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Population status and threat assessment of vulture species in Uttarakhand, India

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Population status and threat assessment of vulture species in Uttarakhand, India

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(Future Conservationist Award 2016)

Location

Dehradun, Haridwar, Pauri, Nainital, U.S Nagar, Champawat districts of Uttarakhand, India
(August 2016 to September 2017)

Institutions involved

Doon University, Dehradun, Uttarakhand, India
Himalayan Institute of Sustainable Environment & Research Society-Dehradun
Dead Animal Disposal Contractor Association, Dehradun & Haridwar, Uttarakhand
Uttarakhand Forest Department, Dehradun, Uttarakhand

Aim of the project: To assess population of vulture species and threats to them in Uttarakhand state and initiating conservation actions

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We also acknowledge support provided by various forest divisions and their staff during the surveys, district panchayat administration, veterinary officers, dead animal disposal contractors and skinner community, farmers, pharmacy practitioners, schools and college administrations, Vulture Mitra, Doon University researchers including all the organizations and individuals who had supported directly and indirectly our project activities on vulture conservation issues.

Section-1

PROJECT SUMMARY

Nine species of vultures are found in the Indian Sub-continent and four of them are critically endangered. The information on present status of their existing population and threats these species are facing is limited including in Uttarakhand state. We initiated population and threat assessment surveys under the project with major focus on livestock carcass dumping sites in the Terai region of Uttarakhand state. A comprehensive awareness education and outreach activities were also conducted, as many of the stakeholders are unaware on vulture conservation issues. Six out of nine vulture species found in Uttarakhand state were recorded under the project with maximum population of migratory vultures during the migratory season from December to April. The Endangered Egyptian vulture was identified as the most abundant resident species while a scattered population of two critically endangered species namely White-backed vulture and Red-headed vulture was also recorded in livestock carcass dumping sites of the state.

Electrocution mortality was identified as one of the major risk for vultures in feeding sites as we recorded forty nine Himalayan-vultures, one Egyptian-vulture and twenty-six steppe eagles electrocuted during the project duration. However, availability and use of vulture toxic NSAIDs including diclofenac identified critical threats to existing vulture population and unawareness among the stakeholders about NSAIDs toxicity is an issue of concern. We enhanced peoples understanding on vulture conservation issues through twenty-seven awareness events, nominating 'Vulture Mitra' and building capacity of volunteers and team members. We identified skinner community as an important stakeholder in vulture conservation and their support could be an advantage for future conservation actions. The outcomes of the project were shared as baseline information with state authorities and conservations organizations to initiate possible conservation initiatives.

INTRODUCTION

The drastic decline of all species of vultures during the recent decades in the South Asia is a well-known fact. The impact of vulture decline, whose role is that of a natural scavenger in our environment, is yet to be assessed. The diclofenac poisoning has been considered one of the major factors behind vulture population crisis during 1990s and 2000s in the Indian Sub-continent (Green et al., 2004; Oaks et al., 2004 Cuthbert et al., 2006a; 2006b; Das et al., 2010). However, limited information is available on their illegal use in the Indian markets even after ban on veterinary use diclofenac in 2006 and large vials of human use diclofenac in the year 2015 (Balodi et al., 2018). The status of vultures in the Himalayan states Uttarakhand, is somewhat unique, as all nine vulture species have been recorded to occur in this state. Out of these, four species are considered Critically Endangered (*Gyps bengalensis, Gyps indicus, Gyps tenuirostris* and *Sarcogyps calvus),* one is Endangered (*Neophron percnopterus*), three are Near Threatened (*Gyps himalayensis, Aegypius monachus* and *Gypaetus barbatus*), and *Gyps fulvus* is Least Concern as per the IUCN red list (Balodi et al., 2018). These species are also provided protection under the Indian Wildlife Protection Act, 1972. However, information on their current population status and threats including the NSAIDS risk they are facing is limited throughout the state.

In this background a study was conducted in Uttarakhand with major focus on population surveys in the lowland region comprise of six districts namely Dehradun, Haridwar, Pauri Garhwal, U.S Nagar, Nainital and Champawat (Figure 1). Four critically endangered and one endangered vultures are resident in the study area while and remaining others are winter migrant from high altitude region of the state and other part of the Asia. The lowland region of Uttarakhand is important in terms of protected area network (2 tiger reserves, 2 national parks, 2 wildlife sanctuaries and 3 conservation reserves) of India and has been identified as one of the potential Vulture Safe Zones (pVSZ) under Saving Asia's Vultures from Extinction (SAVE) initiative. Also, the region is of much conservation importance as many areas of the state are within the sixty to hundred kilometers flying distance from Pinjore and Morni Hills, where the BNHS-RSPB and Haryana Forest Department led Vulture Conservation Breeding Programme (VCBP) is ongoing. It is presumed that carcass dumping sites in Uttarakhand might be the potential feeding ground for captive bred vulture to be released in near future. Additionally, the area shares geographical extent of some of the Vulture Safe Zones (VSZs) of Nepal and the state of Uttar Pradesh. Thus, the project activities were necessary to be

implemented in the state to better understand the exiting issues of vulture conservation and to initiate possible conservation actions.

Our population surveys have identified Uttarakhand as an important habitat for reviving population of six vulture species including critically endangered resident vultures as well as the winter migratory species. However, threat assessment surveys raised our attention on critical issues like electrocution mortality and NSAIDs toxicity risk to vultures, which might hold back the progress of any vulture conservation actions. Our attempts to enhance stakeholder understanding on vulture conservation issues through awareness education and outreach activities would play an important role in the mitigation of these widespread threats in the state. Their support has been instrumental in implementing project activities properly and encouraged us to undertake similar in the future. Most importantly, involvement of skinner community and dead animal disposal contractors with the project could be considered significant in preventing electrocution mortality risk associated with unsafe carcass disposal system, while 'Vulture Mitra' as a team of supporters and future vulture conservationist.

The project was undertaken in the collaboration with Uttarakhand Forest Department, Dead Animal Disposal Contractor Committees or Associations, District Panchayats, Biodiversity Management Committees, Doon University, Himalayan Institute for Sustainable Environment and Research Society and various other stakeholders. Also, support and guidance from the officials of conservation organizations like State Biodiversity Board, BNHS, RSPB, Oriental Bird Club, Bird Conservation Nepal, Wildlife Trust of India, WWF-India and SAVE consortium has strengthen the conservation network. The project activities have created a positive environment for the implementation of future vulture conservation actions in Uttarakhand as well as the neighboring vulture range states and country.

