation of women in every phase of the project: through questionnaire interviews, workshops, regular field visits and ensure accounting of their perceptions and knowledge.

Objective 4: Establish, monitor and contribute to HWCx programme to promote and strive for sustainable living and therefore benefit conservation of *Semnopithecus ajax*.

Methodology: Since much of the project was focused on Objective 1, the results have just been analysed. Based on the outputs and further meetings and communication with the village heads we will have to deal with the issues in this objective in the future.

2.4. Outputs and Results

Objective 1: Analyze cause of crop raiding, community's perception of raiding, definition of loss, community's attitude towards crop raiding langurs and their solution to the issue. Understand raider behavior and quantify damage due to crop raiding langurs.

Output: The study was conducted in the 43 villages surrounding the Kalatop-Khajjiar Wildlife Sanctuary. This study was conducted to identify crop raiding species and estimate the magnitude of agricultural field crop loss due to wild animals. Data was collected via questionnaire surveys and the loss was analyzed by comparing the expected yield with the actual yield after the harvest.

There are two crop seasons in the Pradesh, viz; Kharif and Rabi. The duration of Rabi crop from sowing to harvesting is from October- November to May-June and that of kharif crop is between the months of May-June and September- October. The important Kharif crops are maize and paddy; wheat and barley are the important Rabi crops.

Maize is the major crop as well as a staple food of Himachal Pradesh. During our reconnaissance surveys we found that Maize is the most vulnerable crop and the overall production depends upon the mercy of monsoon rains and crop raiders. Therefore to identify the crop raiders and to assess the damage to crop we conducted 43 surveys between February- May 2016.

Crop raiding was reported in all the 43 villages surveyed. Beside Langurs Black bears, Macaques and porcupines were also found actively engaged in raiding and causing considerable loss. Langurs and macaques were found to raid during day time whereas black bears and porcupines raid during night time.

Wheat was found to be cultivated in 11 out of 43 villages surveyed and barley in 31 out of 43 sites.

The results show that not all crops were equally affected by crop raiders. During this study 100% of the respondents claimed that Maize was the most vulnerable crop followed by Barley (43%), whereas about 30% of the respondent reported that wheat was the least vulnerable crop to damage caused by wild animals. Maximum loss was with Maize where Black bears contributed 42%, Macaques contributed 31%, Langurs contributed 20% and Porcupine only 7% to the total loss.

Based upon our previous findings we conducted questionnaire surveys right after the harvesting season to re-assess the data from the previous study held in February, 2016. The objective of the study was to re-assess and re-confirm data previously recorded about the vulnerability of Maize crop. We used the questionnaire during our field surveys to collect the data.

The study was conducted in the 51 villages surrounding the Kalatop-khajjiar wildlife sanctuary in District Chamba, Himachal Pradesh from November, 2016 to December, 2016. Raiding was reported in all the 51 villages surveyed during the study. Langur, Macaque, Black bear and Porcupine were the identified damage causing wild animals on Maize. Where Black bear raided crops at a magnitude of 42% while the Macaque at 38%, Langur at 14% and Porcupine at 6%.

39 of the 51 villages surveyed in this study were common among the previously surveyed villages. Upon comparing the results with the previous study we found a slight variation in the magnitude of raiding by different animal species from the previous results.(Table 1).

	2014-15	2015-16
	Crop damage %	Crop damage %
Black bear	42	42
Macaque	31	38
Langur	20	14
Porcupine	7	6

Table 1 Percentage of trends of Maize crop damage by crop raiders based on respondents reply.

A slight change in the magnitude of the damage caused by different raiders was because some of the respondent farmers in this study were different from the previous ones.

An increase in crop damage by Langur was reported in 9 out of the 39 villages when compared with the previous results.

At the end of the study we reported that the farmers lost on an average 57.17% from their expected yield due to crop raiding. Apart from sticking with the questionnaire only we also collected the anecdotal information while interviewing the respondents. Almost

all of the respondents reported an increase in trend of crop damage. The respondents also reported an increase in aggressive behaviour of the Langurs in past few years. An increase in antagonism and negative tolerance have been reported towards the crop raiding animals in these two surveys.

