POPULATION STATUS, BREEDING SUCCESS AND CONSERVATION APPROACHES OF VULTURES WITH SPECIAL REFERENCE TO HIMALAYAN GRIFFON (*Gyps himalayensis* HUME, 1969) IN KHODPE, BAITADI, NEPAL

A DISSERTATION SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER'S DEGREE OF SCIENCE IN ZOOLOGY WITH SPECIAL PAPER ECOLOGY

SUBMITTED TO

CENTRAL DEPARTMENT OF ZOOLOGY

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SUBMITTED BY

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2011

RECOMMENDATION

It is my pleasure to mention that **Mr. Dikpal Krishna Karmacharya** has carried out the dissertation entitled **"POPULATION STATUS, BREEDING SUCCESS AND CONSERVATION APPROACHES OF VULTURES WITH SPECIAL REFERENCE TO HIMALAYAN GRIFFON (*Gyps himalayensis* HUME, 1869) IN KHODPE, BAITADI NEPAL"** under my supervision and guidance. This is the candidate's original work, which brings out important findings regarding population status and breeding success essential for conservation of Himalayan Griffon Vultures in the mid hills of far western Nepal. To the best of my knowledge, this dissertation has not been submitted for any other degree in any institutions. I recommend that the dissertation be accepted for the partial fulfillment of the requirements for the **Master's Degree of Science in Zoology** specializing in **Ecology**.

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On the recommendation of supervisor **Dr. Ramesh Shrestha** and Co-supervisor **Dr. Surya Paudel**, this dissertation submitted by **Mr. Dikpal Krishna Karmacharya** entitled **"POPULATION STATUS, BREEDING SUCCESS AND CONSERVATION APPROACHES OF VULTURES WITH SPECIAL REFERENCE TO HIMALAYAN GRIFFON (*Gyps himalayensis* HUME, 1869) IN KHODPE, BAITADI NEPAL"** is approved for examination.

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ACCEPTENCE

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This study entitled **"POPULATION STATUS, BREEDING SUCCESS AND CONSERVATION APPROACHES OF VULTURES WITH SPECIAL REFERENCE TO HIMALAYAN GRIFFON (*Gyps himalayensis* HUME, 1869) IN KHODPE, BAITADI NEPAL"** is original of its kind and has not been submitted anywhere. The findings and statements stated in this dissertation are completely based on my own field works and observations.

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ABSTRACT

Study of population status and breeding success of Himalayan Griffon (*Gyps himalayensis*) was conducted in far western mid hills of Khodpe, Baitadi, Nepal from January 2010 to May 2010. The study was mainly focused on the cliffs with vulture nests near Siddheshwor Temple and also emphasized on the other potential cliffs near Siddhadeep School, Harichan Mod and Ranga Jujuna of Baitadi. Using Jacknife technique the estimated population size of Vultures in study area was found to be 20 individuals for 2010 field season. Among them HGs were estimated to be 12. Other Vulture species include Egyptian Vulture (*Neophron percnopterus*) and Lammergeier (*Gypaetus barbatus*). Altogether 11 occupied nests of HGs were recorded in the cliff near Siddheshwor Temple. Among them 4 were active nests (having eggs) and only 3 nests were productive (fledged chicks). Based on active nests as primary unit the breeding success was found to be 75% while based on occupied nest as primary unit the breeding success was found to be 27% for 2010 field season at Khodpe, Baitadi. Since, ¡ $^{2}_{cal}$ was found to be smaller than ¡ $^{2}_{tab,}$ the null hypothesis was accepted at 5% level of significance and it can be concluded that there was no significant difference in the flock size of Vultures in different months at Khodpe, Baitadi in 2010 field season. 60 % of 63 local respondents in the area bury their livestock carcass for the sanitation purpose and only 17.5% people throw away which could lead to poor availability of food for the Vultures. Due to misconception of Vultures being taken as eagles, these birds are hunted in the area. No veterinary Diclofenac was recorded in agrovet outlets due to the ban of its production and import in Nepal instead only Meloxicam was recorded for sale. Destruction of large cliffs and forests for road construction resulting loss of habitat, excessive use of poisons and pesticides in the agriculture and the climatic change are the possible threats of these birds in the study area. In total, 96 local people were awared about their significance and the conservation messages. This study is the pioneer approach in this area so continuation of the study and establishment of vulture conservation projects are highly recommended which could prove as a boon for conservation of declining vultures.

Key words: Baitadi, Breeding success, Himalayan Griffon Vulture, NSAID, Population size, Meloxicam. Veterinary Diclofenac

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ABBREVIATIONS AND ACRONYMS

BCN	=	Bird Conservation Nepal
BNHS	=	Bombay Natural History Society
DNPWC	=	Department of National Parks and Wildlife Conservation
EG	=	Eurasian Griffon
ENS	=	Environmental News Service
EV	=	Egyptian Vulture
GoN	=	Government of Nepal
HG	=	Himalayan Griffon
IUCN	=	International Union for Conservation of Nature
JTA	=	Junior Technical Assistant
LBV	=	Long-billed Vulture
MoFSC	=	Ministry of Forest and Soil Conservation
NGO	=	Non Governmental Organization
NG	=	Nepal Government
NRs	=	Nepali Rupees
NSAID	=	Non-Steroidal Anti-Inflammatory Drug
NTNC	=	National Trust for Nature Conservation
OWRV	=	Oriental White-rumped Vulture
PAS	=	Protected Area System
RSPB	=	Royal Society for the Protection of Birds
SBV	=	Slender-billed Vulture
UK	=	United Kingdom
VCBC	=	Vulture Conservation Breeding Centre
VDC/s	=	Village Development Committee/s
VSZ	=	Vulture Safe Zone
WWF	=	World Wildlife Fund
ZSL	=	Zoological Society of London

CHAPTER 1: INTRODUCTION

1.1 Background

Vultures are the natural scavengers of the order Falconiformes and large birds of prey of the New World family Cathartidae or of the Old World family Accipitridae that habitually feed on carrion (American Heritage Dictionary 2010). These are found on every continent except Antarctica and Oceania. Although feeding largely on meat (as opposed to insects and small reptiles), these do not generally kill their own prey, which would classify them clearly as a raptor (Wikipedia 2010). A particular characteristic of many Vultures is bald head i.e. devoid of feathers. This is because a feathered head would become spattered with blood and other fluids and thus will be difficult to keep clean when feeding. Physiologically the bare skin areas in Griffon Vultures play an important role in thermo-regulation (Ward et al. 2008). These are the primary consumers of carrion in Asia and Africa, with an individual *Gyps* Vulture consuming around 1 kg of tissue every three days (Mundy et al. 1992).

1.1.1 Vulture Species in Indian Subcontinent

There are nine species of Vultures recorded from Indian subcontinent of which five belongs to the genus *Gyps* (Prakash 1999). Three *Gyps* Vultures, namely the Oriental White-rumped Vulture (OWRV) *Gyps bengalensis*, Long-billed Vulture (LBV) *Gyps indicus* and Slender-billed Vulture (SBV) *Gyps tenuirostris* are residents, and the remaining two, the Eurasian Griffon (EG) *Gyps fulvus* and Himalayan Griffon (HG) *Gyps himalayensis* are largely wintering species (Prakash et al. 2003). OWRV and LBV were abundant across large parts of India until the 1990s. The SBV, which was not distinguished as a separate species from LBV until recently (Rasmussen and Parry 2001), was also locally common in north and north-eastern parts of the Indian subcontinent (Ali and Ripley 1968). During the 1980s, OWRV was thought to be the commonest large bird of prey in the world (Houston 1985). *Gyps* Vulture densities were so high in some areas that they were considered a hazard to aircraft (Grubh et al. 1990).

1.1.2 Vulture Species in Nepal

Nine Vulture species found in the Indian sub-continent all are known to be residents (Ali and Ripley 1968, Grimmett et al. 2000, Rasmussen and Parry 2000). Out of nine,

eight species of Vultures are found in Nepal that includes four species of *Gyps* Vultures i.e. OWRV (*Gyps bengalensis*), SBV (*Gyps tenuirostris*), HG (*Gyps himalayensis*) and EG (*Gyps fulvus*) (BCN 2006). Other Vulture species include Lammergeier (*Gypaetus barbatus*), Egyptian Vulture (EV) *Neophron percnopterus*, Red-headed Vulture (*Sarcogyps calvus*) and Cinerous Vulture (*Aegypius monachus*). The Cinerous Vulture is winter visitor to Nepal. The Long-billed Vulture (*Gyps indicus*), also known as Cliff Vulture may occur in Nepal but there are no confined records yet (Giri and Baral 2001). Long-billed Vulture is considered endemic to India and Pakistan (Rasmussen and Parry 2000).

1.2 Status of Vultures

The population of resident *Gyps* Vultures in the Indian subcontinent have undergone dramatic declines in numbers since the mid 1990s , with declines in excess of 97% for three resident species (OWRV, SBV and LBV now confined in India) (Prakash et al. 2003; Green et al. 2004). In India, numbers of OWRVs have declined by 99.9% from 1992 to 2007 (Prakash et al. 2007). As a consequence, these three *Gyps* Vulture species were listed by the International Union for the Conservation of Nature (IUCN) in 2000 as Critically Endangered (DNPWC/MoFSC/GoN 2009). Recent research in India shows a sharp decline in the population of Red-headed Vultures and Egyptian Vultures (Cuthbert et al. 2006). In 2007, Red-headed Vultures were declined by 91% and Egyptian Vultures were declined by 80% (Vulture Conservation and Breeding Program, 2010). So, these were listed as 'Critically Endangered' and 'Endangered' respectively (IUCN, Vulture Rescue, Birdlife International and The Peregrine Fund 2010). Altogether four species of Vulture i.e. OWRV, LBV, SBV and Red-headed Vulture in Asia are now classified as Critically Endangered and one species i.e. Egyptian Vulture is classified as Endangered (IUCN 2010).