MAP OF THE STUDY AREA

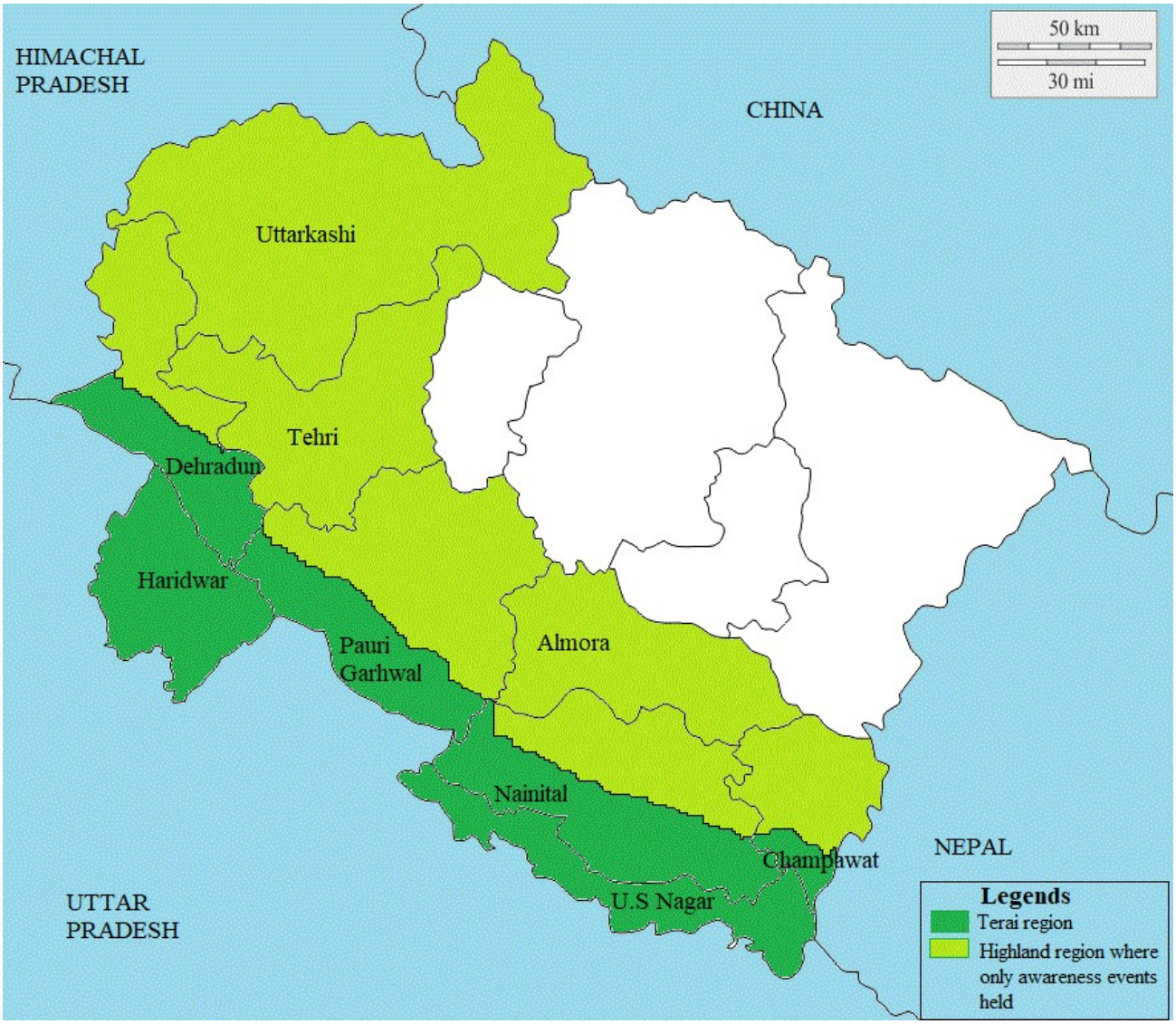

Fig 1: Map of Uttarakhand state showing project sites (in green)

PROJECT MEMBERS

1. Khima Nand Balodi- Ph.D Student, School of Environment & Natural Resource, Doon University
   Qualification- Master of Science in Environmental Science (Natural Resource Management)
   Experience- About four years' experience in community based conservation
   Age- 27 years
   Team Role: Overall project management (project designing, supervision, institution and team coordination, meeting with stakeholders, survey plans, awareness education and outreach plan, advocacy, data analysis and interpretation, reporting and team members, volunteers and students training at Doon University.

2. Bhawna Pandey- Ph.D Student, School of Environment & Natural Resource, Doon University
   Qualification- Master of Science in Environmental Science
   Experience- about 4 years of experience in community based conservation and applied research
   Age- 29 years
   Team Role- Community engagement, laboratory extraction, analysis and data interpretation, and assisting team leader in other project related activities

3. Ashutosh Singh- Deputy Ranger, Forest Survey of India, Central Zone, Nagpur, Ministry of Environment, Forest & Climate Change, Govt. of India
   Qualification- Master of Science in Environmental Science and P.G Diploma in Geo-informatics
   Experience- About six years of experience in forest resource mapping, policy recommendations; conservation oriented research and development, and community based conservation
   Age- 30 years
   Team Role- Project planning, coordination and supporting team leader in other activities

4. Amit Singh Chauhan- Ph.D Student, Doon University, and Senior Project Fellow, G.B Pant National Institute of Himalayan Environment & Sustainable Development, Himachal Regional Centre, Kullu, Himachal Pradesh
   Qualification- Master of Science in Environmental Science
   Experience- About five years of experience in community based biodiversity conservation, especially conservation of threatened Himalayan flora and research on climate change issues
   Age- 30 years
   Team Role- Project planning, field surveys, community engagement and supporting team leader

5. Himani Singh Khati- Intern HISER Society (now as Project Officer)
   Qualification- Master of Science in Environmental Science (Natural Resource Management)
   Experience- About two years of experience in community based species conservation
   Age- 24 years
   Team Role- Assisting team leader (as intern/volunteer) in field surveys and awareness events

6. Sunny Joshi- Intern HISER Society
   Qualification- Master of Science in Environmental Science (Natural Resource Management)
   Experience- About two years of experience in community based species conservation
   Age- 24 years
   Team Role- Assisting team leader (as intern/volunteer) in population surveys, tissue collection, pharmacy surveys and organizing awareness events in schools and colleges

Section-2

AIM AND OBJECTIVES

The aim of the project was to assess the population vultures and threats to them in Uttarakhand state and protecting them from electrocution and NSAIDs mortality risks. The project was undertaken with the following objectives;

- To understand the population status of eight vulture species and identification of potential threats to them in Uttarakhand,
- To understand the use of harmful NSAIDs for veterinary purpose in Uttarakhand,
- To improve the understanding of various stakeholders on vulture conservation issues and NSAIDs consequences, and
- To provide baseline information for implementation of vulture conservation actions in Uttarakhand.

Changes to Original Project Plan

The project was changed from July 1, 2016 and June 30, 2017 (earlier dates) to August 10, 2016 and August 10, 2017 (change dates), however, objectives have remained unchanged. The major part of the project was completed during the proposed project dates except some awareness events with stakeholders and the laboratory analysis of dead animal tissues to understand the use of harmful diclofenac in veterinary treatment.

METHODOLOGY

Population status and threats assessment

The project was initiated with an orientation cum training programme for team members and other student volunteers at Doon University during the August 2016. Alogwith the in-house training, field exposure visits were also undertaken to provide basic knowledge about identification of vulture species including other raptors, method of collecting information on livestock carcass disposal pattern, and understanding potential threats to vultures in and around carcass dumping sites. The team training was followed by indentification of livestock carcass dumping sites with the help of

skinners and villagers in the lowland (Terai) region of Uttarakhand. A total of 35 permanent carcass dumping sites were documented in the six Terai districts of Dehradun, Haridwar, Pauri, U.S. Nagar, Nainital and Champawat from August 2016 to September 2017. However, major focus was on the areas adjoining to two famous Tiger reserves of India namely Rajaji Tiger Reserve and Corbett Tiger Reserve of Uttarakhand. These sites were monitored to understand livestock carcass dumping pattern, utility of these carcass dumping sites as feeding sites by vultures and other scavengers, physical threats to vultures and their mortality in these sites (figure 2). Population assessment was also undertaken through road transects survey method. A total of 9 roads transects with covering 996 kilometer (km) distance including the longest transect of 413 km (from Kalsi to Tanakpur in 15 hours) were surveyed. The population was estimated on the basis of average population of each species of vultures at each sites recorded during a single observation. The approximate number of each species of vulture was estimated with analyzing the data for all observations in all dumping sites during the study period.

Fig 2: Monitoring of livestock carcass dumping site in Doon Valley

Availability and use of vulture toxic NSAIDs

Questionnaire surveys in a total 200 households and 200 pharmacies (including purchasing of medicines from 30 pharmacies) in all six Terai districts and collection of 100 dead animal tissues (liver and kidney samples from Dehradun district only) were undertaken to understand the use and availability of harmful pharmaceutical drugs in veterinary treatments. The households included farmers, dairy owners and cattle shelters houses in these districts (figure 3). The animal tissues were taken to the laboratory and after extraction were analyzed to detect the presence of banned diclofenac. The data was compiled in MS Excel and analyzed for inferences.

Fig 3: Interview with farmer in Dehradun

Awareness education and outreach activities

We conducted awareness activities at village, school, colleges and university levels with farmers, skinners and bone collectors, students, pharmacy practitioner, and members of Biodiversity Management Committees (BMCs) to raise awareness on vulture conservation issues in the state including some highland districts. We also nominated 20 students volunteers as “Vulture Mitra or Friends of Vultures”, with an idea to prepare a team of emerging young conservationists in the state. Various awareness materials were generated to increase people understanding on vulture conservation issues in the state.

