

Final Project Evaluation Report

Your Details	
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Project Title	Eagle of the Farmlands: biology, threats and their conservation actions of the Indian Spotted Eagle (<i>Clanga hastata</i> Lesson 1831) in Lowlands of Nepal
Application ID	24645-1
Grant Amount	£4996
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Date of this Report	February 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
Breeding biology and diet composition to eaglets				<p>To study breeding biology we categorised four different stages i.e. nest preparation, incubation, chick rearing and fledgling. We set up different dates to monitor nests for the different stages. We were able to record the nesting behaviour of three pairs (nest of "B", "C" and "D"). Male eagles were found to have higher contribution on bringing the nesting materials compared to females; on the other hand, females contributed a higher percentage on construction, maintenance and repair of the nest. Dead twigs, small green branches, <i>Dalbergia sissau</i> and eucalyptus leaves were kept in the cavity of the nest. We made an assumption that the nesting pair of "A" and "E" either has changed their nesting location or breeding didn't occur this year. We didn't see those pairs in the previous year nested area, hence such a conclusion was made. Later on during incubation stage along with earlier monitored nest ("B", "C" and "D") the two assumed lost nests (A and E) were found on the same place where they bred last year. This inferred that the nests were built late. We were able to record the incubation behaviour of all the pair (five nests). The time spend to incubate the egg by the females were found to be higher than the males in all the monitored nests. We recorded chick rearing activities of three nests (breeding failure occurred in nest "C" and "D" before it reached to chick rearing stage). We decided to increase monitoring days to obtain</p>

			concrete data due of reduction of sample size of nests from five to three. Frogs were main diet followed by rodents, birds and lizards. The clutch size was found to be one in each nest We couldn't monitor fledgling behaviour because of high movement of juveniles away from the nesting area.
Nest predators, anthropogenic disturbances on breeding success and developing effective conservation measures			Among the five nests, "C" failed at the time of incubation stage. On the 7th day of incubation stage, we found the egg shell just below the nest along with the huge amount of albumen in the eggs. We didn't see any predators or probable predators during the whole observation period. Neither eaglet nor breeding pair were recorded near to the nest "D" at chick rearing stage. There was no sign of any predators. We made an informal interview with local people and found out the probable predators could be leopard or a larger owl residing in the Dhanusa forest. We too recorded about 20-25 numbers of rhesus monkey that has potential to destroy the eagle nest. Grazing of livestock near the nesting area was found to be one of the major disturbances in the Lumbini area. While collection of firewood by local people was major disturbances in Dhanusa. The average maximum distance with alert reaction of the nests were found to be 54.998 during incubation stage while the average minimum distance without alert reaction at incubation period was found to be 98.20.
Qualifying an inventory of threats			Structured questionnaire was conducted among in farmers, pesticides retailers and herders. Data related to perception of people towards ISEA, hunting, killing, poisoning, persecution, egg snatching, nest destruction, quantification of insecticides, pesticides, rodenticides and

			<p>chemical fertilizers, rates of deforestation and establishment of human-infrastructure was acquired. Forty questionnaires in each study area showed that no illegal trade of raptors was recorded, people's perception regarding raptors was negative, average numbers of times the pesticides used in the farm during pre and post harvesting time was found to be higher compared to the number of times the Nepal Government has proposed. Similarly the amount of pesticides used in study area was 500 gm/ha higher than the result proposed by PPD (2014). Higher demand of pesticides such as carbine and Ratile as rodenticides while the amounts of chemical fertilizers were not found to be of concern. The major crops were found to be rice and wheat in the study area.</p>
<p>Conservation and awareness program</p>			<p>To counteract the threats of chemical pesticides to the eagles a 1-day training programme on "Sustainable farming for eagle conservation" was conducted in the three study sites. Though we planned 10 training programmes, eight (with 357 participants) were conducted (three in Koshi, two in Lumbini and one in Dhanusa). The training was provided by Technical Officer of Nepal Agricultural Research Council named Sandip Timilsina. Meanwhile researcher presented their research work entitled "Eagles as Friend not a Foe". Samples of bio-pesticides and different traps were provided to the farmer's community. Fifteen conservation camps in schools were held near to the nesting area of Indian spotted eagle. Five schools in each study sites. The young birders residing in Koshi Tappu Wildlife were given training to identify the raptors of Koshi, technique and types of data to be taken when nest of</p>

			<p>raptors are found. A radio programme on raptor conservation was conducted at local FM station and in national radio programme too. News about the work done for the conservation of raptors was published in local as well as in National newspaper too.</p>
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2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

Objective 1:

Code "A", "B" and "C" was given to the nests located as Lumbini, "D" for the nest of "Dhanusha" and "E" for the nest in Koshi. When we were in the field in March 2018 at study sites to study the nest preparation behaviour of the Indian spotted eagle, we were only able to record the nesting behaviour of three pairs, i.e. "B", "C" and "D". We searched for the pair and their nest "A" and "E" in previously recorded area (2017). In addition we made an extensive search of the nest in the periphery of nesting area so to determine if they have changed their nesting location but no eagle nests were detected. We made an assumption that the nesting pair of "A" and "E" either had changed their nesting location or they didn't breed this year. Later on when we were in the study sites to record the incubation behaviour we went to recheck the lost nest in previously recorded area ("A" and "E"). We found the adult parent was incubating the egg. Hence we concluded the nest preparation might vary according to the individuals however the driving factors for preparing nest earlier and later couldn't be determined.