Most of the respondents were reported to grow their crop for subsistence and not for commercial purpose. Also the farmers are not compensated for their losses by any Govt/ Non- Government agencies. Such losses can make communities antagonistic and intolerant towards wildlife, which can result in retribution killing of problem species.

Objective 3: Gender inclusive approach to conflict mitigation: Involve all members of the community in the system to promote gender equality and an unbiased evaluation of intervention.

Output: During our reconnaissance surveys we found that females contribute more time in agricultural activities than men. Men go out to earn money through labor work and some of them are government servants. Potential female stakeholders were successfully identified in mid-wives during field surveys and with the help of our local associate, Arpana Research & Charities Trust, an NGO dedicated to community welfare and development (January 2015-August 2015). They were briefed about the project and its objectives. We also met with women holding positions in local *Panchayats* and briefed them about the project and its objectives. Their participation will be ensured during the various project activities from planning raid deterrents through implementation and evaluation process.

2.5. Communication & Application of results

We have had trouble addressing all the components of the project due to the vagaries of the conflict involving four species, the weather, and the terrain. Since villages are located on steep slopes, usually as clusters of two-five houses, reaching them, building a rapport with them and assessing damage through questionnaires require long-term and consistent visits and building trust. During these visits, one of the tasks was to conduct outreach programmes after the first set of questionnaire surveys of the 43 villages. It was during these visits we learned that a follow up questionnaire was necessary to ensure consistency in the data provided by the villagers. We have not been able to follow up with the final project results, but this will be done in the ongoing works outlined for the Himalayan Langur Project. In this project funded by CLP, we were unable to follow up.

2.6. Monitoring and Evaluation

Constant visits and interactions with villagers were the ways of monitoring and evaluating the survey conducted. We realised during these visits that follow up surveys had to be conducted for consistency in data. Also, interactions with the host NGO, Arpana Trust who works with villages as part of the health outreach programmes and women self help groups, helped us understand the pitfalls in the surveys. Based on their expert knowledge and inputs we were able to modify our approach with respect to rapport and building trust amongst the villagers and thereby bettering the quality of data in our surveys. We intend to follow up on same lines while pursuing the outcomes of these surveys to implement mitigation methods in the future.

2.7. Achievements and Impacts

During our study we successfully identified the different raiders and their frequency and magnitude of raiding in different villages. We have also collected valuable information about the most affected areas. During field surveys we visited villages, met people and developed good relationships with them. Now at the end of study community residing around Khajjiar-Kalatop Wildlife Sanctuary is very well aware of the project objectives. They are now interested to work with the project finding possible solution of the problem and exploring the benefits of sustainable living.

The local community in the range of the langur and suffering extensive crop damage will be the primary stakeholders of the Conflict Mitigation and Conservation Monitoring System. Women of the community will be considered as key stakeholders as they contribute more time in agriculture than men and encourage to take-up responsible roles. The system apart from serving as a model for other such conservation initiatives in the state and across the country will serve in knowledge transfer exercises wherein the community will share their experience and knowledge of the process with other conflict zone communities.

The information collected through this study will be shared with the communities through awareness campaigns. These awareness campaigns would seek to involve the community and other stakeholders in exploring the benefits of sustainable living and exploring alternatives that would minimize their impact on the environment and promote an eco-sensitive living. The campaigns would also work to aid the community in understanding the importance of conserving *Semnopithecus ajax* for the sustainability of their environment and vice versa, laying the foundation for future conservation studies to the benefit of the threatened langur.

2.8. Capacity Development and Leadership capabilities

The team members gained first hand field experience on human-primate relationship study. The project helped team members in having a better understanding of the patterns and underlying processes of human-wildlife interactions and how this understanding can assist with conflict mitigation and conservation of threatened Langurs. The team members developed understanding of the local customs and dialect during community surveys this will later help them in designing methodology for outreach and awareness programs in the study area. Throughout the study period team members were involved in data collection and analysis which helped to improve their analytical and research skills. After working in difficult terrain and unpredictable weather conditions team members developed their ability to plan, organise and prioritise their work as a responsible member to achieve the objectives and overall goal. Most importantly, we learned that to deal with mitigation measures we need to understand basic biology and behaviours of langurs, which we had not considered during drafting the proposal. Lack of understanding of langur behaviours, diets, feeding behaviours, local migrations, etc., we are unable to provide workable mitigation measures. This has been our biggest eye opener for future works in this field.