Baseline information for conservation actions

The information collected through field surveys was provided to state authorities during 14 discussion meetings at various levels with forest department, veterinary department, district panchayats, power transmission department and state biodiversity board. Actions were also undertaken to mitigate electrocution mortality risk to vultures in various carcass dumping sites of Dehradun district. The project activities were undertaken in proper guidance of members of Saving Asia's Vulture from Extinction (SAVE), and projects updates were provided as per their advice time to time. Regular discussion with focus on transboundary issues was also made with the officers of Bird Conservation Nepal. The results were also shared and being shared through conference proceedings, media coverage and articles in new paper and journals.

OUTPUTS AND RESULTS

Objective 1- Understanding population status of eight vulture species and identification of potential threats

A total of 16 participants including team members and volunteers were oriented in project planning training workshop. Their skill and capacity was enhanced in vulture conservation activities. These participants have supported the team members in population status and threat assessment surveys, questionnaire surveys in households and pharmacies, and laboratory analysis work. A total of A total of 35 livestock carcass dumping sites were identified with the help of skinners and villagers in the region of the state, out of which maximum 17 (48.6%) were identified in Dehradun, 7 (20%) in Haridwar and four each in Nainital and Udham Singh Nagar districts (table 1).

Table 1: Livestock carcass dumping sites identified during the study

District	No. of dumping sites identified	Remarks
Dehradun	17	All are permanent and used by skinners
Haridwar	7	All are permanent and used by skinners
Pauri Garhwal	2	Used by skinners and farmers
Nainital	4	Used by skinner and farmers
U.S. Nagar	4	Used by farmers
Champawat	1	Used by farmers
TOTAL	**35**	

In Dehradun and Haridwar districts all dumping sites are used by skinners community while in other districts majority of these are used by villagers. All these sites were over the river bed and occasionally nearby human settlements. A total of 2971 livestock carcasses were recorded from August 2016 to August 2017 in all recorded dumping sites of surveyed districts. Out of which maximum 2565 (86.33%) livestock carcasses were recorded in 17 sites of Dehradun district followed by Haridwar (9.8%) in seven sites. However, discussions with skinners/contractors revealed that more than 3826 dead livestock carcasses were dumped in Dehradun and around 524 carcasses in Haridwar during the surveys period.

A total of six vulture species were recorded feeding in various dumping sites during study (Appendix 2). The vulture population during the migratory (December to April) season was estimated highest for *Neophron percnopterus* (746-792 individuals), followed by *Gyps himalayensis* (682-758 individuals), *Gyps fulvus* (285-337 individuals), *Aegypius monachus* (76-109 individuals), *Sarcogyps calvus* (28-42 individuals) and *Gyps bengalensis* (26-41 individuals) respectively including all the surveyed districts. During the months of May to November highest population was recorded for *Neophron percnopterus* (630-665 individuals) followed by *Sarcogyps calvus* (10-12 individuals) and *Gyps bengalensis* (5-8 individuals). While other vulture species not recorded in the monitored sites during the study period of May to November.

Steppe eagles *Aquila nipalensis* (285-370 individuals) were among the major raptor scavengers during migratory season in the six Terai region of the state. The nine road transect surveys with covering 996 km recorded a total of 65 *Neophron percnopterus*, 48 *Gyps himalayensis*, 12 *Sarcogyps calvus* and 4 *Gyps bengalensis*. Among all the recorded species maximum population was estimated for Doon valley (Dehradun), Haridwar and Nainital districts respectively.

In terms of potential and existing threats to vultures, risk of electrocution mortality was observed as a major threat. Out of 35 monitored carcass dumping sites, 19 sites were in the vicinity of high power transmission line and a total of 49 Himalayan vultures, 1 Egyptian vulture and 21 Steppe eagles were found dead in such four sites of Dehradun and Haridwar districts (table 2). Mortality of two Himalayan vultures and one steppe eagle in safe dumping sites can be associated with the toxic veterinary drugs, hence NSAIDs poisoning was considered another risk to vultures. Threats like mining activities, dumping of municipal waste, heavy vehicular movement and stray dogs' population in (critical issues) and around livestock carcass dumping sites were documented as other

existing risk to vultures. Moreover, loss of nesting sites (nesting trees), expansion of human settlements and change in dead animal disposal system were considered as potential threats to vulture species in the state.

Table 2: Mortality of raptors during study period and responsible factors

Sites	Mortality of raptors due to electrocution			Mortality of raptors due to uncertain reasons		
	HV	EV	SE	HV	SE	BK
Khushalpur	36	1	7	0	0	0
Majri Grant	11	0	14	0	0	0
Haridwar	2	0	0	0	0	0
Jhajhra	0	0	0	2	0	0
Selaqui	0	0	0	0	0	1
Tunwala	0	0	0	0	1	1
Total	49	1	21	2	1	2

Note: HV= Himalayan Vulture; EV= Egyptian Vulture; SE= Steppe Eagle

Objective 2: Avialability and use of harmful NSAIDs in veterianry treatment

Questionnaire surveys among the 200 respondents (farmers, dairy owners and cattle shelters) revealed that a total of 172 respondents (86%), consult a veterinarian while 11 percent use traditional veterinary medicine and remaining other do not consult a veterinarian before the treatment of their livestock (figure 4).

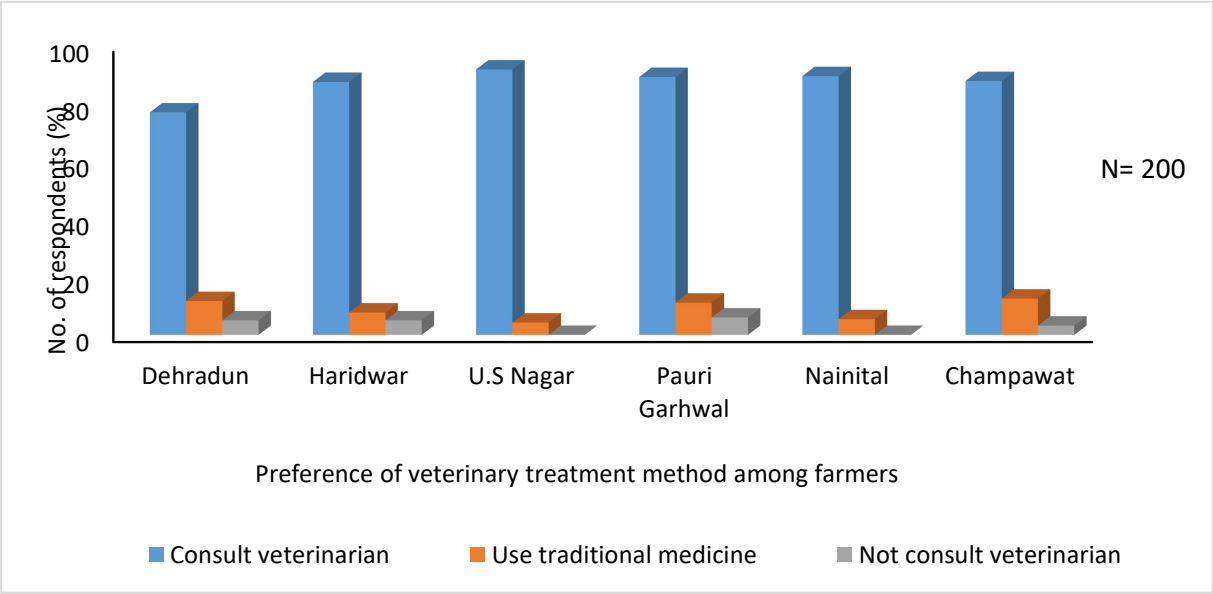

Fig 4: Preference of use of veterinary treatment method in Uttarakhand

About 88 percent of respondents do not know about the medicine given by veterinarian in the treatment of livestock and also about veterinary drug diclofenac. Only 10 percent of respondents were aware about vulture mortality due to diclofenac, while other had reported an unknown drug used for increased milk production as a major reason behind vulture decline in the region.