Objective 2:

In incubation stage, the nest "C" failed to hatch the egg. On the 2nd day of nest monitoring, the female eagle was recorded incubating the egg when it was a 3rd day of nest monitoring of nest "C", neither male nor female were seen incubating the egg. Monitoring the same nest further for few days let us know that the adult often used to fly early in the morning and returned to the nest at around 5 pm. This made us suspect that the egg might has failed to hatch. On the 7th day we saw rufous treepie and common myna perching in the nest of the eagle. We went just down to the nesting tree and found the shell of the eagle's egg with a higher percentage of albumen in the broken egg. We were not able to record any sign of the nest predators. Hence we made few questions regarding on predators in our questionnaire we found the probable predators could be large Indian civet or the larger owl. During the monitoring of chick rearing stage, nest "D" was found to be empty. Neither eaglet nor adult were seen in the nest, this things happens either when the adult fails to hatch the eggs or the eaglet gets killed. Interview with local peoples, official from Mithila Wildlife Trust and local people we got information that the predators could be large Indian civet, common leopard, larger owl or the rhesus monkey. The rhesus monkeys were seen near to the nesting area when we were there to monitor the nest. They have potential to destroy the nest or kill the eaglet too. Hence actual predators couldn't be predicted however probable indicators were listed. On 5th August 2018, an assumption that the eaglet from the nest "A"

would fledge was made, thus the nest "A" was monitored. We recorded the fresh juvenile Indian spotted eagle harassed by crow nearby the nest "A". Then the harassed eagle was assumed to be the offspring of nest "A". Meanwhile monitoring of the nest "B" was done. The eaglet wasn't visible for the whole day. During this time the eaglet should have been big enough to be easily seen in the nest. Thus suspicion about something wrong in the nest "B" was made. We went in the nesting tree and climbed up in the tree. Dead eaglet in the nest was found. Besides the nest we found the pellet of the owl. We showed it to the owl expert and got informed that the pellet were of larger owl but couldn't identify the species of the owl. Hence the particular nest predator for nest failure couldn't be identified.

Objectives 3:

Since the questionnaire were design with the help of senior raptor biologist and the technical officer of Nepal Agricultural Research Council hence no any difficulties were tackled regarding on qualifying threats for the raptors and quantifying the use of chemical fertilisers and pesticides plus their probable impact on raptors.



Female Indian Spotted Eagle of nest "C" incubating at leftmost top corner, Common Myna and Rufous Treepie recorded sitting at the nest after the failure of hatching egg, actual predator couldn't be identified.

Objectives 4:

Minor difficulty was the time allocated for the proposed training programme date for the farmers wasn't favourable. They were too busy on the time we were supposed to conduct the training programme. Hence we pushed the training forward 1 month when the farmer gets free and can easily participate in the programme. We tried to initiate school camp in the proposed time period. The school teachers hesitated to provide their classes to run our programmes, it was because the exams were approaching. They suggested us to come after the exams gets end up. Hence we went there after the school examination got over.



Pellet of bigger owl in the nest of Indian Spotted Eagle of nest "B" where we found the dead eaglet, actual species couldn't be identified

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

a). Objective 1:

This is the first ever attempt to study breeding biology of Indian spotted eagle in Nepal. Direct observation from a blind place, 40m away from the nest using a camouflage hide has been found very effective to get precise data. During the nest preparation stage, male eagles were found to have a higher contribution in bringing the nesting materials i.e. 69.86% in nest "B", 68.11% in "nest C" and 70.31% in "nest D" compared to females, 30.14% in "nest B", 31.89% in "nest C" and 29.69% in "nest D". However, females contributed a higher percentage on construction, maintenance and repair of the nest i.e. 63.89%, 65.22% and 68.75% respectively. Dead twigs were used as main objects to build nests, with small green branches placed in the outer rim of the nest and green leaves of eucalyptus, *Dalbergia sissau* placed in the cavity of the trees. The time spend to incubate the egg by the females were found to be higher than the males in all the monitored nests (Wilcox=25, $P = 0.0079$). The non-incubating male attendance near the nest was found to be higher while compared to non-incubating female attendance near to the nest when data of both non-incubating male and female data were pooled up. Indian spotted eagles repair the nest from time to time. The male plays an active role to deliver the prey items to the eaglet. When the eaglets got bigger in size then parents were often found to sit nearby the branches of the nesting trees or trees nearest to the nesting tree. The clutch size was found to be one. Frogs (58.65%) were the major prey items followed

by rodents (22.12%), birds (14.42%) while lizards (2.88%) were least sighted during the observation period. Twice, the prey items couldn't be identified. The most preferred time periods to feed the eaglet were found between 08:00-09:00 am and 16:00-17:00 pm while 18:00-19:00 was preferred least (Fig 2).