SECTION 3

3.1. Conclusion

On the bases of sample villages taken for damage assessment study, of the total expected yield about 57.17% was lost due to crop raiding wild animals belonging to four species and langurs contributed minimally to crop raiding compared to two other species (Black bears and macaques). The key crop raider protection methods like active guarding and stone pelting were found to be ineffective in reducing the loss due to raiding. The results of the study show an increase in trend to crop damage. The respondents also reported an increase in aggressive behaviour of the Langurs in the past few years. An increase in antagonism and negative tolerance have been reported towards the crop raiding animals. Most of the respondents were reported to grow their crop for subsistence and not for commercial purpose. Also the farmers are not compensated for their losses by any Govt/ Non- Government agencies. Such losses can make communities antagonistic and intolerant towards wildlife, which can result in retribution killing of problem species. This fact is also supported by an incident of Langur killing in the study area last year. Hence we need further studies to collect more information about the temporal and spatial factors that predict crop raiding and distribution and abundance of food for Langurs in the study area before designing crop raiding deterrents which will help reducing the animal wildlife conflict in future.

3.2. Problems encountered and lessons learnt

- *Which project activities and outcomes went well and why?*

1. Involving a pre-established NGO and Village heads during reconnaissance surveys was a wise decision to reach a lot of people in short time, get familiar with them and to brief project objectives which would otherwise have not been possible at the initial stage of the project.

- *Which project activities and outcomes have been problematic and in what way, and how has this been overcome?*

1. The study area remained under dense fog with a low visibility of not more than 5 meters sometime. Rain and fog along with dense crop cover provided perfect shelter to the raiders and at the same time increased the risk for onsite behavioral studies in this region. . We were advised not to visit the villages alone and without any safety measure because of Black bears presence even during day time. To cope up with this problem we chose those villages which can be surveyed via Binoculars and identified stakeholders from different villages who provided us with secondary information on raiding during our regular visits.

2. After our initial surveys we understood that the area was unfavorable for conventional crop raiding studies. For instance, it was difficult to predict time of crop raiding for animals like langurs, macaques and black bears that show an erratic raiding pattern. To overcome this we confirmed the frequency and number of raiding episodes based upon secondary information provided by the respondents.

3. Unpredictable weather: This was dealt by planning field surveys according to weather forecast and following satellite imagery provided by Indian Meteorological Department to void wastage of time and project money.

4. We realized that our proposal was overambitious as we had not accounted for understanding of basic biological, feeding, migration and behavioural knowledge of langurs. This impacted negatively on the aspects of mitigation as we are unable to provide measures based on langur behaviours. This is a major lesson learnt and we hope to address this aspect to make mitigation measures more effective.

As I was the only researcher working in the field for two of the three years of the project, it was not possible for a single person to be present during each and every raiding episode in different villages happening at the same time so we think we

might have lost a lot of valuable information. The above study needs more time, manpower and other resources to get additional and more accurate data.

- *Briefly assess the specific project methodologies and conservation tools used.*
 1. We used questionnaire method to access the crop damage assessment data, where we calculated the crop loss by comparing between expected yield and actual yield after harvest. The above method was found to be effectual in the study area where crop raiding animals are highly unpredictable and show an erratic raiding pattern.
 2. To collect the behavioural data for the raiding animals we conducted random field surveys in the villages surrounding the wildlife sanctuary. Pertaining unfavourable climatic conditions and risk of black bear attacks we chose to collect the data by focal scan sampling via binoculars and collecting secondary information from villagers.

- *Please state important lessons which have been learnt through the course of the project and provide recommendations for future enhancement or modification to the project activities and outcomes.*
 1. Surveys were planned in advance consulting weather forecast and satellite imagery to avoid wasting of project's time, efforts and money.
 2. Keeping in view the revamped permit application system, the process for renewal of the permit has been initiated in advance to avoid any delay in future studies.

3.3. In the future

1. Document food habit and food species preference in the wild.
2. Vegetation sampling from forest patches in and around Kalatop- Khajjiar Wildlife sanctuary to analyze the distribution and abundance of food for Langurs.
3. Organizing education programs in schools that would aim to foster and engender a conservation sensitive behavior and ecological awareness in schools.
4. Meeting with villagers to design raid deterrents, implement and evaluate.