The questionnaire surveys in 200 pharmacies revealed that a total of twelve commonly used drugs were available in the state, out of which vulture toxic drugs like human use diclofenac (with brand name Diclolab and Diclolabact (Inj), and bolus Doiclofon-MR and Nacstar-MR), ketoprofen, aceclofenac, flunixin and nimesulide were prevalent in about 19.5%, 38%, 26%, 17.5% and 57 percent respectively in the surveyed pharmacies. However, the drug considered safe for vultures (meloxicam) was available in about 53.5 percent of surveyed pharmacies. Diclofenac was found and purchased with brand name which were said to be in veterinary use (figure 5).

Fig 5: Commonly available NSAIDs in the market and veterinary use in Uttarakhand state

The laboratory analysis of 100 tissues collected from dead livestock during October 2016 to May 2017 also revealed that the use of diclofenac in veterinary treatment is continued. Diclofenac presence was observed in a total of 23 percent samples, however, the concentration above 1 mg/kg was observed only in 13 percent of the analyzed samples (figure 6), and some were found above the

toxic level. Moreover, the presence of diclofenac was not observed in any samples collected after the March 2017.

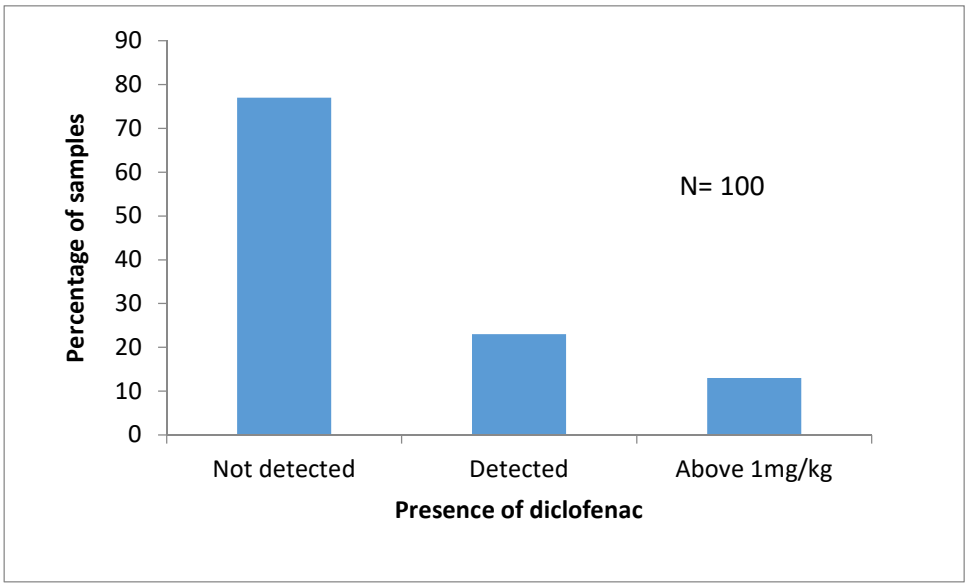

Fig 6: Presence of diclofenac in livestock tissues collected during study period

Objective 3: Improving understanding of various stakeholders on vulture conservation issues and NSAIDs consequences

A total of 17 discussion meetings were held with forest officials including Chief Wildlife Warden, Addl. Chief Wildlife Warden, Divisional Forest Officers, Range officers and foresters to discuss electrocution mortality risk to vultures in the state. One meeting was held with district panchayat and one with the officials of power transmission line agency. The Member Secretary, Uttarakhand State Biodiversity Board was also informed about the issues of vulture conservation in Doon valley and Uttarakhand state during several occasions. Seven (7) discussion meetings were held with dead animal contractors and skinners regarding vulture mortality associated with unsafe dumping activity and shifting of unsafe sites to mitigate electrocution mortality. One meeting was also held with Smt. Rekha Arya, Minister, Uttarakhand Animal Husbandry Department to discuss the use of vulture toxic drugs in veterinary treatment and request her to ban on these drugs in the state.

A total of 27 awareness events (participated by more than three thousands individuals) were organized in schools, colleges, universities and villages (figure 7 & see in appendix). The awareness message on vulture conservation issues was spread through presentations, painting competition, plant distribution and field exposure visits and through celebrating International Vulture Awareness

Day 2017. In addition, twenty 'Vulture Mitra or Friends of Vultures' were nominated under the project, who had supported the team during various conservation activities.

Fig 7: Awareness event on Vulture Conservation at MKP PG College, Dehradun

A total of seven brochures, posters and pamphlets (1000 each), T-shirts (50) and Coffee Mugs (50) were published or printed (with the message 'Save Vulture Save Nature, Lets come together to conserve vulture in Uttarakhand') for distribution during surveys, meetings, and awareness and outreach activities (see Appendix). In addition, letters regarding to stop the use of diclofenac in veterinary treatments and safe dumping or disposal of livestock carcasses were sent to the Chairman/Chief functionary of District Panchayats of all thirteen districts of the state. To spread vulture conservation awareness, 530 letters have been sent to head of Gram Panchayats (Gram Pradhan), with request to discuss vulture conservation issues in open meetings of panchayats. A documentary on 'Vulture conservation in Uttarakhand' has been prepared, however, yet to be finalized before sharing on social media and other platforms.

Objective 4: Baseline information for implementation of vulture conservation actions

The project outcomes were shared with the Saving Asia's Vulture from Extinction (SAVE) Programme, Uttarakhand Forest department authorities, State Biodiversity Board Authorities and Doon University time to time for initiating conservation actions. Project outcomes were shared with stakeholders during one international and a state level conference. The discussion on transboundary issues in vulture conservation activities was also undertaken regularly with the Bird Conservation Nepal officers and Officers of Himachal Forest department. All project outcomes were considered important by the state, national and international conservation agencies for initiating conservation action for saving vulture in Uttarakhand state as well as India. The activities and outcome were also shared through conference proceedings, publication in new papers and articles for journals.

Additional Outputs

i. Oriental Bird Club, UK funded a project titled "Community Based Vulture Conservation in Doon Valley, Uttarakhand, India".
ii. Learning Exchange Programme India-Nepal on Vulture Conservation by Conservation Leadership Programme.
iii. Advocacy, Education and Outreach Plan on Vulture Conservation for Uttarakhand state was prepared under learning exchange.
iv. Attended 6th Annual Meeting of SAVE (Saving Asia's Vultures from Extinction) held in Mumbai on 27-28 November 2016.
v. Multiple records of White-backed vultures (Sighting of 13 individuals in a single visit of a carcass dumping site in Doon Valley) in the study area, while in earlier surveys by the team till 2016 were not recorded.

Communication and Application of results

The outputs of the project were disseminated through conference proceedings and media reporting.

i. Khima Nand Balodi & B.C Choudhury (2018). Dynamics of scavenging ecosystem service role in the absence of vultures in the Terai region of Uttarakhand and its implications, proceeding of the International Biodiversity Congress held on 4-6 October 2018, at Forest Research Institute, Dehradun. (Paper presented).

ii. Khima Nand Balodi & B.C Choudhury (2018). An assessment of the status and threats to vultures in Uttarakhand and possible approaches of conservation. Proceeding of the 12th Uttarakhand State Science and Technology Congress, February 2018. (Paper presented).

iii. Khima Nand Balodi, B.C Choudhury, Krishna Bhushal, Bhupal Nepali, Himani Khati & Sunny Joshi (2017). Religion and Spirituality: Significance in Vulture Conservation and its Sustainability, In proceeding of Conference: Inner Climate and the Quest for Environmental Sustainability, organized by Doon University and Tarab Ling, Dehradun, India, (Paper Presented).

Information collected through the project activities are being applied for mitigating electrocution mortality risks and advocacy for ban on vulture toxic NSAIDs in Uttarakhand state under projects, funded by the Rufford Foundation, UK and MBZ Species Conservation Fund, UAE.