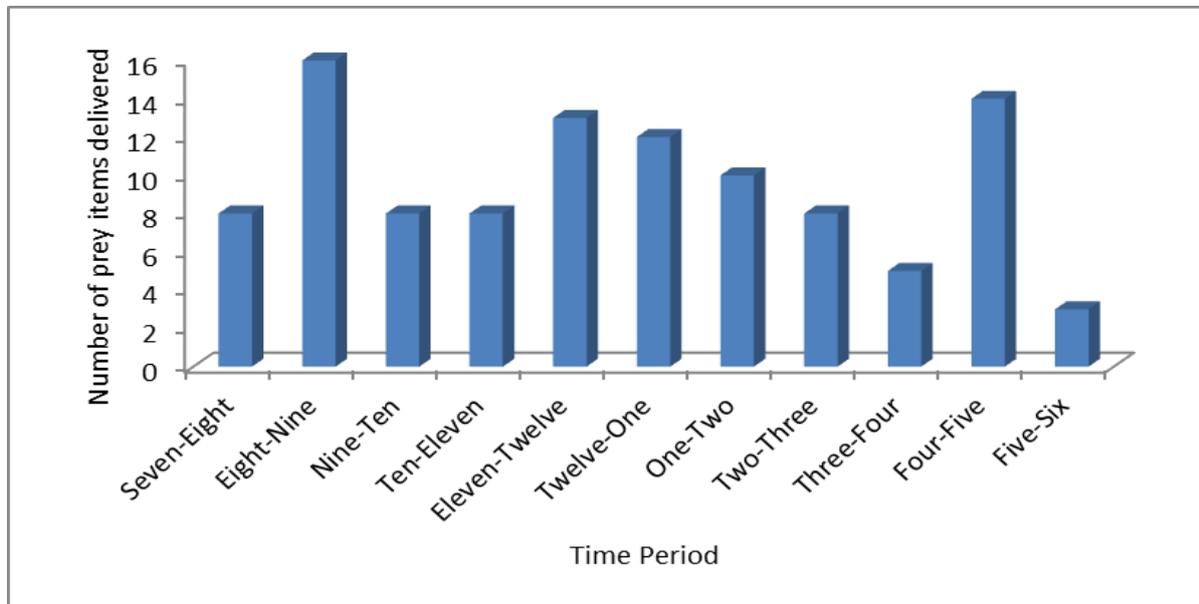


Fig 2: Prey items delivered to the eaglet recorded on hourly basis

Regular monitoring of the eaglet in the nest helps to predict the probable fledgling time period but still the fledgling data we proposed to record were much harder. Also, the high mobility of the juvenile made this monitoring stage impossible to achieve. The timing of the nest preparation were found to be variable among in different pairs, some were found making nest earlier while some found making it lately.



Female adult incubating of Nest "A", Female adult incubating of Nest "B" (from right to left)



Frog in the beak of parent Indian Spotted Eagle

b). Objectives 2:

We found the nest predators of Indian spotted eagle do exist. The probable nest predators were identified through interviews, questionnaires and the presence of the signs and clues near the nesting site, and were found to be civets, common leopard, rhesus monkeys and larger owls. However determination of the particular predators responsible for the death of nest "B" eaglet, breaking down of the egg of nest "C" and the failure of nest "D" couldn't be identified. The average maximum distance with alert reaction of the nests were found to be 54.998 during incubation stage while the average minimum distance without alert reaction at incubation period was found to be 98.20.



Disturbance in the nesting area (Livestock herder herding in the nesting area "A", Local people fishing in river near to the nesting area "B")

c). Objectives 3 and 4:

We didn't find any records of poisoning, hunting and egg snatching. We found that 95% of the respondents didn't like to see the raptors in their farmland while 5% decided to stay neutral. 92.5% preferred not to share their farmland with raptors while 7.5% didn't mind. The amount of the chemical fertilisers used in the farmland doesn't seem worrisome. However the average amount of pesticides used in the study area was found to be 500 gm/ha higher than the result proposed by PPD (2014). The pesticides were found highly utilised during pre- and post-harvesting the crops. The most preferred insecticides by the farmers were found to be Carbine with Ratile (Zinc Phosphite) as a rodenticides. It was found that 89.12% of farmers didn't have proper knowledge on use of the pesticides.

A 1-day organic farming training programme was conducted at three sites. In total the programme was conducted eight times. The farmers came to know about the organic farming and the proper way of practising it. Whoever has taken this training has been able to know the impact of chemical pesticides, use of alternatives and procedures to make biological pesticide and importance of Indian spotted eagle and other raptors in the ecosystem. The sustainable organic farming training provided by this project to the farmers was still not enough because there were many farmers whom we weren't able to provide the training. Sensitisation of the students near the breeding territory of the eagles though might not have an immediate impact on the conservation of Indian spotted eagle and other raptors in the sensitised area, we are almost sure that this action has imprinted the concept of conservation among in the students. This will surely help to inspire them and bring out the new generation conservation leaders in the sensitised area that will ensure the conservation of the raptors. After the end of the training programme, farmers were randomly selected and interviewed. The negative perceptions of the participants towards raptors have found to be changed among in participants.

Table 1: Name of Schools where conservation camp was conducted

S.No.	Name of Schools	Address	Class	Students
1	Shree Mahendra Secondary School,	Titrigachi, Koshi	9, 10	48,41
2	Shree Basantaritu Secondary School	Bangey, Koshi	9,10	58, 63
3	Shree Seto Gurans English School	Bangey, Koshi	5, 6	42, 32
4	Shree Kaushika Lower Secondary School	Koshi	8	39
5	SaptaKoshi Secondary School	Bagalpur, Kosho	9,10	57, 51
6	Balbidhya Mandir Boarding School	Bagalpur, Kosho	7,8	48, 39
	Shree Tapsi Baba Secondary School	Dhanusa	5,6,7 (once lecture)	36, 33, 42
7	Shree Tapsi Baba Secondary School	Dhanusa	8, 9 and 10	29, 27,31
8	Public Youth College	Dhanusa	11, 12	35, 40
9	New Vision Residentail School	Dhanusa	4,5	30,25
10	Gyankunj Pathsala	Dhanusa	9,10	34,38
11	Shree Pragati Boarding School	Majhidiha, Rupandehi	5	40
12	Shree Sudhabagar Secondary School	Rupandehi	9, 10	45, 49
13	Shree Jan Jagriti Lower Secondary School	Maghali, Rupandehi	7,8	26, 32
14	Shree Tenuhawa Community Secondary School	Tenuhawa, Rupandehi	10,11	44, 35
15	Shree Gems English School	Parsa chowk, Rupandehi	6,7	33, 31