5. Establish the HWCx Programme. Identify leaders from the community to carry the program through and engage in knowledge sharing with other
6. affected communities.

Financial Report

Please copy and paste the summary sheet from your financial report here

Itemized expenses	Total CLP requested (USD)	Total CLP used (USD)
PHASE I - PROJECT PREPARATION		
Communications	500.00	619.79
Field guide books, maps, journal articles and other printed materials	300.00	
Insurance and Medical Supplies	200.00	
Reconnaissance (Initial Survey of Potential crop raiding sites)	1,000.00	1,253.41
EQUIPMENT		
Scientific/field equipment and supplies (2 GPS and 1 Binocular)	500.00	
Other Basecamp Equipments 1 Desktop computer 1 Printer 1 UPS along with the batteries 2 Writing desk/3 Chairs/1 stove	2,000.00	2,021.33
Camping equipment	250.00	
PHASE II - IMPLEMENTATION EXPENSES		
Accommodation for team members and local guides	1,800.00	1,784.64
Food for team members and local guides (Please detail: Food in field)	2,200.00	2,345.53
Travel and Local Transportation Fuel charges Team members/project investigator trip from Head office to site	2,680.00	3,076.52
Workshops	1,800.00	
Outreach/education activities and materials (brochures, posters, video, t-shirts, etc.) (Brochure, Poster, T-shirts) Guidelines manual 50 pages	5,000.00	2,796.38
Other (Team Stipend)	6,200.00	10,775.86
PHASE III - POST-PROJECT EXPENSES		
Administration	250.00	258.62
Report production and results dissemination	200.00	
Other (Printing & Stationery)	120.00	168.72
Total	25,000.00	25,100.81

SECTION 4

Appendices

Appendix 4.1. CLP M & E measures

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	0	
Number of species assessments contributed to (E.g. IUCN assessments)	1	Assessment of <i>Semnopithecus ajax</i> in the Asian primate Red List assessment process in Singapore in November 2015.
Number of site assessments contributed to (E.g. IBA assessments)	0	
Number of NGOs established	0	
Amount of extra funding leveraged (\$)		
Number of species discovered/rediscovered	0	
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	0	
Number of species/sites legally protected for biodiversity	0	
Number of stakeholders actively engaged in species/site conservation management	10	
Number of species/site management plans/strategies developed	0	This is in progress as part of a CBSG process
Number of stakeholders reached	>500	
Examples of stakeholder behaviour change brought about by the project.	0	

Examples of policy change brought about by the project		
Number of jobs created	0	
Number of academic papers published	0	In progress
Number of conferences where project results have been presented	4	<ol style="list-style-type: none"> 1. Asian primate assessments 2. Forest departments in Shimla, Dharamshala and Chamba 3. Ministry of Environment, Forests & Climate Change 4. Abroad in various venues.

Appendix 4.1 CLP M&E measures

Appendix 4.2. Project Photos:



Plate 1: Vishal Interviewing farmer during reconnaissance surveys



Plate 2: During first crop damage assessment surveys with volunteer from Gujrat, India



Plate 3: Vishal interacting with farmers during first crop damage assessment surveys