Monitoring and Evaluation

Team meeting was organized to monitor and evaluate the progress on project activities. We received time to time valuable suggestions and inputs from project supervisors to better implement the project activities.

Achievements and Impacts

Enhancement of team member capacities

The project was based on field surveys and applied laboratory analysis with a major focus on stakeholder involvement. All the team members have enhanced their capacities in term of population surveys, data collection and analysis, project development, community mobilization on vulture conservation issues and conservation project implementation. This would be instrumental in fundraising, research and project implementation as well as conservation communication for wide range of audience. Through the project experiences and outcomes, the team members have been able to raise additional funds to continue the vulture conservation actions in the state.

Training to university students

Capacity building training and field exposure on vulture conservation issues was provided to university students. This has help us in project activities as many of these student have supported

us in population surveys, pharmacy surveys, awareness events and animal tissue collection. It has also encouraged them to implement similar activities on related conservation issues.

Key stakeholders were involved in project implementation

The Uttarakhand forest department and skinner community were directly involved in project activities. It has been the important initiative as the skinner community collects dead livestock from villages, towns and cities and dumped them at various dumping sites in the study region. These sites are used by vultures and other scavengers as feeding sites and skinners will play a key role in continuous food supply in safer locations, while forest department act as an regulator and manager of conservation actions. In addition, the neglected skinner community also felt privileged that their importance in vulture conservation is being recognized. Also the local communities will support future conservation actions on vulture in the state. Also, involving Biodiversity Management Committees in the project would have widespread conservation benefit in near future.

Vulture conservation actions created a hope of species recovery

First time, a comprehensive study was undertaken on vulture population assessment and threats they are facing in the state. It was understood that the population of vulture species over 3-4 years is on an increase, as sightings of some of them being reported time to time. Along with, comprehensive awareness education and outreach activities were also undertaken to raise stakeholders understanding almost in all districts. Advocacy with key project findings among the stakeholder department to protect vultures from physical threats and poisoning of pharmaceutical drugs has been a significant activity to initiate Uttarakhand as Vulture Safe State.

Capacity development and leadership capabilities

The project has built leadership capabilities of team leader and other members as well, as we have been able to bring multiple stakeholders at a common platform for a common cause. Moreover, our work has been appreciated at various platforms by both the governmental and non-governmental organization. Also, many of them have had approached for financial support and conduct collaborative work to conserve vultures in the state and the country.

Section- 3

CONCLUSION

The outcomes of the present study are crucial as a base for the future vulture conservation actions in Uttarakhand state, as earlier to this limited information was available on the issue. The population status of six species and threats like electrocution mortality, unregulated carcass disposal system, risk of poisoning with pharmaceutical veterinary drugs and loss of habitat has provided a basic understanding about required actions needed to protecting the endangered birds. The increasing trend in population of resident vulture species is good news for the state, especially for the skinner and bone collector community which largely rely on their fast scavenging services. Moreover, intervention to ban on vulture toxic NSAIDs needed to be initiated from authority level, as farmers and pharmacy practitioners were not well aware on its consequences. Diclofenac was not detected in the tissues collected after March 2017, which reflects the ban on large vial of human use diclofenac in 2015 is strictly being followed, however, continuous monitoring is must in future studies.

All the key stakeholders were involved in the project and their support has been instrumental in implementing the project, however, continuous advocacy would be important for creating the state as vulture safe state. Awareness education and outreach activities were widely undertaken to spread the vulture conservation message to a larger audience, especially among the younger generation, which would help in seeking citizen support for a larger impact. “Vulture Mitra’ initiative would play an important role during any actions in order to species recovery in the state and its greater conservation success.

Problems encountered and lessons learnt

The population surveys and threat assessment activities were undertaken very well as per the project plan; even it has become easier due to the support from trained volunteers and students. Also, conducting the awareness programme at various level went good way and we conduct more events than proposed in the project. However, project activities like tissue collection from dead livestock and vultures and their analysis have been problematic. Firstly, we received tissue collection permission from dead vultures very late in March 2017 and most of the time dead vultures were found decaying (could not collect tissues because of completely damage of vulture carcass). Secondly, after extraction of tissue samples collected from livestock, it took much time in their laboratory analysis due to dysfunctionality of instruments, no response from the officials of

laboratory outside the Doon University or the state, unavailability of researchers to perform the analysis. This has been the major reason behind the delay in project completion and submission. Also, many times the team leader has worked solely on the project activities as availability of other team members remained limited due to their own Ph.D research work and official responsibilities. We overcame with these issues after more collaboration with other Ph.D research scholars working on similar toxicological aspects, which help us in laboratory analysis.

We learnt that we have had proposed a lot of project activities to be achieved within one year duration. Also, we have had limited financial sources to meet out our day to day expenses (other than project) and thus many time we were involved in raising funds from other sources (consultancy, part time work, etc) to meet these demands. We realized that the project must have achievable objectives within the time frame and also a considerable share of project cost must be under the stipend or salary head. So that it will be easier to implement the project timely.

In the future

The population and threat assessment surveys are needs to be conducted in the highland region of the state, as it shares the larger geographical extent of the state and also we recorded decrease in existing population of resident and migratory vultures during the month of May to November. It is possible that the resident vultures may also have shifted their habitat toward higher elevations like other migratory species. The state has witnessed many development interventions over the last two decades such as road projects, electrification, increased veterinary facilities and others. It is possible that vultures in the highland region might be facing electrocution mortality and NSAIDs poisoning risks. The population and NSAIDs surveys in the Terai region would be continued to monitor the population dynamics and project impacts in mitigation of various risks to vultures. Also, it would be helpful to bring out a complete picture of vulture status throughout the state. In addition, it would be understand the genetic diversity among the populations (especially critically endangered *Gyps bengalensis*) in the region, state and in India, thus, molecular studies will be undertaken in near future.

Financial Report

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)
PHASE I - PROJECT PREPARATION		
Communications (Stationary/telephone/internet/postage)	400.00	501.32
Field guide books, maps, journal articles and other printed materials	250.00	185.81
Insurance/Medical facilities	300.00	60.99
Visas and permits	100.00	0.00
Team orientation/training/team meeting	300.00	218.18
Reconnaissance	200.00	0.00
EQUIPMENT		
Scientific/field equipment and supplies	900.00	762.70
Photographic equipment	500.00	590.61
Camping equipment	350.00	288.80
Hiring of vehicle for field surveys and fuel	1,100.00	1931.74
Other (travel hiring)	200.00	
PHASE II - IMPLEMENTATION		
Accommodation for team members and local guides	850.00	1214.46
Food for team members and local guides	800.00	
Travel and local transportation (including fuel)	400.00	416.42
Workshops and Stakeholders meetings	950	961.62
Outreach/Education activities and materials (brochures, posters, t-shirts, etc.)	850.00	1615.11
Tissue Sample Collection and analysis	3,000.00	2526.85
Purchasing of NSAIDs from Market and Survey Cost	550.00	524.35
PHASE III - POST-PROJECT EXPENSES		
Administration	300.00	373.90
Report production and results dissemination	100.00	283.40
Report submissions and post project expenses	100.00	44.23
Total	**12,500.00**	**12,500.00**

Section- 4

APPENDICES

Appendix 1: CLP M&E measures table

Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	5	CLP Management team
Number of species assessments contributed to (E.g. IUCN assessments)	8	Scientific Assessment of population status of eight species of vultures was undertaken in Uttarakhand state
Number of site assessments contributed to (E.g. IBA assessments)	NA	
Number of NGOs established	None	
Amount of extra funding leveraged ($)	1920	Oriental Bird Club, UK
Number of species discovered/rediscovered	None	However, recent records of White-backed vulture from Doon valley
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	None	
Number of species/sites legally protected for biodiversity	None	
Number of stakeholders actively engaged in species/site conservation management	17	Consultation meetings, unsafe site shifting, etc
Number of species/site management plans/strategies developed	1	Under Learning Exchange opportunity (India-Nepal)
Number of stakeholders reached	3500 & more	Directly through awareness events and stakeholder meetings
Examples of stakeholder behavior change brought about by the project.	Awareness building on vulture conservation issues	Vulture conservation activities of the team were appreciated at various platform, skinner community helping in project activities, pharmacy people accepted pharmaceutical drugs as a major cause behind vulture crisis, local people informed us about new sightings, increasing population, etc
Examples of policy change brought about by the project	In process	(i)Vulture conservation action plan for Uttarakhand state (ii)Ban on vulture toxic NSAIDs in Uttarakhand (iii)allocation of safe dumping sites
Number of jobs created	NA	However, 7 individuals got financially (wages/stipend) benefitted by the project
Number of academic papers published	In process	3 articles are under preparation on population status, threats and food availability
Number of conferences where project results have been presented	3	2 International, 1 state level