Table 2: Farmer's Community Group along with their participant numbers

S.No	Farmer community group	Number of training organized	No of participants
1	Kausika Samudayek Baan Upabhokta Samiti , Koshi	1	45
2	SaptaKoshi Madhyabarti Samudayek Baan Upabhokta Samiti, Koshi	2	102
3	Sana Kishan Sahakari Sanstha, Dhanusa	2	76
4	Siddharta Kisan Samuha, Lumbini	1	46
5	Lumbini Sana Kisan Samuha, Lumbini	2	88

4. Briefly describe the involvement of local communities and how they have benefited from the project.

Local support was necessary for the completion of the project especially to achieve the objectives 2, 3 and 4 respectively. They shared with us information about the carnivores and different species of animals that could act as probable nest predators. The involvement of the local community during the questionnaire survey and the information provided has been very fruitful to develop the conservation programme in the study areas. Note that Birdlife International has said threats to the Indian spotted eagle are unknown. Hence we were able to find the most probable threats to the eagle. Communities were involved in the later part of the project i.e. during the conservation programme. The chair-person and vice-chair person of different farmer's groups played an active role to select the active farmers for the farmer's training programme, "sustainable farming for eagle conservation". During this programme, local farmers actively participated on queries section and even shared their experience about the raptors abundance 10 years ago.

Without the support from the local people, we wouldn't have been able to conduct the conservation camps in different schools at three different sites. Approval and supporting the programme by providing their valuable time during the school hour is the one of the significant factors that has resulted the succession of the school conservation camps. We also conducted the Nepali essay competition and drawing competition among in the school students. To prepare themselves for such competition they have to learn basic things hence they might have come to know about the importance of eagles.

Technical officer of Nepal Agricultural Council, Sandip Timilsina (Information about him, see his link <http://www.rarslume.gov.np/index.php/2016-03-25-07-17-46/staff-rars-lume>) provided the training to the farmer participants. The local farmers residing near the nesting territory of Indian spotted eagle directly benefited. They got the information about the different chemical pesticides, impact of chemical pesticides on health of farmers, consumers and to whole biodiversity and alternatives. They learnt to make biological pesticides and organic farming techniques. The target people also benefited by gaining knowledge about the importance of Indian spotted eagle and other raptors by raptor researchers. Besides these their private queries regarding on the agriculture were fulfilled by the expert during the training programme. The trainer provided the phone number of his and asked them to phone him if they get any dilemma while manufacturing biological pesticides. Our project contributed economy to the local hotels during our regular field visit. Students of the project areas were benefited from our conservation camps. Similarly, schools and libraries also received our posters and brochures.

Native plants of the study areas will be provided to the farmer's group in March, 2019 for afforestation. This will help to develop the scientific forest in the study areas and can create suitable nesting habitat in the long run. This will both benefit the target species (raptors) as well as to the farmers. Note that afforestation is possible only after end of the February 2019.



Participants noting down the important information provided by the trainer (left)
Group photo after the end of program in Koshi.

5. Are there any plans to continue this work?

Absolutely, Yes. Following action are outmost to conduct in future that needs to be supported by RSG very soon are listed below.

i) Monitoring of the nest along with increasing the monitoring sites

We have found one more another nest of Indian spotted eagle at a new place. Besides these, there are few more probable places where we believe they breed. This would help to increase more sample size and will certainly help to obtain more robust data. The robust data can give us better information of this least known raptors thus might help in developing various conservation plan.

ii) Incorporating more farmers in the study area

We successfully conducted a 1-day organic farming training programme in the study sites. In total we conducted the same programme eight times. Training conducted by this project couldn't incorporate all the active farmers residing near to the breeding area hence more such program are essential. The upcoming projects will include the farmers that were left to take a training run by this project.

iii) Conduct the diet composition using camera traps

Installation of camera traps in the nest provides wide array of data compared to direct observation method. They provide various useful information about eggs laid, egg laying date, total days of incubation that eagles goes, presence/absence of siblicide, fledging date, prey items and nest predators. They are also cost effective and provides larger sample size data with minimum cost effort.

iv) Enlightening all local stakeholders including local community on the role of Indian spotted eagle along with others raptors for ecosystem services to change their perception, increase the level of tolerance and motivate the willingness amongst the targeted group for the co-existence of the species and local level long term conservation of Indian spotted eagle.

v) Citizen scientists

Huge project aiming of recording huge data from the large geographical area is only possible through citizen scientists. Thousands of new findings have been acquired just because of the citizen scientists. The citizen scientist remains in the study areas during the whole year hence monitoring the nest regularly will certainly help to obtain concrete data with less cost. We have also planned to provide special training about raptors to the young birders and develop them as citizen scientists residing near the nesting area of Indian spotted eagle.

vi) Gastro intestinal parasites

Parasites are often associated with birds of prey, regardless the birds are captive or wild. Besides these there have been several reports on the death of birds of prey due of parasitic infection. It is sure that the parasites have impacts on immune system consequently leading to death of the raptors. Hence, we are planning to collect the guano in upcoming project and analyse it in lab. Data about the parasites of the raptors are completely lacking in our country. This action will help to understand its diseases and the probable sources of the diseases.