Several surveys on the population status of Vultures and reasons for their sudden decline have been studied by various avian experts. Decline of Vulture populations in India was first recorded at the Keoladeo Ghana National Park, Rajasthan during mid 1980's to mid 1990's, followed by Northern India road counts. Declines have been projected in excess of 97% over a 12 year period in India and 92% in a 3 year period in Pakistan (Virani 2006). Nepal has also experienced similar reductions. A dramatic decline of two species, OWRV (*G. bengalensis)* and SBV (*G. tenuirostris)* was

noticed in Nepal since the mid-1990s, when an estimated >150,000 pairs of OWRVs were known to breed. There are now less than 1000 pairs of the SBVs in Nepal. The current rate of annual decline in Nepal is estimated to be 40% and the rate of decline within a decade is estimated at 90 to 95% (Nepal Country Report 2006).

1.2.1 Probable Cause of the Sudden Decline in Vultures Population

Surveys of regional veterinarians and veterinary drug retailers identified the non-steroidal anti-inflammatory drug (NSAID) Diclofenac (Todd 1988) as a drug that was commonly used, absorbed orally and known to be nephrotoxic (Nys 1983, Murray 1993, Paul-Murphy 2001). Considerable evidence now indicate that the catastrophic Vulture decline has been caused by the NSAID Diclofenac, which is widely used to treat livestock across the Indian sub-continent (Green et al. 2004; Oaks et al. 2004; Shultz et al. 2004). These are exposed to Diclofenac when they feed on carcasses of livestock that have died within a few days of treatment and contain toxic residues of the drug (Oaks et al. 2004). Diclofenac is used for a variety of painful and inflammatory conditions in both veterinary and human medicine. Vultures that consume sufficient tissue from treated carcasses die from the effects of Diclofenac induced kidney failure, with clinical signs of visceral gout (Oaks et al. 2004, Swan et al. 2006a).

Diclofenac is not the only source of Vulture mortality or the only cause of failed nesting attempts, although it is the main, if not the only, cause of the massive decline in populations (Green et al. 2007). Other source of mortality include poisoning through feeding on deliberately poisoned carcasses that are placed out to kill other animals (e.g. dogs, foxes, jackals etc) felling of nesting trees, especially those with active breeding attempts, disturbance and destruction of nests to prevent Vultures nesting above agricultural land and dwellings exclusion from feeding sites through disturbance or alternative carcass disposal methods (burial), and direct persecution and hunting of Vultures either for medicinal purposes (DNPWC/MoFSC/GoN 2009).

1.2.2 Conservation Practices

Ban on veterinary Diclofenac, exchange of Diclofenac with Meloxicam, establishment of captive breeding center, Vulture restaurant and safe feeding centres, Vulture safe zones, monitoring of Vulture colonies in the world and raising

conservation awareness are some strategies to save the Critically Endangered Vultures from the brink of imminent extinction. For awareness on Vulture in this year, BCN has conducted 34 events on Vulture targeting local community, schools and veterinarians in eight districts with the total participation 26,283 individuals (BCN 2009/10). For the conservation of Vulture in long term, India has prepared the 'Action plan for Vulture conservation in India, 2006' and recently in Nepal 'Vulture conservation action plan for Nepal, 2009-2013' has been endorsed with the main objectives to prevent the extinction of Vulture species by ensuring re-introduction, safe food supply, maintenance of suitable habitat and better understanding of the ecological importance of these birds in Nepal (DNPWC/MoFSC/GoN 2009).

1.2.2.1 In-situ Conservation

In-situ conservation and availability of safe food, in combination with conservation advocacy and awareness programs, plays an important role to help ensure that at least some of the small remaining Vulture populations remain extant. Two in-situ measures have been adopted to reduce mortality in the wild: a) the exchange of Diclofenac with alternative save drug the 'Meloxicam' in areas surrounding natural breeding colonies; and b) provision of safe food near the breeding colony areas (DNPWC/MoFSC/GoN 2009)

Nepal is leading in-situ conservation in South Asia through innovative approaches such as community based 'Vulture Restaurants' and the declaration of 'Vulture Safe Zone' (VSZ) The VSZ approach primarily targets to create a safe environment for Vultures, free from the veterinary drug Diclofenac, supported by intensive awareness, advocacy, scientific research and nest site conservation. In Nawalparasi, an extensive Meloxicam for Diclofenac swapping program has led to an estimated 90% reduction in veterinary Diclofenac stocks. On 31st March 2010 at VSZ, Nawalparasi over 52 liters and 13,064 tablets of the veterinary drug Diclofenac were destroyed during 'Diclofenac Destruction Program' (BCN 2009/10). In conjunction with this and an advocacy program targeted for vets, pharmacists and farmers, a Vulture feeding area, or 'Jatayu Restaurant', has been established in close proximity to the breeding colony at Pithauli village, East Nawalparasi. The restaurant acquires old cattle that are no longer fit to work. These cattle are reared with good housing, feeding and veterinary facilities until their natural death, then are used as a source of food for Vultures in the

area (DNPWC/MoFSC/GoN 2009). The Government of Nepal has banned the manufacture and import of veterinary Diclofenac in June 2006 and promoted Meloxicam as a Vulture-safe alternative to Diclofenac. It has been manufactured by few Pharmaceutical Companies in Nepal. The Jatayu restaurant has now been replicated successfully in 6 sites till date in i) Pithauli and Kawasoti VDC of Nawalparasi District, ii) Gaidahwa Lake, Lumbini, Rupandehi District, iii) Lalmatiya VDC of Dang District, iv) Bijauri VDC of Dang,.v) Beli VDC of Kailali District and vi) Ghachok VDC of Kaski District (Paudel 2010).

1.2.2.2 Ex-situ Conservation

Realizing the rapid decline (25-48% per annum) of wild populations (Green et al. 2004) and urgent need to establish breeding centres, Vulture Conservation Breeding Centres (VCBC) were established by the Bombay Natural History Society (BNHS) and Haryana Forest Department at Pinjore, Haryana State, India. Two additional centres have been established at Raja Bhat Khawa (Buxa Tiger Reserve), West Bengal, in 2006, and Rani Forest in Assam State in 2007. These three centres currently hold 226 Vultures of critically endangered species. Actions to establish a VCBC have also been initiated in Pakistan and this centre currently holds around 11 birds. The Department of National Parks and Wildlife Conservation (DNPWC), Nepal, in collaboration with National Trust for Nature Conservation (NTNC), BCN, RSPB and ZSL has established a VCBC at Kasara, Chitwan National Park. The centre currently has two holding aviaries and a breeding aviary that hold twenty-two pair of critically endangered white-rumped Vultures (DNPWC/MoFSC/GoN 2009).

1.2.3 Challenges

1.2.3.1 Use of Diclofenac

Despite the ban on veterinary Diclofenac production in 2006 and other conservation activities, populations of Vultures continue to decline across India, Pakistan and Nepal. Results from field surveys indicate that in 2007 populations of Oriental white-rumped Vultures in India had declined by more than 99.9% in comparison to numbers recorded in 1991-93 (Prakash et al. 2007). Diclofenac is widely used as an effective anti-inflammatory analgesic in human medicine and also known to be used for veterinary purpose. As long as the human use of Diclofenac continues, the possibility of diversion of human Diclofenac formulations to veterinary use is likely to occur.

1.2.3.2 Other Causes

Diclofenac is not the only source of Vulture mortality or the only cause of failed nesting attempts, although it is the main, if not the only, cause of the massive decline in populations (Green et al. 2007). Other sources of mortality include poisoning through feeding on deliberately poisoned carcasses that are placed out to kill other animals (e.g. dogs), destruction of nesting trees, especially those with active breeding attempts, disturbance of nests to prevent Vultures nesting above agricultural land and dwellings, exclusion from feeding sites through disturbance or alternative carcass disposal methods (burial) and direct persecution.

1.2.3.3 Bird flu

In recent years, the outbreak of avian influenza has had a profound effect on the poultry industry. However, its effect and impact on other bird species is largely unknown. Outbreak of avian influenza around captive breeding site could pose a risk to Vulture species as well. Adequate measures need to be adopted to prevent such risk (DNPWC/MoFSC/GoN 2009).

1.2.3.4 Awareness

Superstitious beliefs and lack of awareness on the ecological importance of Vultures as well as their population decline could be a major barrier in successfully implementing the Vulture conservation. Intensive education and awareness campaign for stakeholders ranging from students, farmers to veterinary practitioners and government authorities will help to sensitize them on the plight of Vultures and garner support for Vulture conservation (DNPWC/MoFSC/GoN 2009).

1.2.3.5 Emerging threat from Ketoprofen

The NSAID Ketoprofen, was thought to be safe for vultures for a long time but later it was also found toxic. The only alternative to Diclofenac that should be promoted as safe for Vultures is the NSAID Meloxicam (Naidoo et al. 2009) which is the non-toxic and safety-tested drug.

1.2.4 Significance for Human Well-Being

The ecological, social and cultural significance of Vultures may be summed up as scavenging on animal carcasses of animals and thereby helping keep the environment

clean; and the disposal of dead bodies as per the religious practices of the Parsi community. Vultures are the primary removers of carrion in India and Africa. Removal of a major scavenger from the ecosystem will affect the equilibrium between populations of other scavenging species and/or result in increase in putrefying carcasses. In the absence of carcass disposing mechanisms, Vulture declines may lead to an increase in the number of putrefying animal carcasses in the country side. In some areas the population of feral dogs, being the main scavenging species in the absence of Vultures, has been observed to have increased. Both increases in putrefying carcasses and changes in the scavenger populations have associated disease risks for wildlife, livestock and humans. In the absence of any alternative mode of disposal of animal carcasses, they continue to be disposed off in the open land and with increasing numbers of feral dogs, there is increased risk of spread of rabies, and livestock borne diseases like anthrax (Prakash et al. 2003). The decline in Vultures has also affected the traditional custom of the Parsis of placing their dead in the 'Towers of Silence' for Vultures to feed upon them (Ministry of Environment & Forests, Government of India 2006).