Plate 4: Focal scanning of the villages during onsite behavioural studies



Plate 5: A view of Maize farm from one of the village in study area



Plate 6: A female farmer guarding her farm



Plate 7: Langur stealing corns from a farm



Plate 8: Macaque eating maize corn after stealing it from adjacent farm

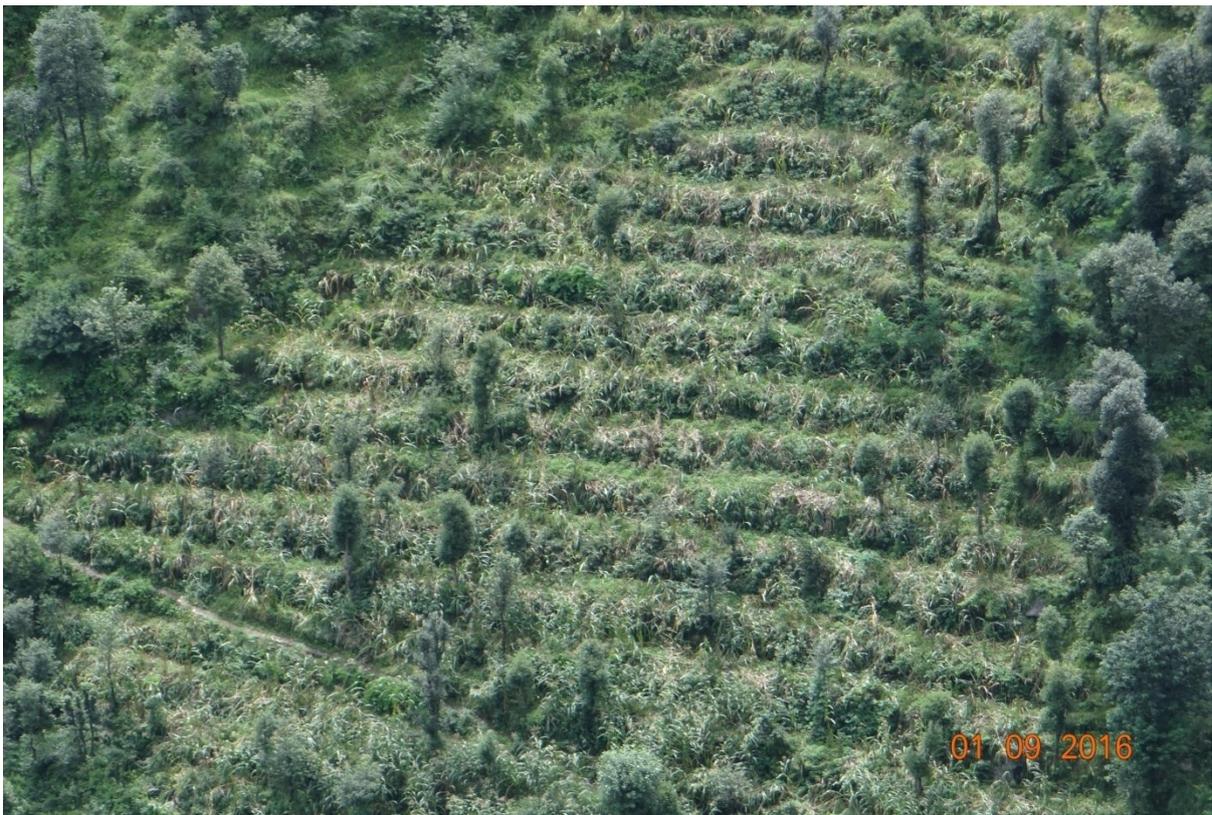


Plate 9: A farm completely destroyed by Black bear



Plate 10: Females harvesting their crop



Plate 11: Vishal interviewing female farmers after crop harvest during crop damage assessment



Plate 12: Scare crow used by a farmer to guard his farm

Bibliography

References:

Ancrenaz, M., Hearn, A. J., Ross, J., Sollmann, R., and Wilting, A. 2012. Handbook for wildlife monitoring using camera traps. BBEC II Secretariat: Malaysia.

Apantaku, S. Olusegun. "Indigenous technical knowledge and use of forest plant products for sustainable control of crop pests in Ogun state, Nigeria." *Journal of Sustainable Agriculture* 14 (2-3): 5-13.

Ayotte, J., Parker, K., and Gillingham, M. 2008. Use of Natural Licks by Four Species of Ungulates in Northern British Columbia. *Journal of Mammalogy* 95 (3):1041–1050.

Bond, Jennifer. 2015. Making Sense of Human–Elephant Conflict in Laikipia County, Kenya. *Society & Natural Resources*. 28(3)1-16.

Cai, Jing., Jiang, Z., Zeng, Y., Li, C., and Bravery, B.D. 2008. Factors affecting crop damage by wild boar and methods of mitigation in a giant panda reserve. *European Journal of Wildlife Research* 54 (4):723-728.

Charles Santiapillai and Bruce Read (2010). Would masking the smell of ripening paddy-fields help mitigate human–elephant conflict in Sri Lanka?. *Oryx*, 44:509-511. doi:10.1017/S0030605310000906.

Chhangani AK, Mohnot SM. 2004. Crop raid by hanuman langur *Semnopithecus entellus* in and around aravallis (India) and its management. *Primate Report* 29 pp 35–47.