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

We have shared our results through different medium.

i) Distribution of conservation materials: Our poster and brochures were a way to share our results with the local farmers and conservation community. Brochures and posters were distributed in schools, farmer's community group and forest community group in the project area. We also interpreted the meaning of different photos in the poster before distributing it to the concerned people.

ii) One day Farming training program "Sustainable Farming for Eagle Conservation" During 1-day farming programme, we distributed the posters and brochures to the participants. We had a presentation of our present research and findings to the farmers during the training programmes.

iii) Conservation camp in the schools and to the local birders During the conservation camp, results were shared to the students. We also shared our present study and results to especially to the young birders of Koshi during 1-day program.

iv) Enews and radio/FM program:

Media always plays significant roles in making conservation more fruitful. We had published our current works and projects in the media. Recently our story was covered in online news portal newspaper of eastern Nepal local newspaper named "Udoshdaly

(<https://udghoshdaily.com/%E0%A4%B5%E0%A4%BF%E0%A4%9A%E0%A4%BE%E0%A4%B0/3877-2019-01-25-02-52-40>). We had another publication on national online newspaper called "Deshsanchar" regarding on our work (link: - <https://deshsanchar.com/2019/01/20/148579/>). We broadcasted our recent work and usefulness of raptors as "Eagles a friend of farmers not a foe" on radio program through Sunsari FM 104.6 MHz and in nationally renowned radio program called Ujjyalo Online Falcha (<http://ujyaaloonline.com/radio-program-detail/ujyaalo->

falcha). The link is given above but one has to go on date of December 20th episode to listen the program. We believe that this indirect approach will help to convey the conservation message to thousands of people.

v) Conference and articles

Right now we are writing scientific paper for the upcoming Asian raptor conference, very soon going to be held in Bali, Indonesia by ARRCN (Asian Raptor Research and Conservation Network). We are also trying to submit the article in a peer review journal mainly focusing in Journal of Raptor Research.

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

Grant was received in February 2017- December 2017 however our conservation project work were delayed. The allocated time period for the farmer training programme was delayed by 1 month. The time frame we made for the training fell at the time of the harvesting and festival month hence couldn't conduct it on time. Plus the time allocated for conservation camp in school fell on the just before the second terminal examination of students so couldn't do it in expected time period. Hence the project got accomplished on January.

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
Objectives 1 and 2:	3270	3417	+147	The main reason the monitoring time period was too hot hence we had to rent a room bit comfortable room that made us cost more than budgeted amount, food expenses also got increased up due of very hot weather we had to have lots of extra water containing product to keep away from dehydration which was not included in the proposed budget. On the other hand we increased the number of monitoring days (expected 7, monitored- 17 days)
Objectives 3	255	423	+168	Food, accommodation and travel fair cost got increased.

				The weather was hot so had to take bit comfortable room. To protect dehydration lots of water containing juice were taken thus increased the proposed budgeted amount. Since this part weren't included in the budget.
Objective 4	1471	1739	+268	In the proposed budget we only included the travel, food and lodging budget for the only two researchers. We didn't propos the budget for the trainer's travel cost, food and lodging expenses. Increment in expenses than the expected amount budgeted was due of above following reasons. Besides this we also took the research assistant lead to increases our expenses.
Total	4996	5580	+584	Our dear friend Peggy Parker donated the rest of the money for our project.

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

i) Increasing the monitoring sites (or increasing the nest number)

Increasing the monitoring sites and increasing the number of nest helps to get more concrete data that surely helps to understand more about this species. This will particularly help to develop the conservation strategy more effectively. One more nest has been discovered in western Nepal and more probable sights have yet to be thoroughly searched. We have found few more areas where we believe that this Indian spotted eagle is expected to breed.

ii) Conduct a new approach to study the diet composition

Implementation of videography and photography technique has been regarded to be effective and most reliable compared to direct observation. Direct observation technique is often limited by abilities, budget and researcher fatigue. Implementation of videography and photography technique has been regarded to be effective and most reliable. The improvised version of camera traps on power efficiency, photo quality and its size has made it more easiness for ecological study.

Different breeding activities such as numbers of eggs and its laid date, health of eaglets, total incubation days, fledging date and prey items delivered, with a larger sample size of data in a minimum cost and less effort are only possible through camera traps technique. We were only able to mark the probable nest predators during the field visit however this method will help to determine the particular nest predators responsible for the breeding failure. Hence we have planned to install of

camera trap near to the nest of Indian spotted Eagle during whole chick rearing stage (85 days) that will surely provide lots of information compared to the direct observation.

iii) Incorporating more farmers for the training programme and more conservation camps in schools

We were able to provide training to the farmers regarding on discouraging chemical use of pesticides and promote organic farming for the welfare of human as well as raptors. However we were only able to incorporate few farmers residing near the nesting area of Indian spotted eagle. On the other hand, eagles usually have a huge foraging area hence such programme shouldn't be limited up to nesting area. The foraging area equally ought to be focused for such programme. Intoxication in prey items in the foraging area can cause endangerment to the health of the eagles and eaglets. Hence we believe such programme should be conducted both in nesting area as well as in foraging area.