Appendix 2: Vultures population recorded in different dumping sites (table)

District	Sites/region	Vulture population in winter and pre-summer in various dumping sites (maximum during single visit)						Vulture population in summer at various dumping sites (maximum during single visit)					
		WBV	HV	ERV	EV	CV	RHV	WBV	HV	ERV	EV	CV	RHV
Haridwar	Haridwar	6	36	0	57	12	4	0	0	0	46	0	2
	Laksar	0	14	0	12	0	0	0	0	0	13	0	0
	Manglore	0	0	0	9	0	0	0	0	0	14	0	0
	Roorkee	0	0	0	23	0	0	0	0	0	27	0	0
Pauri	Kotdwar	0	32	0	17	4	2	0	0	0	16	0	1
	Sigdi-Motadhak	0	26	0	12	2	2	0	0	0	13	0	0
	Chila-Rishikesh	3	23	17	11	7	3	2	0	0	16	0	2
	Kalagarh	2	31	16	9	2	1	1	2	0	8	0	1
Dehradun	Rishikesh	0	22	0	16	4	1	0	0	0	11	0	0
	Majari Grant	2	38	0	103	7	1	0	0	0	94	0	0
	Raipur	0	38	0	16	5	2	0	0	0	19	0	0
	Tunwala	0	24	0	7	7	1	0	0	0	11	0	0
	Jhajhra	5	120	64	43	16	3	2	0	0	39	0	0
	Selaqui	0	2	0	83	3	0	0	0	0	59	0	0
	Khushalpur	13	86	42	113	12	5	2	0	0	137	0	1
	Herbertpur	0	19	0	47	5	1	0	0	0	38	0	0
	Malhan-Asharodi	2	46	14	17	7	3	0	0	0	29	0	0
Nainital	Ramnagar	5	37	0	9	2	4	0	0	0	12	0	2
	Haldwani	0	22	0	7	0	2	2	0	0	15	0	3
	Kotabag	0	26	0	9	0	2	0	0	0	7	0	2
U.S.Nagar	Kashipur	Sites were identified but not monitored for regular population assessment						0	0	0	6	0	0
	Bajpur							0	0	0	9	0	0
	Jaspur							0	0	0	11	0	0
	Khatima							0	0	0	5	0	0
Champawat	Banbasa							0	0	0	2	0	0

Note: WBV=White-backed vulture; HV= Himalayan Vulture; ERV=Eurasian vulture; EV= Egyptian vulture; CV= Cinereous vulture; RHV= Red-headed vulture

Appendix 3: Vultures recorded through road transect surveys in Terai region of Uttarakhand

S.No	Place (from)	Place (to)	Total time taken (hour)	Total distance covered	No. of individuals of each species	Remarks
1	Kalsi	Tanakpur	15 (2 days)	413 km	EV=23 HV= 17 RHV= 5	These species were recorded mostly over the human settlement, on power transmission line towers in the vicinity of roads. Other species of vulture were not recorded in this transect. However, other raptors like eagles, buzzards, black kites, black-shouldered kites, shikra, kestrels, sparrow-hawks, etc were recorded during the survey.
2	Tanakpur	Ramnagar	5.5	158 km	EV=7 RHV=1	Recorded in flight over the settlements and nearby rivers.
3	Ramnagar	Haldwani	2.5	64	EV=2 RHV= 2 HV= 5	Other species of vultures were not recorded.
4	Haridwar	Kotdwar	3	60	EV=5 HV=5 RHV=1	Other species of vultures were not recorded.
5	Haridwar	Roorkee	3	69	EV= 3	The transect included Laksar, Manglore and Roorkee
6	Dehradun	Rishikesh	2	55	EV=5 HV=7 RHV=1	Other species of vultures were not recorded.
7	Dehradun	Haridwar	2	62	EV=3 RHV=2 WBV=2	Other species of vultures were not recorded during this transect survey.
8	Dehradun	Ponta Sahib	2	60	EV=3 HV=5	Other species of vultures were not recorded.
9	Dehradun	Kalsi	2	55	EV=13 HV= 9 WBV= 2	Other species of vultures were not recorded.

Note: HV= Himalayan vulture; EV= Egyptian vulture; RHV= Red-headed vulture; WBV= White-backed vulture

Appendix 4: Awareness materials published under the project

Poster & Banner: Do and Don't in for vulture conservation

Poster, Pamphlet & Banner: Vultures of India

Poster & Pamphlet 3: Vultures of Uttarakhand with threatened category information

Poster & Pamphlet 4: Stop diclofenac use

Appendix 5: Media coverage during the Project

तारों में दौड़ता करंट बना गिद्धों का काल

■ अरविंद शेखर

देहरादून। एजएजबी

एक समय था जब दर्द व सूजनरोधक दवा डिक्लोफिनेक सोडियम गिद्धों की दुश्मन बन गई थी। लेकिन अब तारों में दौड़ता बिजली का करंट उत्तराखंड में गिद्धों का काल बन रहा है।

अकेले देहरादून और उधमसिंह नगर जिले में पिछले साल जाड़ों में 100 बिजलीघर और इलेक्ट्रिक गिद्ध बिजली के करंट में मारे गए हैं। यह खुलासा हुआ है दून विश्वविद्यालय और हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल एन्वायरमेंट रिसर्च सोसाइटी के एक अध्ययन में। कहा है कि अध्ययन के दौरान कई तारों वाले गिद्धों की लगातार मौत

पिछले जाड़ों में ही अकेले देहरादून और उधमसिंह नगर जिले में 100 गिद्ध हुए करंट के शिकार

दून विवि व हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल एन्वायरमेंट रिसर्च सोसाइटी के अध्ययन से खुलासा

की वजह से 2006 में केंद्र सरकार ने डिक्लोफिनेक पर पाबंदी लगा दी थी लेकिन फिर भी उपयोग अवैध रूप से इस्तेमाल चलता रहा। अगस्त 2015 में केंद्र सरकार ने इस पर दोबारा प्रतिबंध लगा दिया। यह प्रयास पशुओं के इलाज के लिए इस दवा का पहले खूब इस्तेमाल होता था।

पशु के मर जाने पर लोग उसकी लाश फेंक देते थे। इन लाशों को खाने वाले गिद्धों की आबादी पर डिक्लोफिनेक का बहुत बुरा असर होता था और वे करंट के लपेटे में आकर मारे जाते थे। लेकिन अब बिजली का करंट गिद्धों की मौत का कारण बन रहा है। केमलेका लोहारीना प्रेसर, ब्रिटेन के प्रोफेसर कार्ल कनर, ब्रिटेन की रॉयल सोसायटी और प्रोफेसर (शेष पेज 15)

Rashtriya Sahara on date 25/08/2017

पेंटिंग में गायत्री प्रथम

हल्द्वानी। राजकीय इंटर कॉलेज लामाचौड़ में गिद्धों के संरक्षण को लेकर पेंटिंग प्रतियोगिता हुई। इसके साथ ही हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल इंवायरमेंट एंड रिसर्च सोसाइटी की ओर से गिद्धों के संरक्षण की जानकारी दी गई। प्रतियोगिता में गायत्री पहले और गौरी गुप्ता दूसरे नंबर पर रही। इस दौरान प्रधानाचार्य आरके उप्रेती, संस्था के ज्योति प्रकाश जोशी, खीमानंद बलोदी, आरसी जोशी, गणेश उपाध्याय, दीपक पांडे, जसपाल सिंह आदि थे। ब्यूरो