Gore, M.L and Kahler, J.S. 2012. Gendered Risk Perceptions Associated with Human Wildlife Conflict: Implications for Participatory Conservation. *PLoS One* 7(3) pp 1-10.

Gerber, B.D., Williams, P.J., and Bailey, L.I. 2013. Primates and cameras: Noninvasive sampling to make population level inferences while accounting for imperfect detection. DOI 10.1007/s10764-014-9761-9

Goswami, Medhi, K., Nicholas, J.D., Oli, M.K. 2015. Mechanistic understanding of human–wildlife conflict through a novel application of dynamic occupancy models. *Conservation Biology* 29(4):1100-1110

Gunn, Jody, et al. "The influence of lunar cycles on crop-raiding elephants; evidence for risk avoidance." *African journal of ecology* 52 (2): 129-137.

Hill, Catherine M. Perspectives of "Conflict" at the Wildlife–Agriculture Boundary: 10 Years On." *Human Dimensions of Wildlife ahead-of-print* (2015): 1-6.

Hill, C.M., (2000): A conflict of interest between people and baboons: crop raiding in Uganda" *International Journal of Primatology*. 21 pp 299-315.

Hill, C.M., (2004): Farmers' perspectives of conflict at the wildlife-agriculture boundary: Some lessons learned from African subsistence farmers. *Human Dimensions of Wildlife*, 9(4) pp 279-286

Hockings, K and Humle, T (2009). Best practice guidelines for the prevention and mitigation of conflict between humans and great apes. Gland, Switzerland: IUCN/SSC Primate Species Specialist Group (PSG): 40pp.

Hill, C.M., & G. E. Wallace.2012. Crop protection and conflict mitigation: reducing the costs of living alongside nonhuman primates. *Biodiversity and Conservation*, 21(10) pp 2569-2587

Hsiao, S.S., Ross, C., Hill, C.M., and Wallace, G.E. 2013. Crop-raiding deterrents around Budongo Forest Reserve: an evaluation through farmer actions and perceptions. *Oryx*, available on CJO2013. doi:10.1017/S0030605312000853.

Kaplan, Bentley S., and M. Justin O'Riain 2015. Shedding light on reflective prisms as potential baboon (*Papio ursinus*) deterrents in the Cape Peninsula, South Africa: short communication. *African Journal of Wildlife Research* 45(1): 117-121.

Karant, Krithi K., Naughton- Treves, L., DeFries, R., and Gopaldaswamy, A. 2013. Living with wildlife and mitigating conflicts around three Indian protected areas." *Environmental management* 52(6): 1320-1332.

Maximilian D. Graham, William M. Adams and Gabriel N. Kapiro.2012. Mobile phone communication in effective human elephant–conflict management in Laikipia County, Kenya. *Oryx*, 46: 137-144. doi:10.1017/S0030605311001104.

Rovero, F., Zimmermann, F., Berzi, D., and Meek, P. 2013. Which camera trap type and how many do I need? A review of camera features and study designs for a range of wildlife research applications. *Hystrix* 24(2):148-156.

Rovero, F., Martin, E., Rosa, M., Ahumada, J. A., Spitale, D. 2014. Estimating Species Richness and Modelling Habitat Preferences of Tropical Forest Mammals from Camera Trap Data. *PLoS ONE* 9(7): e103300. doi:10.1371/journal.pone.0103300

Rowcliff, J. M., Field, J., Turvey, S. T., and Carbone, C. 2008. Estimating animal density using camera traps without the need for individual recognition. *Journal of Applied Ecology* 45: 1228-1236. doi: 10.1111/j.1365-2664.2008.01473.x

Scotson, L., Vannachomchan, K. and Sharp, T. 2014. More valuable dead than deterred? Crop-raiding bears in Lao PDR. *Wildlife Society Bulletin*, 38: 783–790.

Thuppil, Vivek, and G. Richard. 2015. Playback of felid growls mitigates crop-raiding by elephants *Elephas maximus* in southern India. *Oryx* 50(2):1-7.

Mnason Tweheyo , David Mwesigye Tumusiime , Nelson Turyahabwe , Asaph Asimwe , Lawrence Orikiriza. 2012. Wildlife damage and control methods around Lake Mburo National Park, Uganda International Journal of Pest Management Vol. 58(1).