Of course, imprinting of conservation concept among in students can play significant role in a long run. The academic courses have some lesson related to biodiversity however we came to realise that conservation programme is needed to the students. Form the questionnaire survey (95% farmers didn't like to see raptors in their farmland and 67 respondent answered raptors should nest only in protected area) and short informal interview to the students should that negative perception on raptors exist among in people.

iv) Developing Citizen Scientist

Any project that aims to record large volumes of data in a large geographical area can only succeed when citizen scientists are integrated. Such types of projects also provide an opportunity local people to participate in the conservation and enjoy the conservation sciences. National Audubon Society (USA) makes efforts to create citizen scientist and nurture them to conduct Christmas Bird Count, British Trust for Ornithology uses citizen scientists in order to conduct bird research. Ecological Society of America annual meeting at 2008 proposed 60 papers mentioned the involvement of citizen scientist actively in their journal. Hence citizen scientists can help to add lots of data in the database. On the other hand, they make cost efficiency and are available at the monitoring area at any time. Hence developing a citizen scientist in the nesting area is outmost things we have to do in next project.

v) Mapping of the threats area to the raptors

Since Lumbini and Dhanusa are some of the hotspots for raptors in Nepal. These are the places where different species of raptors including threatened as well as least concern species breeds meanwhile different species of migratory raptors winters in this area. Hence mapping the particular threats places of raptors in these areas and developing counter strategies on these places is another most important thing to be performed.

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?

The Rufford Foundation logo was used in posters and in brochures published during the project.

The Rufford Foundation was acknowledged in the articles printed in the online newspaper.

The Rufford Foundation will be acknowledged in our manuscript when it will be submitted to the peer review journal and at the conference that will soon held in Bali of Indonesia by ARRCN.

The Rufford Foundation logo was used in the one day farmer training program. The logo was also used in the certificate provided to the participants.

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

Sandesh Gurung (Team Leader): He was involved from the initiation to till the end of the project. He was the key person to design the research method, collect the recorded data in the field (nest monitoring + questionnaire), analyse the data, write a report, news articles, arrange and manage the farmers training program in the nesting area, conduct school conservation camp and design conservation materials.

Dheeraj Chaudhary (Researcher): He was also involved from the very beginning of the project to end of the project. He mainly collected the ecological data, questionnaire data, conduct school conservation camp, helps in designing conservation materials, conduct farmers training program. Besides he also went to monitor the fledged juvenile eagle three months after the fledgling stage got over. He went there to make sure if those eagles were still doing good.

Surya Gurung (Researcher): He was also involved in nest monitoring (incubation stage and chick rearing stage). After then his health didn't support him and had to take a long bed rest. He actively took part in developing the ecological data required to fulfil our objectives, developing semi-structured questionnaire and conservation materials. He also made input of his suggestion at the time of preparing the conservation slide to present to the children and to the farmers.

Aditya Pal (Research Assistant): He was involved from the initiation of the project till to the end of the project. He was involved in collection breeding biological data of Indian Spotted Eagle, questionnaire survey, actively took part in preparing the conservation materials and in farmers training program. As a local of Dhanusa, he presented our work to the farmers and to school children in native language during the conservation program which we found to be very effective.

Bimal Timilsina (Volunteer): Bimal Timilsina, an employee of Himalayan Nature at Koshi, who is also the main in-charge of Koshi Bird Observatory (branch office of

Himalayan Nature) was involved in nest monitoring, making a link with farmers community and helped in conducting conservation programs in Koshi and Dhanusa.

All the members actively took part in all the allocated work as proposed in the proposal. Hence we believe this project came into success.

12. Any other comments

I would like to express my gratitude to The Rufford Foundation for funding this project. My team and I truly appreciate your understanding and support regarding on the extension of the time we have asked for in order to accomplish the proposed project.



Researcher inside the camouflage hide recording the data (right), research necessary materials inside the hide (left).



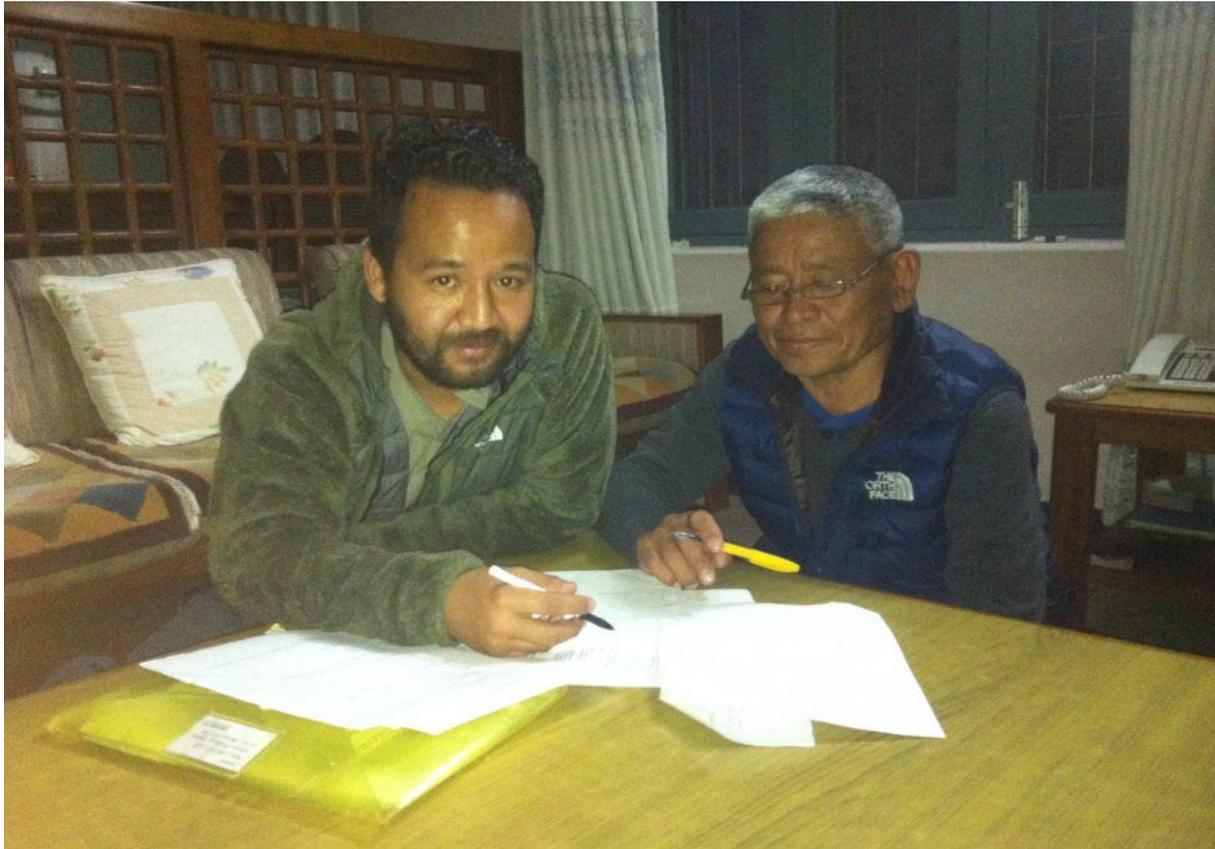
Researcher Dheeraj Chaudhary outside the camouflage hide to monitor nest of Indian Spotted Eagle.