Amar Ujala 27/08/2017

दून यूनिवर्सिटी की ओर से सहसपुर के कारबारी ग्रांट में हुई जागरूकता कार्यशाला, गिद्धों के पर्यावरण मित्र की भूमिका बताई

सहसपुर क्षेत्र के लोगों को गिद्धों का संरक्षण और उनका महत्व बताया

जागरूकता

कार्यशाला

- दून यूनिवर्सिटी की छात्राओं ने दी गिद्धों के संरक्षण की जानकारी
- लोगों से सफाई व्यवस्था पर भी ध्यान देने की अपील की

सहसपुर | हमारे संवाददाता

उत्तराखंड में गिद्धों के संरक्षण विषय पर कारबारी ग्रांट में जागरूकता कार्यशाला हुई। इसमें दून यूनिवर्सिटी की छात्रा नेहा नेगी, रेणू गुसाईं व शोभा भट्ट ने ग्रामीणों से पर्यावरण मित्र गिद्धों के संरक्षण को आगे आने की अपील की। कारबारी ग्रांट में आयोजित जागरूकता कार्यशाला में स्थानीय लोगों ने बढ़चढ़ कर भाग लिया। इसमें दून यूनिवर्सिटी की छात्रा नेहा नेगी ने कहा कि सूबे में गिद्धों की संख्या में कमी आई है, जो चिंता का विषय है। बताया कि गिद्धों का धार्मिक, आर्थिक व पर्यावरणीय महत्व है। 1990 के दशक में गिद्धों की संख्या में भारी गिरावट दर्ज की गई थी। जिसका प्रमुख कारण पालतू पशुओं को दी जाने वाली पीड़ा नाशक दवा डायक्लोफिन थी। इसे वर्ष 2006 में केंद्र सरकार ने प्रतिबंधित कर दिया, लेकिन अभी भी लोग उस दवा का प्रयोग करते हैं। जिसका सीधा असर गिद्धों की संख्या पर पड़ा है। रेनू गुसाईं ने गिद्धों को पर्यावरण मित्र बताते हुए साफ सफाई पर भी जोर दिया। कहा कि हमें अपने आसपास सफाई का विशेष ध्यान रखना चाहिए,इससे कई बीमारियों से भी बचा जा सकता है। इस दौरान लोगों के बीच क्विज प्रतियोगिता का आयोजन भी हुआ। इसमें वीरेन्द्र कुनियाल ने प्रथम, ममता थपलियाल ने द्वितीय व दिव्यांशु ने तृतीय स्थान प्राप्त किया।

सहसपुर के कारबारी ग्रांट में बुधवार को गिद्धों के संरक्षण को लेकर जागरूकता कार्यशाला हुई। ● हिन्दुस्तान

Hindustan on 29/08/2017

सूबे में कम हो रही गिद्धों की संख्या : डॉ. इंदु सिंह

जागरण संवाददाता, देहरादून: एमकेपी पीजी कॉलेज और हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल इन्वॉयरमेंट एंड रिसर्च सोसाइटी के संयुक्त तत्वावधान में 'उत्तराखंड में गिद्धों के संरक्षण' विषय पर एक दिवसीय सेमीनार का आयोजन हुआ। जिसमें कॉलेज की प्राचार्य डॉ. इंदु सिंह ने कहा कि सूबे में गिद्धों की संख्या में कमी आई है, जो चिंता का विषय है।

एमकेपी में आयोजित सेमीनार में दून विवि के विशेषज्ञ खीमानंद बलोदी ने बताया कि गिद्धों का धार्मिक, आर्थिक व पर्यावरणीय महत्व है। 1990 के दशक में गिद्धों की संख्या में भारी गिरावट दर्ज की गई थी। जिसका प्रमुख कारण पालतू पशुओं को दी जाने वाली दवा डायक्लोफिन थी। जिसे वर्ष 2006 में केंद्र सरकार ने प्रतिबंधित कर दिया। मगर मनुष्यों में अब भी डायक्लोफिन का प्रयोग हो रहा है, जिसका जानवरों पर प्रतिकूल प्रभाव भी देखा जा रहा है। उन्होंने कहा कि जिन बीमार पशुओं की विभिन्न प्रकार की रसायनिक दवाओं के प्रयोग से मौत हो जाती है, उनका मांस खाने से गिद्धों का लीवर भी खराब हो जाता है। उन्होंने बताया कि गिद्धों के संरक्षण के लिए वह और उनकी टीम कंजर्वेशन लीडरशिप प्रोग्राम पूरे उत्तराखंड में चला रही है।

Dainik Jagaran 26/08/2017

एसजीआरआर नेहरूग्राम में 'गिद्धों के संरक्षण' पर आयोजित कार्यशाला के दौरान बनाई गई पेंटिंग दिखाते स्कूल के छात्र-छात्राएं ● जागरण

कीटनाशक के कारण हुआ गिद्धों का विनाश

एसजीआरआर नेहरूग्राम में छात्रों को गिद्धों के संरक्षण के प्रति जागरूक करने के लिए आयोजित की गई कार्यशाला

जागरण संवाददाता, देहरादून: दून विश्वविद्यालय एवं हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल इंवायरनमेंट एंड रिसर्च सोसाइटी की ओर से आयोजित गिद्धों के संरक्षण पर कार्यशाला में लोगों को जागरूक किया गया।

एसजीआरआर नेहरूग्राम में आयोजित कार्यशाला में गिद्धों के संरक्षण विषय पर पेंटिंग एवं निबंध प्रतियोगिता का भी आयोजन किया गया। विवि से आए सन्नी जोशी ने गिद्धों के मानव जीवन में महत्व, धार्मिक महत्व, गिद्धों की वर्तमान स्थिति एवं गिद्धों की प्रजातियों पर संभावित खतरे के बारे में जानकारी दी। बताया कि 1990 के दौरान गिद्धों की संख्या में भारी गिरावट आई, जिसका प्रमुख कारण पालतू पशुओं को दी जाने वाली दर्द निवारक दवा डायक्लोफीनॉक थी। लेकिन, इसके साथ-साथ पूर्व में प्रचलित कीटनाशकों या जहर का प्रयोग भी इसका बड़ा कारण रहा।

विवि की ही नेहा नेगी ने बताया कि भारत में गिद्धों की नौ प्रजाति पाई जाती है, जिनमें उत्तराखंड के अंदर आठ मौजूद है। इसके अलावा भी वक्ताओं ने गिद्धों को लेकर विभिन्न जानकारी दी। इस अवसर पर विद्यालय के प्रधानाचार्य डीपी जोशी, बीआरएस रावत, पंकज शुक्ला, गीता सती, संगीता डोबरियाल आदि मौजूद रहे।

Dainik Jagran 30/08/2017

छात्रों को दी जानकारी

उत्तरकाशी : दून विवि एवं हिमालय इंस्टीट्यूट एंड रिसर्च सोसाइटी के शोधार्थियों ने चिन्यालीसौड़ में सरस्वती विद्या मंदिर इंटर कॉलेज व राजकीय बालिका इंटर कॉलेज में गिद्ध संरक्षण को लेकर कार्यशाला आयोजित की। साथ ही गिद्धों का संरक्षण तथा स्वच्छ भारत अभियान पर चित्रकला प्रतियोगिता आयोजित की। इस कार्यशाला में शोधार्थियों ने बताया कि 1990 से लेकर लगातार हिमालयी गिद्धों की संख्या में कमी आ रही है। दून विवि एवं हिमालय इंस्टीट्यूट एंड रिसर्च सोसाइटी के शोधार्थी अपने शोध के लिए उत्तरकाशी पहुंचे। इस दौरान शोधार्थियों ने चिन्यालीसौड़ के सरस्वती विद्या मंदिर इंटर कॉलेज तथा राजकीय बालिका इंटर कॉलेज में कार्यशाला आयोजित की। इस कार्यशाला में दून विवि की शोधार्थी शोभा भट्ट ने कहा कि गिद्धों का पर्यावरण संरक्षण में विशेष महत्व है। लेकिन 1990 से गिद्धों की प्रजाति खतरे में है।