1.3 Ecology of Himalayan Griffon

1.3.1 External Morphology

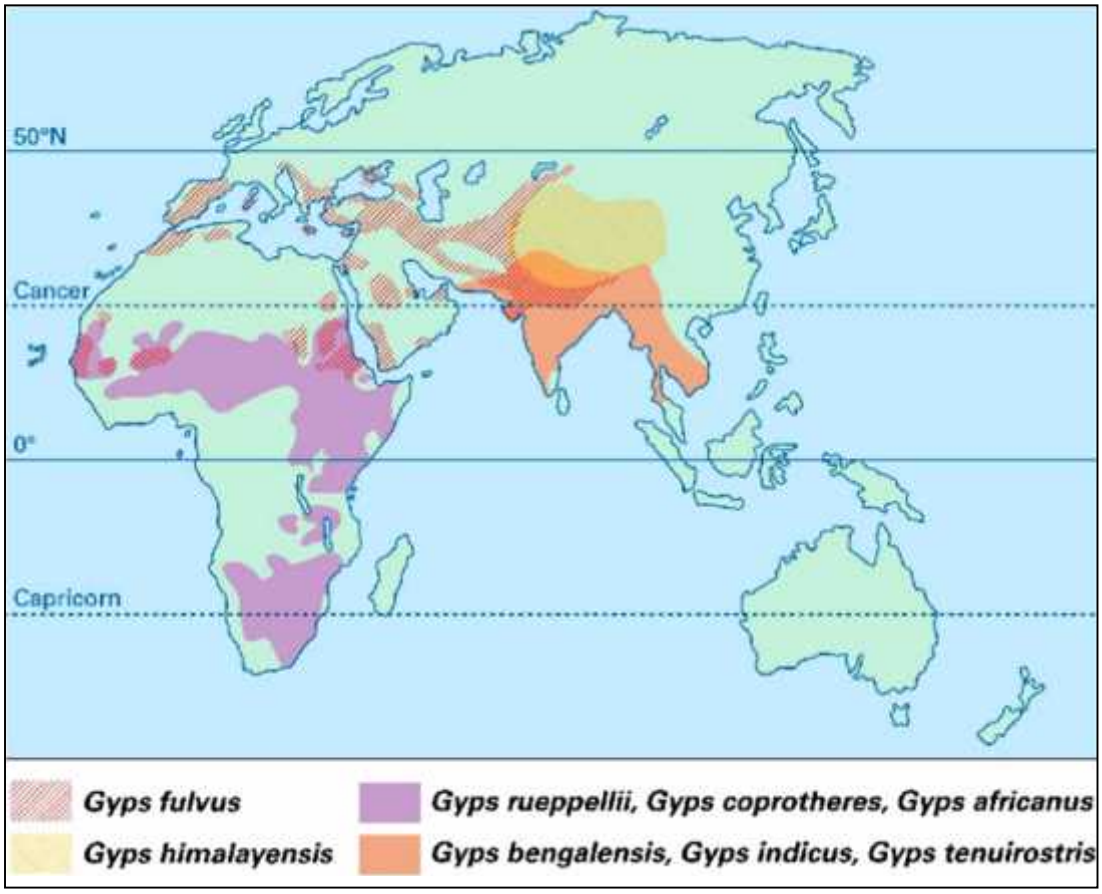
Adult Himalayan Griffons are 103–110cm (41-43inches) long, have a wingspan of 260–289cm (102-114inches) across the wings and weigh 8–12 kg (18-26.4 lbs). They are the second largest Old World Vulture, behind only the Cinereous Vulture in size (BirdLife International 2004). It is a huge pale colored Vulture. Abdomen is pale with the hinder margins of the open wings and tail black. Head and neck down covered, white neck ruff are clearly visible when the bird is squatting. It is the heaviest Nepal breeding Vulture which resembles Eurasian Griffon but more pale white to sandy buff, larger and wider with yellowish beak. Young bird dark and streaked differs from other young Griffons by large size, higher altitude and associated adults (Shrestha 2001).

1.3.2 Status, Distribution and Habitat

This species has an extremely large range, and hence does not approach the thresholds for Vulnerable under the population size criterion (<10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations, or with a

specified population structure). For these reasons the species is evaluated as 'Least Concern' (Birdlife International, 2009 and IUCN 2010).

This species has been recorded from the Indomalayan/Palearctic relams in the high altitude of Central Asian republics and Himalayas from Afghanistan, northern Pakistan, northern India through southern Tibet and Nepal to Bhutan, northern Assam, and central China to Singapore. This species occurs mainly in mountainous portions of the Himalayas, although juveniles winter in lowland portions of the Indian subcontinent. (Global Raptor Information Network 2010). Distribution is normally between 600 to 2500m altitudes, foraging up to 4500m and ever higher (Ali and Ripley 1968).



Map.1. Geographical Distribution of Vulture Species (Source: BCN)

1.3.3 Voice and Calls

It produces grunts, screeches gooses, like clamor and hisses sounds (Shrestha 2001).

1.3.4 Breeding

Season: The breeding season is chiefly January to March or April. **Nest:** Nest is large rough and untidy pad of sticks and rubbish placed on the ledge of a cliff, often inaccessible. **Egg:** Egg is singleton; white, usually unmarked sometimes handsomely blotched with pale reddish to deep reddish brown. Share of the sexes in the nesting chores, and period of incubation, unrecorded (Ali and Ripley 1968).

1.4 Statement of the Problem

Nepal is hilly country. It contains several mountain hill cliffs. These are the habitat of the Himalayan Vultures but still there is dearth of data regarding status and breeding due to lack of regular monitoring. During the road transect survey of Vulture, the staff of BCN found the new colony of Vultures in these areas. It shows there may be presence of many colonies of Vultures in the hilly regions of Nepal. But still have not been recorded. So, there is necessity to assess the regular survey in these areas and make an address to them. Unless a comprehensive study of the population status and existing threats is conducted, no reasonable management recommendation and conservation action plan can be established. There is necessity of regular monitoring to save these majestic scavenging birds from extinction.

1.5 Aims of the Study

- To study the Population Status and Breeding Success of Himalayan Griffon in far western mid hills, Khodpe of Baitadi, Nepal.
- To assess threats and recommend measures for Vulture conservation in the area.
- To survey NSAIDs, current trend on their use and prevailing stocks in the Agro-vet shops of Baitadi and Dadeldhura districts.

1.6 Research Hypothesis

There is significant difference in the flock size of Vultures in different months at Khodpe, Baitadi.

1.7 Importance of the Study

No regular study has been conducted in the far western mid hills of Nepal regarding the status and nesting of Vultures. Lack of information regarding status and distributions may lead to the local extinction of these species. Recent studies

concluded that populations of lowland species have continued to decline and they are now almost absent or extinct from eastern areas of the country as breeding birds. The grave conservation situation is clear for lowland species but research in high altitude areas of Nepal has been lacking.

Nepal holds important breeding populations of the Himalayan Griffon. Currently the Himalayan Griffon is not believed to approach the thresholds for the population decline criterion of the IUCN Red List and is evaluated as 'Least Concern' (Birdlife International, 2009 and IUCN, 2010) and its status has been described as 'common' to 'fairly common' in Nepal (Grimmett et al. 2000, Baral et al. 2002). The effect of Diclofenac on Himalayan Griffon is predicted to be as lethal as on the lowland species of *Gyps* Vultures (Swan et al. 2006a). Since livestock husbandry is an integral part of Nepal's mountain ecosystems there may also be Diclofenac use and contamination of carcasses in high altitude areas of the country. As a consequence, there is an obvious need to monitor the population of Himalayan Griffons and ascertain the use of Diclofenac in the Himalayan regions of Nepal.

Most of the researches were done in the protected area system (PAS), but the problem is that most Vulture colonies lie outside the network of PAS. This research has been conducted outside the protected area which adds the data and is important because of the nesting and breeding habits of Himalayan Vultures.

1.8 Limitation of the Study

i. The study was started from the late December so the pre breeding activities could not be recorded.
ii. No Dead Vultures and carcasses were recorded during the study period to examine medically for the probable cause of mortality.
ii. Steep slope of cliff and environmental complexity like presence of fog in early mornings of winter disturbed the clear visibility of Vultures and their nests through binoculars.

CHAPTER 2: LITERATURE REVIEW

2.1 Himalayan Griffon

Acharya et al. (2009) studied population trends of Himalayan Griffon in the mountainous region of Upper Mustang, Nepal, which is an important breeding area for the species. Vultures were surveyed in 2002, 2004 and 2005 along 188 km of transects, and observing numbers of birds at breeding colonies. The number of birds recorded per day and per kilometre of transect declined by 67% and 70% respectively over the period of study. The numbers of active nests were declined by 84% from 2002 to 2005. The veterinary drug Diclofenac was available in pharmacies in the Mustang region. Young Himalayan Griffons, which migrate to the lowland areas of Nepal and, in increasing numbers to India, are highly likely to be subject to Diclofenac poisoning.

Lu et al. (2009) collected data during 1996 and 2004 to 2007, indicated that Himalayan Griffon is still widespread throughout the Tibetan plateau and has not experienced a major population decline, likely as a result of protection by Tibetan Buddhism and limited disturbances from human activities largely due to the remoteness of the plateau. The continued existence of this scavenger has not only ecological but also cultural implications because of their unique role in the centuries-old sky burial tradition that is followed by nearly 5 million Tibetan people. Estimates based on road transect counts showed that 229,339 Himalayan Griffons (+/- 40,447) occupy the 2.5 million km^2 Tibetan plateaus. Domestic yaks provide about 64% of the Griffons' diet, while wild ungulates and human corpses provide 1% and 2%, respectively. They recommended to establish the modern conservation consciousness among Tibetan Buddhists, to ensure that this abundance continues.

Li and Kasorndorkbua (2008) reported the Himalayan Griffon, a large scavenging raptor previously known to be resident to the Sino-Himalayas and Central Asia, is increasingly being recorded throughout South-East Asia. It now been recorded in six South-East Asian countries and is represented by a total of over 30 documented records, mostly of immature birds. The causes for the increase in sightings are unknown, but has been speculated that climate change, deforestation and hunting,

coupled with natural patterns of post-fledging dispersal and navigational inexperience may be contributing to this change.

Virani et al. (2008) conducted the Himalayan Vultures (*G. himalayensis*) survey in Nepal between 2001and 2006. They found no evidence that their populations are facing the same magnitude of decline or threat as those of the other three species of lowland *Gyps* Vultures. They suggested that Himalayan Vultures may not be experiencing the same degree of Diclofenac poisoning for a number of reasons, including possibly different foraging behaviors by Himalayan Vultures compares to the other *Gyps* Vultures, and/or relative lower use of Diclofenac in the highland regions.