Madden, F. 2004. Creating coexistence between humans and wildlife: Global perspectives on Local efforts to address human-wildlife conflict. Human Dimensions of Wildlife. 9 pp 247-257.

Marchal, V. and Hill, C. 2009. Primate crop-raiding; A study of local perceptions in four villages in north Sumatra. Indonesia. Primate Conservation, 24 pp 431-435.

Molur, S., Brandon-Jones, D., Dittus, W., Eudey, A., Kumar, A., Singh, M., Feeroz, M. M., Chalise, M., Priya, P. and Walker, S. 2003. Status of South Asian Primates: Conservation Assessment and Management Plan Report. Workshop Report, 2003. Zoo Outreach Organization/CBSG-South Asia, Coimbatore, India.

Ogra, M. V. 2008. Human-wildlife conflict and gender in protected area borderlands: a case study of costs, perceptions, and vulnerabilities from Uttarakhand (Uttaranchal), India. Geoforum 39(3) pp 1408-1422.

Pocock, R.I. 1928. Langurs, or leaf monkeys, of British India. Journal of Bombay Natural History Society. V(xxxii), Pg 472-502.

Singh, V and Thakur, M.L. 2012. Rhesus macaque and associated problems in Himachal Pradesh-India. Taprobanica. 4(2) pp. 112-116.

Treves, A., Wallace, R.B., White, S. 2009. Participatory Planning of Interventions to Mitigate Human-Wildlife Conflicts. Conservation Biology. 23 pp 1577-1587

Wallace, G.E., & C.M. Hill (2012): Crop damage by primates: Quantifying the key parameters of crop-raiding events. PLoS ONE, 7(10): e46636.

Wong, W. M., N. Leader-Williams, and M. Linkie. 2015. Managing Human-Sun Bear Conflict in Sumatran Agroforest Systems." Human Ecology 43 (2): 255-266.

Publications:

Shah,T., Ahuja,V., Anandam,M., and Srinivasulu,C. In Press. Avifauna of Chamba District, Himachal Pradesh, India with emphasis on Kalatop-Khajjiar Wildlife Sanctuary and its

surroundings. *Journal of Threatened Taxa*.

Anandam, M., Ahuja, V., and Molur, S. 2015. Chamba Sacred Langur *Semnopithecus ajax* (Pocock, 1928) . In: C. Schwitzer, R.A. Mittermeier, A.B. Rylands, Chiozza, F., E.A. Williamson, J. Wallis and A. Cotton (eds.), *Primates in Peril: The World's 25 Most Endangered Primates 2014–2016*, pp. 20 -22. IUCN SSC Primate Specialist Group (PSG), International Primatological Society (IPS), Conservation International (CI), and Bristol Zoological Society, Arlington, VA.

Zinner, D., Fickenscher, G.H., Roos, C., **Anandam, M.V.**, Bennett, E.L., Davenport, T.R.B., Davies, N. J., Detwiler, K.M., Engelhardt, A., Eudey, A.R., Gadsby, E.L., Groves, C.P., Healy, A.O., Karanth, P.V., Molur, S., Nadler, T., Richardson, M.C., Riley, E.P., Rylands, A.B., Sheeran, L.K., Ting, N., Wallis, J., Waters, S.S., & Whittaker, D.J. (2013). Family: Cercopithecidae. In R.A. Mittermeier, D.E. Wilson (Eds) *Handbook of the Mammals of the World: Primates (Volume 3)*. Lynx Edicions: Spain.

Chivers, D.J., **Anandam, M.V.**, Groves, C.P., Molur, S., Rawson, B.R., Richardson, M.C., Roos, C., & Whittaker, D. (2013). Family: Hylobatidae. In R.A. Mittermeier, D.E. Wilson (Eds) *Handbook of the Mammals of the World: Primates (Volume 3)*. Lynx Edicions: Spain.

Achamba!-Conservation Education Magazine:

http://zooreach.org/ZOO_WILD_Activities/2012/6Apr2012_Semnopithecus_ajax_HP/Achamba%20booklet.pdf

Address list and web links

An annotated list of useful names, addresses and websites

Distribution list

List where copies of the report have been distributed for reference by future project leaders and others, and where the report can be bought (if relevant).