Adult female Indian Spotted Eagle feeding the eaglet.



Nest "E" adult with a prey item to feed their eaglet (left), The broken egg recorded just below the nesting tree of pair nest "C" with a higher amount of albumen.



Designing the structured questionnaire survey to determine the threats (Right to left: Senior raptor biologist Surya Bahadur Gurung and Sandesh Gurung).



One day training program entitled on "Nurturing the young birder for the conservation of raptors".



Questionnaire survey by Dheeraj Chaudhary in Dhanusa, Aditya Pal at Dhanusa (from Right to Left).



Researcher Sandesh Gurung conducting a questionnaire survey in Lumbini.



Trainer Sandip Timilsina, Technical officer of Nepal Agricultural Research Council encouraging to use bio-pesticides that are less hazardous to human and biodiversity plus the yellow trap on the left side displayed by trainer (Right to Left).



Farmers making queries regarding on the yellow trap on the left and participants thoroughly inspecting the bio-pesticides on the right.



Providing sample of yellow traps and the sample of bio-pesticides to the farmer's community group.



Assistant forest officer of Dhanusa Shankhar Narayan Jha with a speech about the conservation importance in Nepal and congratulating successfully accomplishing the training, Dheeraj Chaudhary providing information about his work experience about the Indian Spotted Eagle.



Group photo with farmers after the farmers training program in Koshi and Dhanusa (Right –Left).



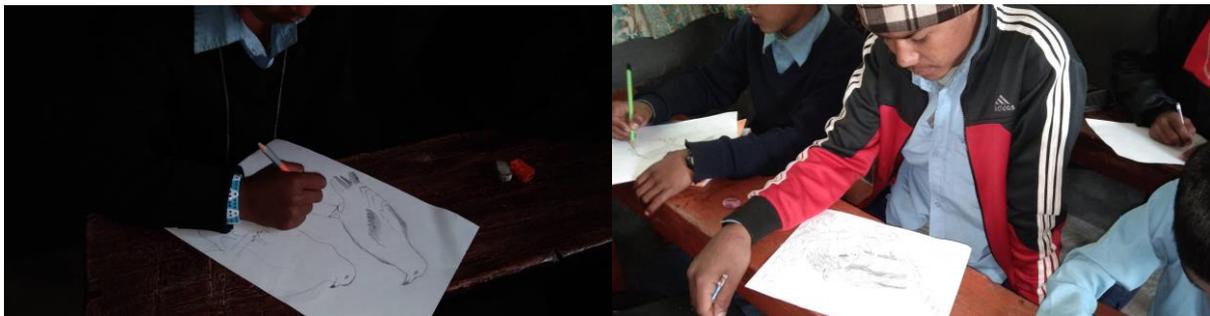
School conservation program in Lumbini at Tenuhawa Community Secondary School (left) and Shree Sudhabagar Secondary School (right).



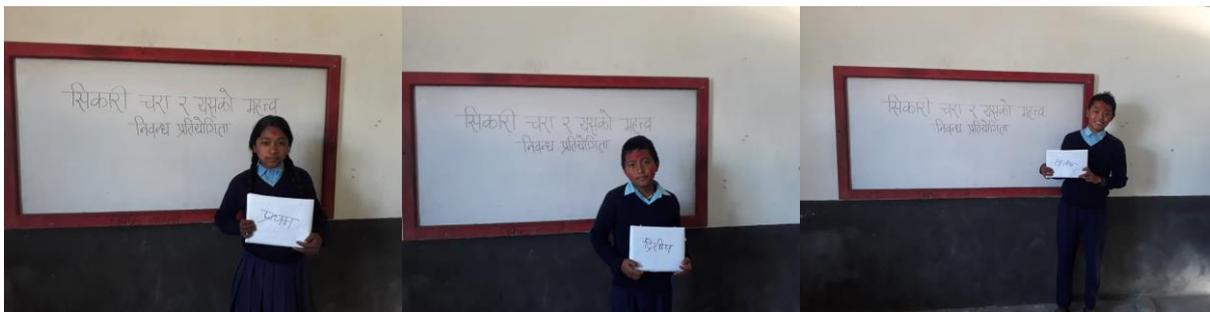
Aditya Pal at Tapsi Baba Secondary School (Left) and Researcher Sandesh Gurung presenting the presentation slide on importance of Eagle in Shree Basantaritu Secondary School (Right).