Atkore and Dasgupta (2006) during wildlife assessment program in the western Himalaya, along the Bhagirathi River valley in Uttaranchal on 28 November 2005 recorded the Himalayan Griffon feeding on needles of chir pine *Pinus roxburghii* at about 08:55 hrs, along the monitoring trails between Dhauldhar and Badni villages, having altitude range between 1038–1088 m. The vegetation was mainly chir pine mixed with scrub, with species like *Cordia myxa*, *Lantana camara* and *Carrisa sp*. Since Vultures are known to feed mainly on carrion, they noted this unusual behavior of feeding on vegetative matter probably that helps the bird in procuring nutrient supplement and/or roughage to aid in digestion, as practiced by mammalian carnivores.

Katzner et al. (2004) conducted observations with 10x40 binoculars on 4 August 2002, from several points from the cliff and recorded adjacent nesting by Lammergeier *Gypaetus barbatus* and Himalayan Griffon *Gyps himalayensis* on the Tibetan Plateau, China.

2.2 NSAID

Naidoo et al. (2009) conducted the experiment which demonstrated the Diclofenac, and now Ketoprofen, have been clearly shown to be toxic to *Gyps* Vultures, and carprofen and flunixin are also likely to be toxic. The veterinary use in livestock of these four NSAIDs must be prohibited and/or very strictly regulated in order to

prevent the extinction of *Gyps* Vultures in Asia and potential detrimental impacts to Vulture populations in Africa and Europe.

Taggart et al. (2009) assessed the affect of Diclofenac and evaluated residue prevelances of other NSAIDs. They detected Diclofenac and eight more NSAIDs by liquid chromatography, mass spectrometry methods in 1488 liver samples from carcasses of livestock taken across seven Indian states. Diclofenac was present in 11.1% of samples, Meloxicam (4%), Ibuprofen (0.6%), Ketoprofen (0.5%) and other like Carprofen, Naproxen, Funixin, Nimesulide, Indometacin were also detected. Although Meloxicam is safe for a range of avian scavengers, including *Gyps* Vultures, data regarding the safety of other NSAIDs is currently limited.

Pain et al. (2008) conducted surveys of Diclofenac contamination of domestic ungulate carcasses, combined with Vulture population modelling, which showed that the level of contamination is sufficient for it to be the sole cause of the decline. Testing on Vultures of Meloxicam, an alternative NSAID for livestock treatment, showed that it did not harm them at concentrations likely to be encountered by wild birds and would be a safe replacement for Diclofenac.

Cuthbert et al. (2007) conducted the surveys of veterinarians' and zoos' documents about the treatment of over 870 scavenging birds from 79 species. As well as Diclofenac, carprofen and flunixin were associated with mortality, with deaths observed in 13 and 30% of cases, respectively. Mortality was also found following treatment with ibuprofen and phenylbutazone. NSAID toxicity was reported for raptors, storks, cranes and owls, suggesting that the potential impact of NSAIDs may extend beyond *Gyps* Vultures. In contrast, there were no reported mortalities for the NSAID Meloxicam, which was administered to over 700 birds from 60 species. The relative safety of Meloxicam supports other studies indicating the suitability of this NSAID to replace Diclofenac in Asia.

Gilbert et al. (2007) studied the role of Vulture restaurants in reducing Diclofenac exposure in Asian Vultures with the main aims to determine whether Vulture restaurants are effective in reducing Vulture exposure to Diclofenac and subsequent mortality. The study measured mortality at a colony during breeding and non-

breeding periods. Platform terminal transmitters (PTTs) were used to record the movement of Vultures with global positioning system (GPS) accuracy to determine whether food provisioning is able to modify home-range and foraging behaviour. Their findings indicated that Vulture restaurants can reduce, but not eliminate Vulture mortality through Diclofenac exposure and represent a valuable interim measure in slowing Vulture population decline locally.

Swarup et al. (2007) tested the safety of the NSAID Meloxicam on the oriental white-backed Vulture, long-billed Vulture and a range of other scavenging birds in India (Egyptian Vulture *Neophron percnopterus*, cattle egret *Bubulcus ibis*, house crow *Corvus splendens*, large-billed crow *Corvus machror-hynchos* and common mynah *Acridotheres tristis*). All 31 *Gyps* Vultures and the 20 other scavenging birds given Meloxicam were survived. Feeding behaviour remained normal and there were no significant differences between the treated and control groups in body mass, or the blood haematology and biochemistry parameters monitored, including those known to be affected by Diclofenac.

Green et al. (2006) measured the concentration of Diclofenac in the tissues of treated Indian humped and European cattle (*Bos indicus* and *Bos taurus*) in relation to the interval between dosing and death. Diclofenac concentration, averaged across the carcass, was enough to cause appreciable mortality (> 10% of birds per meal) if wild Vultures were to take a large meal from the carcass of an animal that was given its last dose of the drug within a day or two before death. They recommended that, in ex situ and in situ conservation projects, Vultures should be fed on carcasses of animals that are known not to have been treated with Diclofenac in the week before death.

Swan et al. (2006a) tested the toxicity of Diclofenac to a Eurasian (*Gyps fulvus*) and an African (*Gyps africanus*) species, neither of which is threatened. A dose of 0.8 mg/kg of Diclofenac was highly toxic to both species, indicating that they are at least as sensitive to Diclofenac as *G.bengalensis*. They suggested that Diclofenac is likely to be toxic to all eight *Gyps* species, and that *G. africanus*, which is phylogenetically close to *G. bengalensis*, would be a suitable surrogate for the safety testing of alternative drugs to Diclofenac.

Swan et al. (2006b) conducted safety testing of Meloxicam on the six African white-backed Vulture *Gyps africanus*, which was previously established to be as susceptible to Diclofenac poisoning as the endangered Asian *Gyps* Vultures which were fed tissues from cattle which had been treated with a higher than standard veterinary course of Meloxicam prior to death. All Meloxicam treated birds survived and none suffered any obvious clinical effects. They concluded that Meloxicam is of low toxicity to *Gyps* Vultures and that its use in place of Diclofenac would reduce Vulture mortality substantially in the Indian subcontinent.

Prakash et al. (2005) gave the evidence to support that Diclofenac caused catastrophic Vulture population decline using the results of the recent papers along with the pioneering work in Pakistan, conclusively showed that Diclofenac was responsible for the catastrophic mortality amongst Vultures throughout the Indian subcontinent.

Green et al. (2004) studied the Diclofenac poisoning as a cause of Vulture population decline across the Indian subcontinent. Surveys indicate annual rate of decline of 22-50% for WRV, SBV during 2000-2003 by collection of dead Vulture carcasses, post mortem examinations and Diclofenac analysis.

Oaks et al. (2004) studied Diclofenac residues as the cause of Vulture population decline in Pakistan. Between 2000 to 2003 high annual adult and sub-adult mortality (5-86%) and resulting population declines (34-95%) were associated with renal failure and visceral gout in 16 OWBV colonies in the Kasur, Khanewal and Muzaffargarh-Layyah districts of Pakistan. Diclofenac residues and renal disease reproduced experimentally in OWBVs by direct oral exposure and through feeding Vultures' proposed that residues of veterinary Diclofenac are responsible for the OWBV decline.

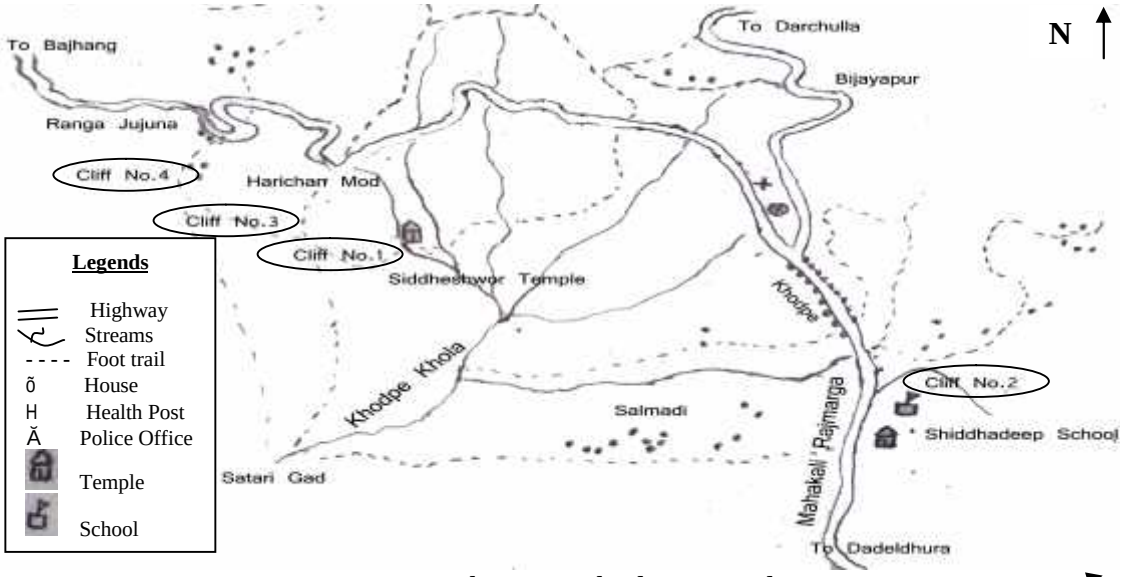
Shultz et al. (2004) showed that a high proportion of *Gyps bengalensis* and *G. indicus* found dead or dying in a much larger area of India and Nepal also have residues of Diclofenac and visceral gout, a post-mortem finding that is strongly associated with Diclofenac contamination in both species. Hence, veterinary use of Diclofenac is the major cause of the rapid Vulture population declines across the subcontinent.

CHAPTER 3: STUDY AREA

3.1 Physical Description

The proposed study was carried out in the cliffs of far western mid hills, 29°25'5.1"N, 80°37'50.7"E to 29°26'29.2"N, 80°36'56.9"E of Khodpe, Siddheshwor VDC, Baitadi, Nepal that is surrounded by Darchulla in North, Bajhang and Doti in East, Dadeldhura in South and Uterpradesh of India in West. It is located at the altitude of 2260m covering 8km long trail and 835km far from the Kathmandu which takes 25.5 hours by bus.