Amar Ujala on 1/09/2017

वन्यजीवों के संरक्षण से बची रहेगी हरियाली

जागरूकता

- विश्व वन्यजीव दिवस पर मटक माजरी में जागरूकता कार्यक्रम आयोजित
- ग्रामीणों को वन्यजीवों के संरक्षण को लेकर किया गया जागरूक

जागरण संवाददाता, देहरादून: विश्व वन्यजीव दिवस के अवसर पर वक्ताओं ने वन्यजीवों के संरक्षण का आह्वान किया ताकि धरती की हरियाली 'जंगल' सुरक्षित रहें। वन्यजीवों के निवास स्थल जंगलों में हस्तक्षेप न करने की भी अपील की गई। साथ ही बताया गया कि गिद्ध जंगली जानवरों के संरक्षण में महत्वपूर्ण भूमिका निभाते हैं।

शनिवार को हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल एनवॉयरनमेंट एंड रिसर्च सोसाइटी, जैव विविधता प्रबंध समिति मटक माजरी, वन विभाग एवं दून विवि के संयुक्त तत्वावधान में मटक माजरी में जागरूकता कार्यक्रम आयोजित किया गया। इस वर्ष विश्व वन्यजीव दिवस की थीम 'जंगली बिडाल प्रजातियों के संरक्षण' पर आधारित है। इस अवसर पर जैव विविधता प्रबंध समिति मटक माजरी के अध्यक्ष एम. हुसैन ने ग्रामीणों को वन्यजीवों के पारिस्थितिकी तंत्र में महत्व एवं उनके संरक्षण की जरूरत पर जानकारी दी।

दून विवि के रिसर्च स्कॉलर खिमानंद बलोदी की ओर से गिद्धों की पारिस्थितिकी सेवाओं के विषय में ग्रामीणों को बताया गया। दून विवि की शोधार्थी ईना बहुगुणा ने भी अपने विचार रखे। हिमालयन इंस्टीट्यूट फॉर सस्टेनेबल एनवॉयरनमेंट एंड रिसर्च सोसाइटी के कार्यक्रम अधिकारी सनी जोशी ने जैव विविधता प्रबंध समिति की वन्यजीवों के संरक्षण में भूमिका पर विचार रखे।

वन दारोगा तिमली रेंज पवन सिंह रावत ने लोगों से वन्यजीवों के संरक्षण में वन विभाग का सहयोग करने की अपील की। इस अवसर पर जैव विविधता प्रबंध समिति मटक माजरी के सदस्य बिलाल, कुर्बान, आरिफ, नूर बेगम तथा जूलॉजिकल सर्वे ऑफ इंडिया की प्रशिक्षु नेहा नेगी, रेनू कुमारी सहित अन्य ग्रामीण उपस्थित रहे।

Dainik Jagran 03/10/2018

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15. https://newsfeed.co.in/cities/sightings-in-corbett-tiger-reserve-raise-hopes-on-conservation-of-endangered-vultures-dehradun/

Distribution list

Central Library, Doon University, Dehradun, Uttarakhand

Uttarakhand State Biodiversity Board

Office of the Chief Wildlife Warden, Headquarter, Uttarakhand Forest Department

Divisional Forest Officer (Dehradun, Kalsi, Haridwar)

Himalayan Institute for Sustainable Environment & Research (HISER) Society, Dehradun

Photographic documentation

Fig 8: A skinner transporting cattle carcass in a horse-cart

Fig 9: De-skinning of a cattle carcass in a dumping site

Fig 10: Feral dogs in a carcass dumping site of Doon valley (Rural site)

Fig 11: Feral dogs in a carcass dumping site in Doon valley (Urban site)

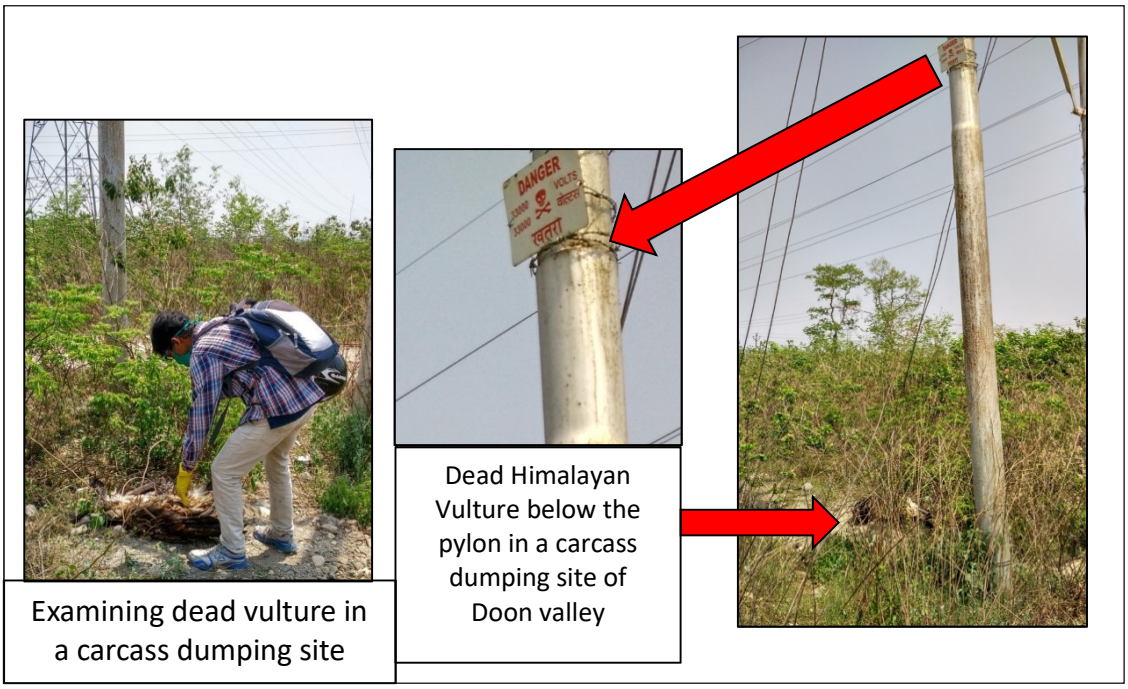

Fig 12: Symbolic representation of assessment of electrocution mortality of vultures

Fig 13: Vultures on high voltage power tower and consequent mortalities

Fig 14: White-backed vulture in Doon valley

Fig 15: Red-headed vulture in Uttarakhand

Fig 16: Egyptian vultures in Doon valley

Fig 17: Himalayan vultures in Doon valley

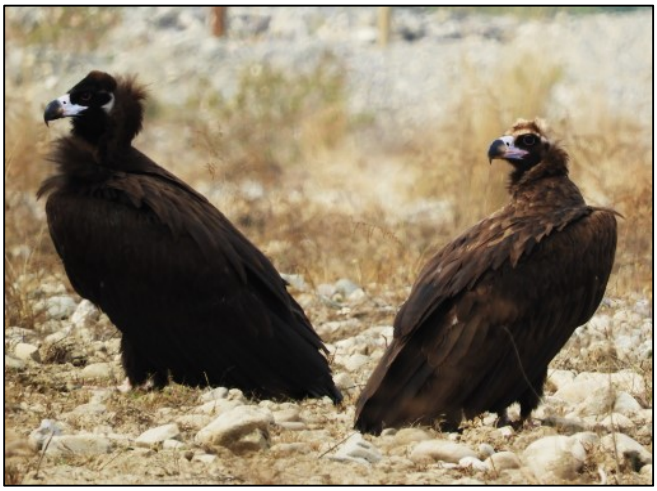

Fig 18: Cinereous vultures in Dehradun

Fig 19: A mix population of vultures in Dehradun

Fig 20: Photographic documentation of some awareness events on vulture conservation in Uttarakhand

A. With village youth in Dunda; B. With BMC members and villagers in Kalsi; C. With students in Almora D. With students in Dehradun; E, F& H. With students in Uttarkashi; G. With students in Haldwani

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