Drawing competition in Schools.



Drawing competition in school of Koshi.



Essay competition held among in children entitled "Birds of Prey and its importance" (left –right, first second and third).



Conducting FM program in Sunsari FM 104.6 MHz about Indian Spotted Eagle research.



Interview about the Indian Spotted Eagle along with other raptors, their importance in Ujyalo Online Falcha, one of the most widely listened program in Nepal with a Nepal renowned presenter Deepa Timilsina.



© Sandesh Photography

Young fledgling of Nest "A" harassed by crows.



Fledgling of nest "E" of Koshi (On the right: First month aged fledged juvenile, fourth month aged fledged same Juvenile on the left).



Adult male Indian Spotted Eagle chasing the crows at the nesting area.



चीलको संख्या घटनुको कारण र यसको संरक्षणका चुनौतीहरू

- वासस्थानको विनाश
 - अभियन्त्रित वन फडागी, गैँड लगाउने रूखको कटागी
- विषादीयुक्त आहाराको सेवन
 - खेतबारीमा अत्याधिक रूपमा प्रयोग हुने रसायनिक मल र किटनाशक औषधिहरू यसको आहारा (मुसा, कृषकृम, सर्प आदि) विषाक्त हुँदा चीलको स्वास्थ्यमा प्रतिकूल असर पर्नु र कमीपच असरमा मृत्यु भै हुनु
- अवैध गतिविधि
 - चीलको गैँड मारिनु, गैँडमाट बच्चा निकाल्ने
- बदलाको मानव
 - घरको हाँस कुशुर खाइदिने मानव कुमाउ
- मानव अतिक्रमणले प्रजनन क्रियाकलापमा आउने विघ्न बाधाहरू






लघु महाचील संरक्षणमा किसानको भूमिका

- अभियन्त्रित वनजङ्गल फडागी रोकी यस महाचीलको वासस्थान जोगाउने
- अत्याधिक रसायनिक मल तथा औषधीको प्रयोग नगरी घरेलू जडीबुटीबाट बनेको औषधी तथा प्राकृतिक मलको प्रयोग गर्ने
- अवैध चोरी शिकारी नियन्त्रण गरी संरक्षणमा सहयोग गर्ने
- चील सम्बन्धी सकारात्मक जनचेतना फैलाउने

चील संरक्षणका लागि जैविक कृषि प्रोत्साहन कार्यक्रम









छोटो परिचय

लघु महाचील (Indian Spotted Eagle) विश्वमै एक दुर्लभ पक्षी प्रजाति हो। यसको सङ्ख्या घट्दै गइरहेको कारण विश्व प्रकृतिक संरक्षण संघले लोपोन्मुख प्रजातिको सूचीमा अति संवेदनशील मनी सूचीकृत गरेको छ। यो महाचील दक्षिण एशियामा मात्र पाईने पक्षी हो। यसको फैलावट बंगलादेश, कम्बोडिया, म्यानमार, भारत, पाकिस्तान र नेपालमा रहेको छ। यसको सङ्ख्या न्यूनतम तीस र अधिकतम सतरी रहेको अनुमान छ।

लघु महाचीलको महत्व > कृषकको साथी

लघु महाचील एक शिकारी पक्षी हो। यसले मुसा, छेपारो, सर्प र अन्य चराहरू खाने गर्दछ। यसरी कृषकको बाली खाइदिने मुसा र अन्य चराहरू खाएर कृषकको अन्नबाली जोगाउन मद्दत गर्दछ।



साथै, मुसा खाएर यसको संख्या नियन्त्रण गर्ने भएकोले मुसाबाट मानिसमा रोग सार्ने सम्भावना पनि कम हुन्छ। यस्तै, सर्प खाइदिनाले सर्पको संख्या अभियन्त्रित रूपमा बढन पाउँदैन, फल-स्वरूप मानिसलाई सर्पले डस्ने घटनामा पनि कमी ल्याउँदछ। अतः पारिस्थितिकीय प्रणालीमा निकै महत्वपूर्ण भूमिका निर्वाह गर्ने यस महाचीलको उपस्थितिलाई स्वस्थ पर्यावरणको सूचक मानिन्छ।



प्रजनन अवधि

मानव वस्तीको वरपरका अग्ला रुखहरूमा गैँड बनाउन रुचाउने यस महाचीलले दैनिक आहाराका लागि खेतबारी तथा सिमसार क्षेत्र वरिपरि विचरण गर्दछ। प्रायः मध्य चैत्रमा गैँड बनाउन सुरु गर्ने यस महाचीलले माइतदेखि असोजसम्ममा बच्चा हुकाइ सक्दछ।



Brochures used on Conservation Program of Indian Spotted Eagle.



Training certificate provided by the organizers to the participants.



Conservation posters of Indian Spotted Eagle with a slogan "Sustainable Farming for Eagle Conservation" in Devnagari Script (Nepali language).

Short description about the poster

- The background photo is of farmland where the Indian Spotted Eagle prefer hunt
- The nest consist of parent with a prey items (rodent) about to feed their eaglet giving message to farmers that they are friend of farmers but not a foe.
- The big hand symbolize the hands of farmers and the small hands symbolize the upcoming generation where they must work together to conserve the eagle. Besides this hands photo also symbolize the transference of the wisdom about the eagle benefits to their offspring.

Before distributing posters we also described each and every meaning of the photos in the poster to the farmers, students and other local people.