Map of Study area



Map 2. Map showing Khodpe, Baitadi.

Map 3. Map of Nepal Showing Baitadi District.

3.2 Topographic Distribution (Area in Hectars)

Table 1. Topographic Distribution of Baitadi

Physical condition	Agriculture		Pasture	Forest	Other	Total
	Cultivated	Non Cultivated				
High Mountain	0	0	185	0	0	185
Mid Mountain	31,485	19,018	19,014	78,721	255	148,493
Total	31,485	19,018	19,199	78,721	255	148,678

(Source: VDC Profile, 2008)

3.3 Climate

Baitadi district has humid sub-temperate monsoon climate. In summer days are quite hot with the mean maximum temperature of 26.42°C in 2009. The maximum temperature in June 2009 was 33°C. The winter is relatively so cold. The mean minimum temperature recorded in 2009 was 13.55°C. The minimum temperature recorded was 4.9°C in December (Fig. 1).

The monsoon starts from May and reaches peak in August and continues to late October. The mean annual precipitation was estimated to be 129.41mm during 2009. The maximum rain fall was recorded to be 384mm in August 2009 (Fig. 2).

The relative humidity is relatively high. The mean relative humidity during morning is 86.56% and that of during evening is 86.12%. Its maximum value in the morning was found to be 94.8% in August and in the evening was found to be 98.3% in November 2009 (Fig. 3).

Climatic condition of Baitadi

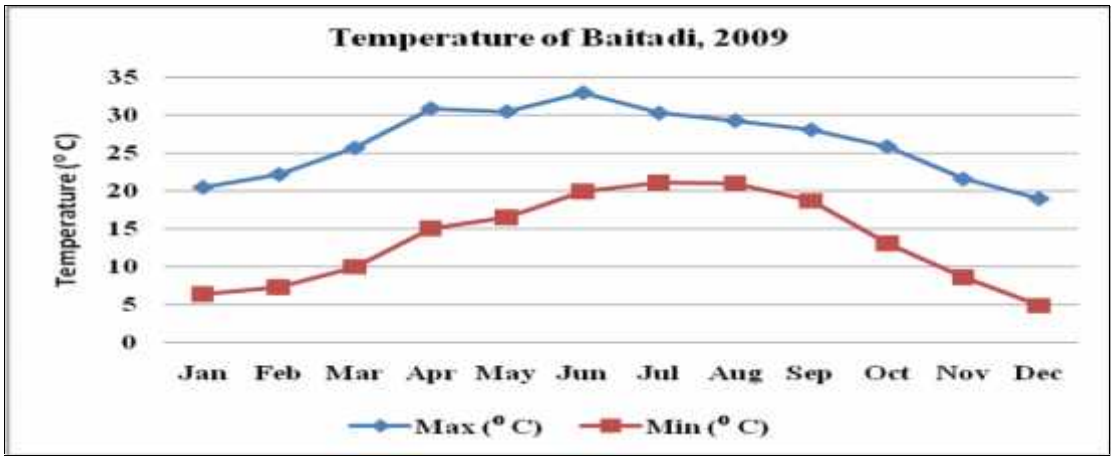


Fig. 1. Monthly maximum and minimum temperature of Baitadi in 2009.

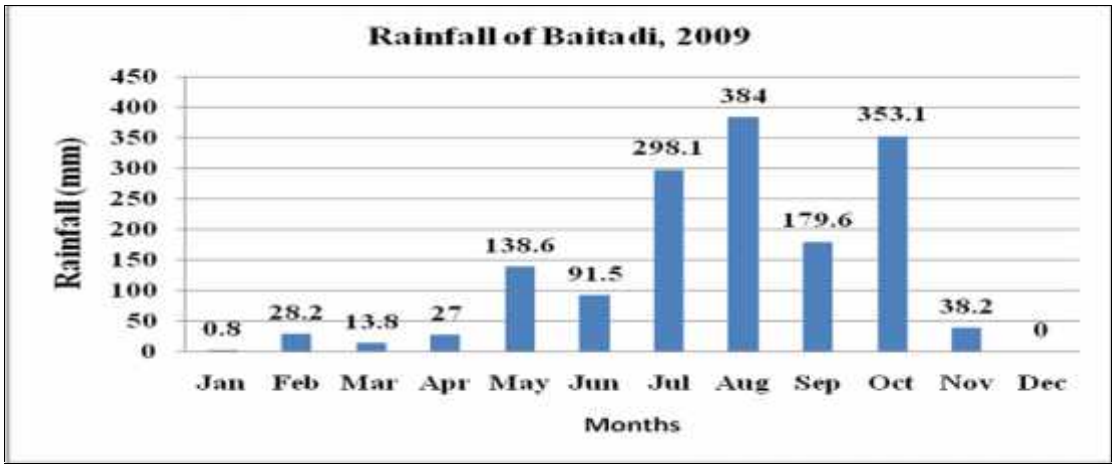


Fig. 2. Monthly rainfall of Baitadi in 2009.

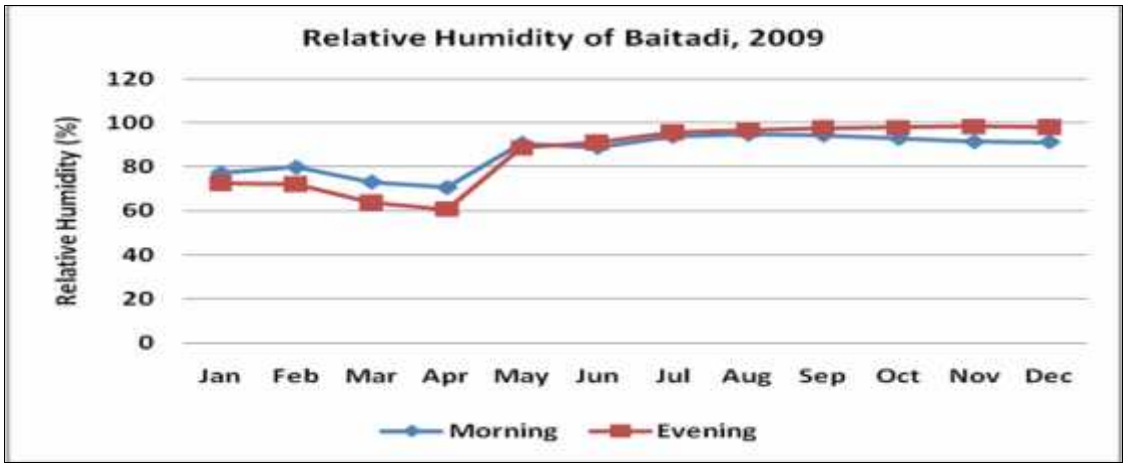


Fig. 3. Monthly relative humidity of Baitadi in 2009.

(Source: Department of Hydrology and Meteorology, NG, 2011).

3.4 Biodiversity

3.4.1 Flora

Khodpe consists of diverse vegetation types comprising subtropical, temperate and sub alpine forest. In the lower altitudes (1000-2000m) subtropical vegetation dominates the landscape. Forest mainly consists of Montane Sal *Shorea robusta*, Pine *Pinus wallichii*, Kafal *Myrica esculenta*, Saj *Terminalia* species and Alder *Alnus nepalensis* (Utis) species. From 1800-3000m temperate type of vegetation dominates the landscape. The forest comprised of lower temperate mixed broad leaved species such as Tej Pat *Cinnamomum tamala etc*. and upper temperate broad leaved species Horse chestnut *Aesculus indica*, Mapple *Acer* species etc. Above 2900m is dominated by sub alpine vegetation such as Fir, Oak *Quercus* species, Birch *Betula* species (Paiyun, Bhoj patra), Lali gurans *Rhododendron* etc.

3.4.2 Fauna

The study area is rich in bird diversity with consists of Himalayan Griffon *Gyps himalensis*, Lammergeier *Gypaetus barbatus*, Egyptian Vulture *Neophron percnopterus*, Red headed Vulture *Sarcogyps calvus*, Cinereous Vulture *Aegypius monachus*, Flycatcher *Muscicapa rubeculoides*, Woodpecker *Picoides* species, Jungle Crow *Corvus* species, Bulbuls. Cuckoo *Cuculus sparverioides*, Black eagles *Ictinaetus malayensis*, Asian koel *Eudynamys scolopacea* etc. A wide variety of butterflies, moths and insects also adds the faunal diversity.

The area is also supported by different species of butterflies, fishes, amphibians, reptiles, birds and mammals. The mammalian species include Wild boar *Sus scrofa cristatus*, Ghoral *Nemorhaedus goral*, Himalayan black bear *Selenaractos thibetanus*, Yellow throated marten *Martes flavigula* (Malsampro), wild dog *Cuon alpinus*, Musk deer *Moschus chrysogaster*, Golden jackal *Canis aureus*, Indian hare *Lepus nigricollis*, Bengal fox *Vulpes bengalensis*, Leopard *Panthera pardus*, Rhesus monkey *Macaca mullata*, Common langur *Semmenopithecus entellus*, Jungle cat *Felis chaus*, Common mongoose *Herpestes edwardsii*, bats etc.

CHAPTER 4: RESEARCH METHODS

Preliminary survey was carried out in the far western midhills of Dadeldhura, Doti, Baitadi and around its vicinity to locate the nesting and roosting sites of Vultures along with the carcass dumping sites. The fieldwork was conducted from the dawn till dusk. The study was concentrated in different cliffs of the Khodpe, Siddheshwor VDC, Baitadi from January 2010 to May 2010.

4.1 Absolute Count

Because the study area is small it is practical to regularly count all nesting and roosting sites, which gives accurate results. Total count of Himalayan Vultures was done in their nesting and roosting sites repeatedly and maximum number obtained was noted. The nesting and roosting sites were identified by thorough survey of the study area. All the roosting and nesting Vultures were monitored in the morning hours (06:00 AM to 10:30 AM, this is the time when they come from their nests for basking the sun and fly in the sky over their nests then they go for searching the food) and in the evening hours (04:00 PM to 06:30 PM, this is the time when they return to their nest and fly in the sky around their nests). Nesting and roosting sites of potential places were also visited during day time.

Since the data were of total counts Jacknife Techniques (cited in Rodgers 1991) were used to estimate population size. The underlying assumption of this method is that with repeated counts theoretically there is the probability of counting all the animals in the area at one time. The method uses the difference between the highest count n_{max} and the second highest count n_{max-1} to calculate N, the estimated total number;

$$N = 2\, n_{max} - n_{max-1}$$

This gives the population size of Himalayan Vultures. Young and adults could not be clearly distinguished, so the age structure of the Vultures' population could not be assessed. The nesting and roosting sites were also thoroughly searched for dead Vultures. Binoculars, telescopes and digital cameras were used wherever necessary.

4.2 Nest Census

In order to study breeding success of Himalayan Vultures, nests were counted and nest occupancy was recorded. According to Postupalsky (1974) an active nest is the one in which eggs had been laid, an occupied nest is the one in which eggs have not been laid but some nest building activity must have taken place. A nest from which a chick fledged is termed as 'successful or productive nest'. The geographic position and crude height of nests on the cliffs were also recorded with the help of GPS**.** Nests monitoring were made every fortnightly to assess the nest status and breeding success.

4.3 Questionnaire Survey

Questionnaire survey was done with the local people from different VDCs around the vicinity of study area to get general information about Vultures, methods of carcass disposal, persecution of Vultures, agricultural practices and conservation attitudes. A form designed by BCN was used for surveying (Annex 7). A general survey of the Agro-vet shops was done and veterinary professionals were questionnaired regarding the status of Diclofenac in the market and the effectiveness of Diclofenac replacement by Meloxicam (Annex 6).

4.4 Community Outreach Education Programs

Community outreach and conversation education programs were launched for the local villagers, school children, staffs and veterinary professionals regarding the role of Vultures in nature. Pamphlets printed by BCN displaying the role of Vultures in nature and save Vulture-the natural scavengers were also distributed to the community people.

4.5 Secondary Data Collection

Different reports and journal papers were searched and incorporated in the report wherever possible, however literatures related to Himalayan Griffon are limited in Nepal perhaps elsewhere in the world. Different experts were contacted to refresh the data and issues on Himalayan Griffon. Different libraries were searched along with the internet browsing.

4.6 Data Analysis

4.6.1 Population Size

The population size of Himalayan Griffon was determined using Jacknife technique (Cited in Rodgers, 1991). This method assumes that with repeated counts theoretically there is the probability of counting all the animals in the area at one time. This method requires at least five repeated absolute counts and uses the difference between the highest count 'n_{max}' and the second highest count 'n_{max-1}', to calculate population size (N).

The estimated total number,

$$N = 2n_{max} - n_{max-1}$$

(at no immigration or emigration)

4.6.2 Breeding Success

Breeding success of Himalayan Griffon was determined using following formula

$$\text{Breeding success} = \frac{\text{Productive Nest}}{\text{Active or Occupied Nest}} X 100\%$$

4.6.3 ¡ ^{2}-test

This is used to test the significant difference in the flock size of Himalayan Vultures in different months. It is given by the formula

$$¡^2 = \sum \frac{(O - E)^2}{E}$$

Where, O= Observed frequency

E= Expected frequency

CHAPTER 5: RESULTS

5.1 Fieldwork Efforts

A total of 23 days were spent in the study area starting from January to May 2010. On average 7 hours were spent in the field per day (Table 2). Repeated surveys were made to estimate population size. One field assistant was hired and trained in January 2010 to monitor nests fortnightly. During the fieldwork local villagers, members of Bhumeshor Community Development Organization (BCDO), Baitadi, and local veterinarians supported a great deal.

Table .2 Summary of fieldwork efforts.

S.N.	Date	Days Spent	Time(hrs)
1.	2nd -14th January	13	91
	16th January	1	7
	30th January	1	7
2.	13th February	1	7
	28th February	1	7
3.	14th March	1	7
	28th March	1	7
4.	12th April	1	7
	25th April	1	7
5.	12th May	1	7
	15th May	1	7
Total	**January-May**	**23**	**161**

5.2 Population Estimate

There were 4 potential cliffs as nesting sites of Vultures in Khodpe of Baitadi. Using Jacknife technique the estimated population size of Vultures in study area was found to be 20 individuals for 2010 field season. Among them Himalayan Griffons (HGs) were estimated to be 12. A minimum of 8 Vultures were recorded in February while a maximum of 17 Vultures were recorded in January. The minimum of 6 HG were recorded in February and March similarly maximum of 11 HG were recorded in April. The average flock size of vultures recorded was 11.2 with Standard deviation

(S.D.) 2.83 and the average flock size of HG recorded were 7.9 with S.D. 1.58 (Table 3 and 4). Vulture individuals and nests were recorded in the cliffs near Siddheshwor Temple while in the cliffs near Siddhadeep School, Harichan Mod and Ranga Jujuna no Vulture but, only old droppings were recorded during observations.

Table 3. Population size of Vultures in Khodpe, Baitadi

	January			February		March		April		May		
Location of cliff	3rd	16th	30th	13th	28th	14th	28th	12th	25th	12th	Average flock size	S.D.
Near Siddheshwor Temple	14	12	17	8	11	9	14	14	9	9	11.7	2.83

5.3 Species of Vultures

During observation three species of Vulture including Himalayan Griffon, Egyptian Vulture and Lammergeier were recorded. Lammergeiers were recorded only in the month of January (Table 4).

Table 4. Species of Vultures in Khodpe, Baitadi

	January			February		March		April		May		
Vulture Species	3rd	16th	30th	13th	28th	14th	28th	12th	25th	12th	Average flock size	S.D.
Himalayan Griffon	8	7	10	6	7	6	9	11	7	8	7.9	1.58
Egyptian Vulture	4	5	6	2	4	3	5	3	2	1	3.5	1.50
Lammergeier	2	0	1	0	0	0	0	0	0	0	0.3	0.64
Total	**14**	**12**	**17**	**8**	**11**	**9**	**14**	**14**	**9**	**9**	**11.7**	**2.83**

5.4 Nest Census

In January, 9 nests were recorded and in February, 2 new nests were observed altogether 11 nests of HG were recorded in the cliff near Siddheshwor Temple**.** In the cliffs near Siddhadeep School, Harichan Mod and Ranga Jujuna no nest but, several new and old droppings were recorded (Annex 1).

5.5 Breeding Success

In 2010 field season a total of 11 occupied nests of HG were recorded in the cliffs near Siddheshwor Temple. In January, 9 including 3 incubating and in February, 2 new including 1 incubating nests were recorded. Among 4 active nests (having eggs) only 3 nests were productive (fledged chicks). The first chicks of HG were observed on 28th February 2010 in 3 nests. Based on active nests as primary unit the breeding success was 75% while based on occupied nest as primary unit the breeding success was 27%. Altogether 8 nests were unsuccessful (Table 5). Out of 8 unsuccessful nests, 7 (i.e. 88%) failed during egg laying and 1 (i.e. 12%) during incubation period.

Table 5. Occupied, active, productive and unproductive nests, and breeding success of HG for the 2010 field season in Khodpe, Baitadi

Location of cliff	**Occupied Nests**	**Active Nests**	**Productive (Successful) Nests**	**Unproductive (Unsuccessful) Nests**	**Breeding Success (Active Nest as Primary Unit)**	**Breeding Success (Occupied Nest as Primary Unit)**
Near Siddheshwor Temple	11	4	3	8	75%	27%

5.6 Carcasses Availability

A total of 3 carcasses were recorded from Ox and Buffalo. Among them 2 were of Ox and 1 was of Buffalo. Ox carcasses were recorded in January and May while Buffalo carcass was recorded in February (Table 6). These carcasses were buried out immediately after their death by local people for sanitation purpose. So these were not available for the Vultures.

Table 6. Carcass records in various months in Khodpe, Baitadi

Sites	January	February	March	April	May	Total
Panighatta	Ox	-	-	-	Ox-	**2**
Ranga Jujuna	-	Buffalo	-	-	-	**1**
Total	**-**	**1**	**-**	**-**	**1**	**3**

5.7 Dead Vultures

No dead Vulture was found during the study period.

5.8 Hypothesis testing

Null hypothesis, H_o: There is no significant difference in the flock size of Vultures in different months at Khodpe, Baitadi.

Alternative hypothesis, H_1: There is significant difference in the flock size of Vultures in different months at Khodpe, Baitadi.

Calculated ¡ ^{2} value (¡ $^2_{cal}$) = 6.908

Tabulated ¡ ^{2} value (¡ $^2_{tab}$) = 16.919 at 5% level of significance for 9 (i.e. 10-1) degree of freedom (d.f.).

(i.e. ¡ $^2_{cal}$ = 6.908< ¡ $^2t_{tab}$ = 16.919)

Since, ¡ $^2_{cal}$ is smaller than ¡ $^2_{tab,}$ the null hypothesis is accepted at 5% level of significance and it is concluded that there is no significant difference in the flock size of Vultures in different months at Khodpe, Baitadi in 2010 field season.

5.9 Questionnaire survey

5.9.1 Questionnaire survey with the local people

5.9.1.1 Characteristics of respondents

A total of 63 respondents close to Vulture colony were questionnaired of which 43 were male (68.25%) and 20 were female (31.75%). The age of the respondents ranged from 17 to 75yrs. The mean age of respondents was 49yrs (Fig. 4).

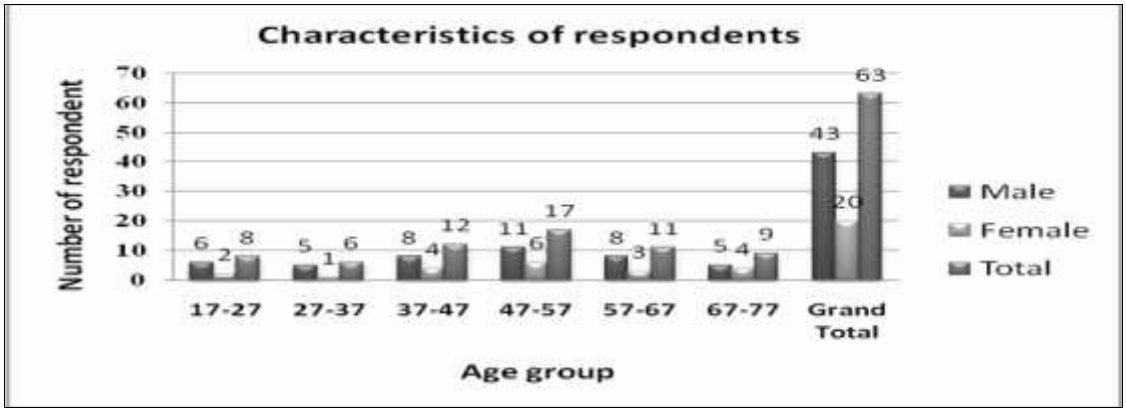


Fig. 4. Characteristics of local respondents.

5.9.1.2 Livestock

Out of the 63 local respondents 46 people (73%) have livestock and 17 people (27%) haven't any. The number of livestock owned by the villagers ranged from 5 to 24, the average number of livestock being 11. Livestock of villagers include cow, ox, buffalo, sheep, goat, pig and rabbit. Among the livestock maximum of 127 (34%) goats, while minimum of 26 (7%) oxen were recorded (Fig. 5). According to the villagers, the number of livestock rearing by the people is decreasing day by day due to shifting in the professions from agriculture to others. This made decrease in the number of carcasses availability to the Vultures.

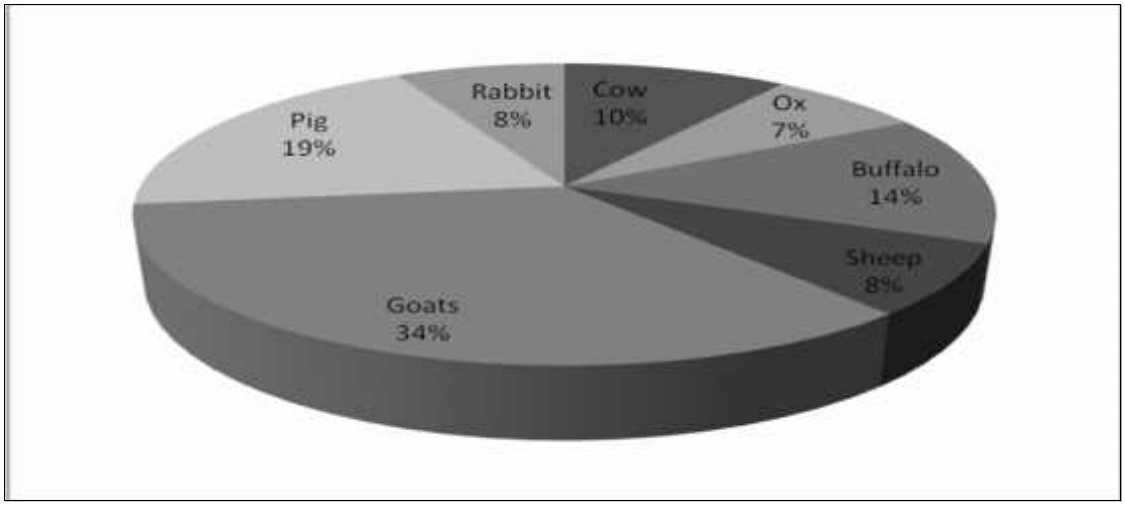


Fig. 5. Livestocks of respondents.

5.9.1.3 Carcass disposal

Majority of respondents 43 people (68.25%) did not use to call the vet when livestock fall ill due to remoteness and use local medicines but 20 respondents (31.75 %) call the vet. When livestock die, majority of the respondents (60%) bury it for the

sanitation purpose, 17.5% throw away, 13% use as food and 9.5% send it to sell for skinning purpose (Fig. 6). Only few people throw the carcass of livestock, it also shows less availability of food for Vultures in the area.

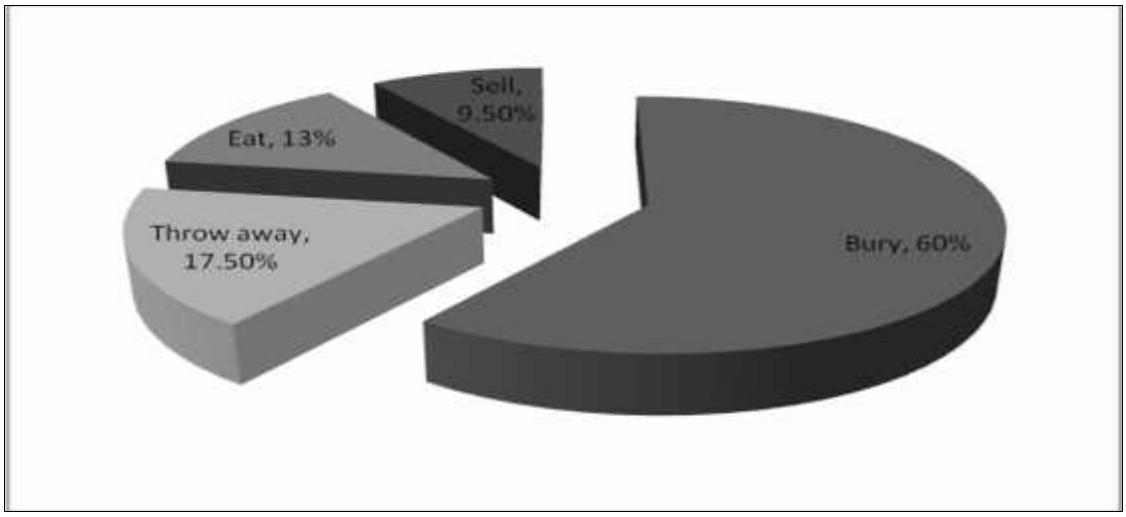


Fig. 6. Different methods for the disposal of carcass.

5.9.1.4 Attitude of local respondents and threats

Among the respondents, 51 people (81%) have seen the Vultures but 12 people (19%) haven't (Fig. 7). 18 people (28.57%) have heard about the hunting of Vultures but 34 people (53.97%) haven't and 11 people (17.46%) have no idea about the hunting of Vultures (Fig. 8). The hunting is due to the miss concept about Vultures, according to them Vulture is similar to the kite and eagle and they prey upon chickens so to protect their chickens they hunt the Vultures. None of them knew about Diclofenac and Meloxicam (Fig. 9). Majority of respondents 41 people (65%) believed that the Himalayan Vultures are declining from the study area but minority of respondents 8 (13%) did not believe on it and 14 people (22%) have no idea about it (Fig. 10). Among 41 respondents who believed in decline in Vultures in the area gave multiple responses about the possible cause of Vulture decline. Majority of them 34 people (83%) agreed with lack of food, 24 people (59%) agreed with habitat destruction, 22 people (54%) agreed with climate change, 12 people (29%) agreed with chemical fertilizers and pesticides while 8 people (20%) agreed with drugs and 8 people (20%) agreed with hunting (Fig. 11).

Among 63 respondents, 24 people (38%) showed positive response towards affect of life style with decline of Vultures, 8 people (13%) showed negative response and 31 people (49%) have no idea about it. Majority of the respondent 47 people (74.60%) agreed with the need of Vulture conservation because of important part of ecosystem, natural scavenger and saves from rabies but 7 people (11.11%) did not agree with the need of its conservation and 9 people (14.29%) have no idea about it (Fig. 12). No respondent has confident about the use of Vulture part for disease treatment but few of them said that the bone and intestine of Vulture is used in traditional medicines. According to local respondents, till date no awareness program was launched in the area by any individual/organization about the conservation of wildlife or birds including Vulture (Fig. 13).

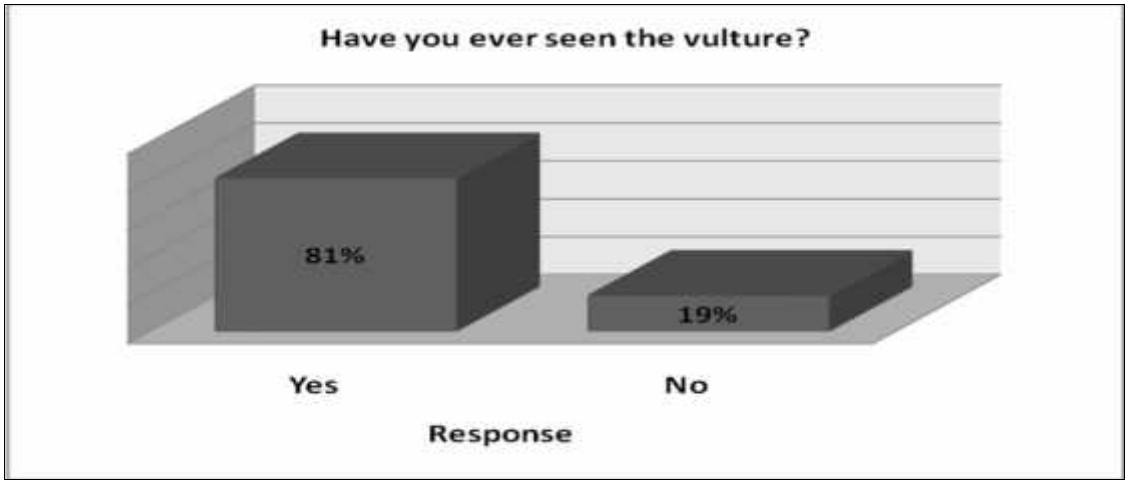


Fig. 7. Respondents that have seen the Vultures.

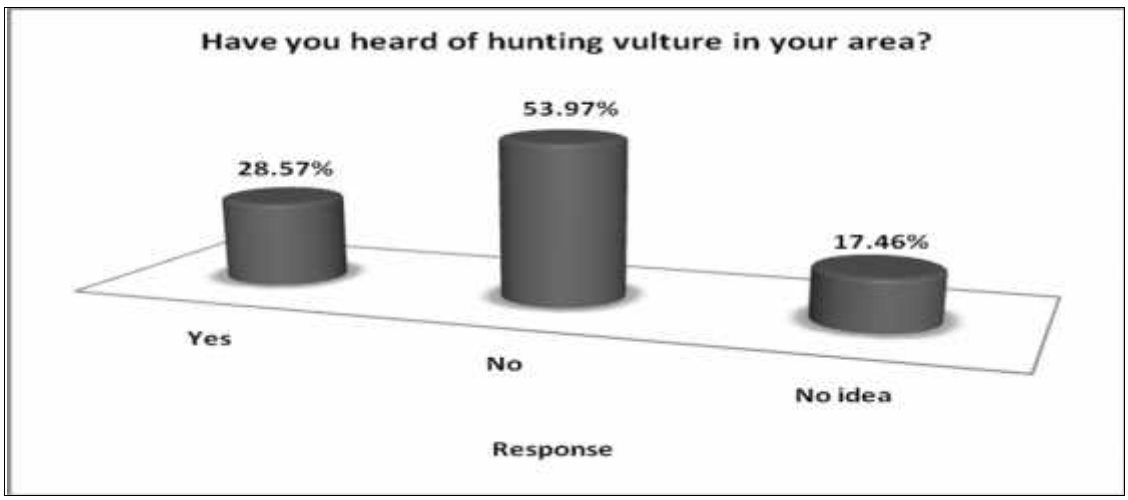


Fig. 8. Respondents that have heard the hunting of Vulture.

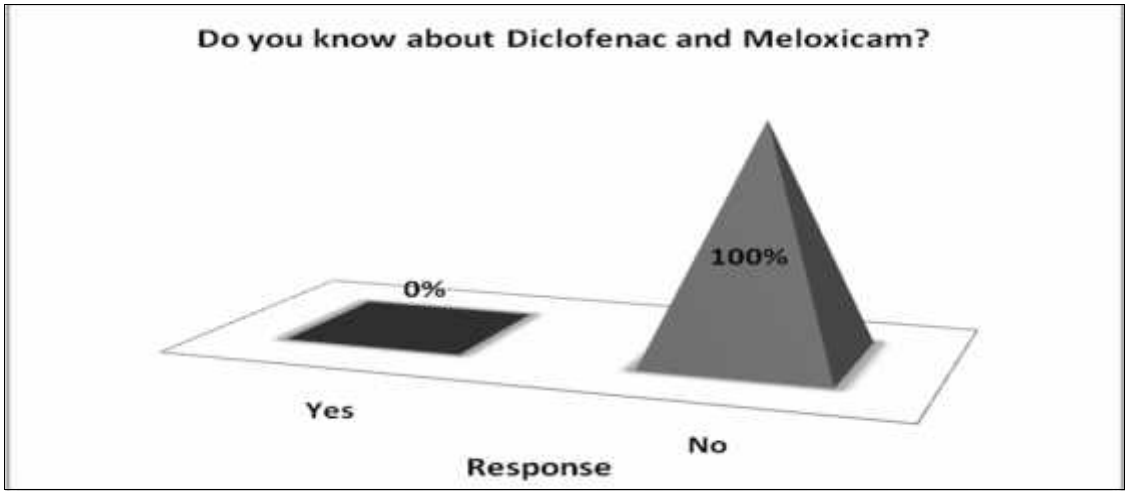


Fig. 9. Respondent's response about Diclofenac and Meloxicam.

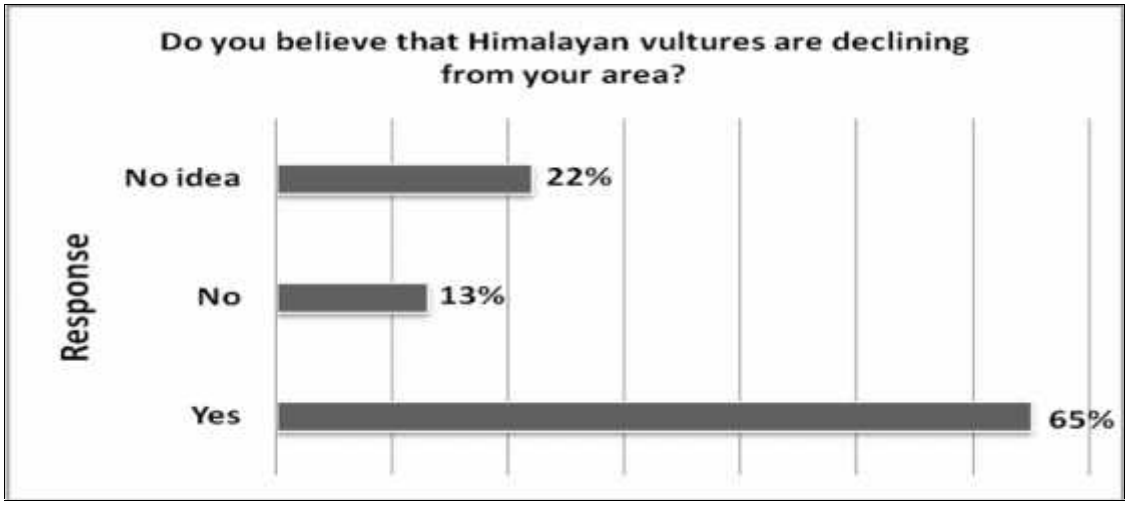


Fig. 10. Response towards decline in Himalayan Vultures.

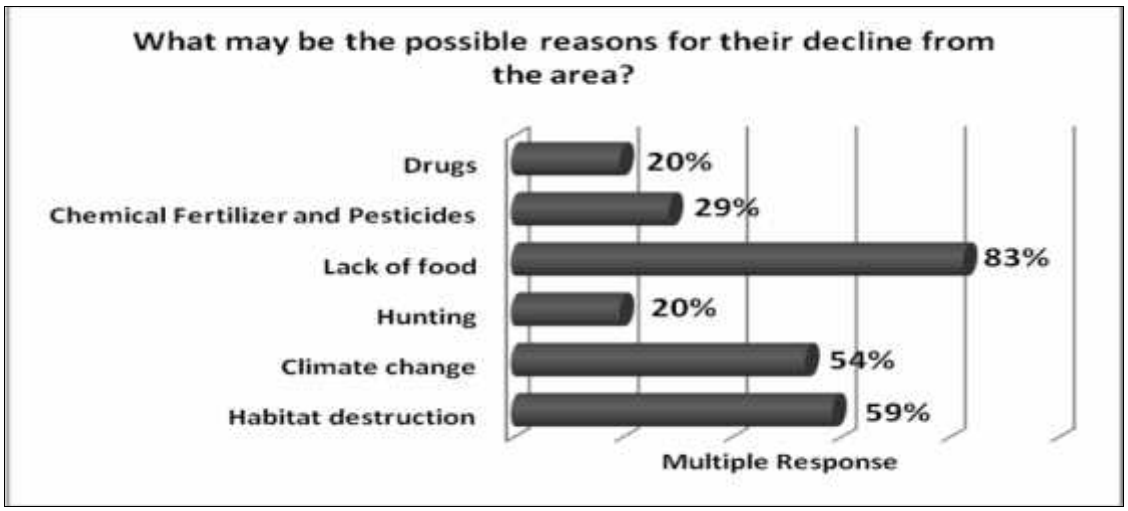


Fig. 11. Response towards possible reason for Vulture decline.

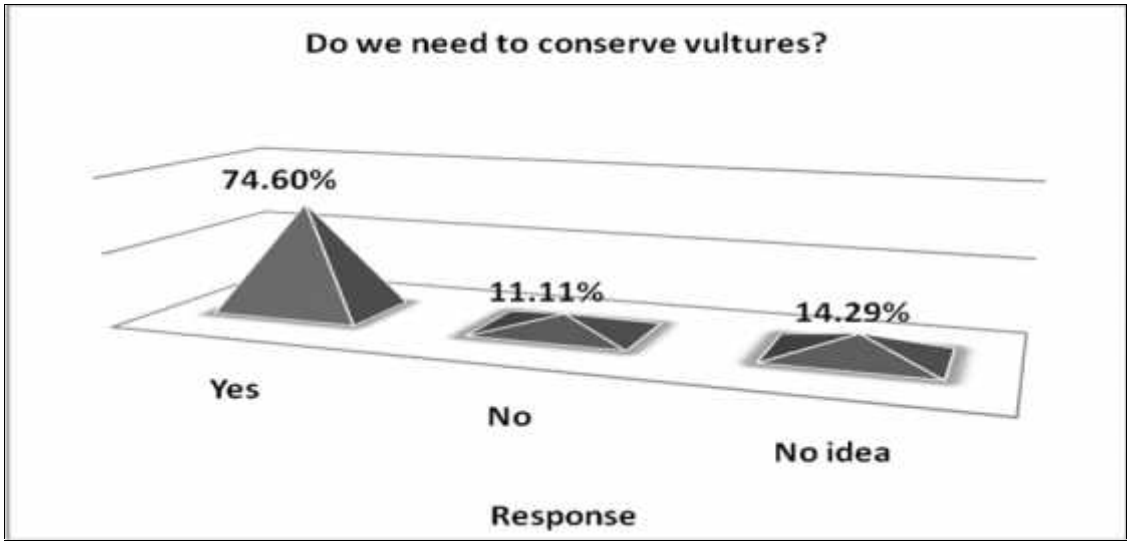


Fig. 12. Response towards need to conserve Vultures.

Fig. 13. Response about previously awareness program.

5.9.2 Questionnaire survey with the agro-vet professionals

A total of 3 agro-vet professionals were interviewed from 3 agro-vets, 1 from Baitadi and 2 from Dadeldhura (Table 7). The objective of the survey was to know the current trend on NSAIDs, their use and prevailing stocks in the Agro-vet shops of Baitadi and Dadeldhura districts and the attitude of Agro-vet professional towards Vultures' conservation. All the respondents were found Junior Technical Assistant (JTA)

Table 7. Distribution of Agro-vets in Baitadi and Dadeldhura

S.N.	Name of agro vet	Place
1.	Kailpal Agro Vet	Khodpe, Baitadi
2.	Laxmi Agro Vet	Bagbazar, Dadeldhura
3.	Saud Agro Vet	Bagbazar, Dadeldhura

5.9.2.1 Prevalence of Diclofenac and Meloxicam

No Diclofenac was recorded in the agro vets of the study area. According to the agro vet professionals of the area, drugs are supplied from Dhangadhi, Kailali which is a Vulture safe zone where Diclofenac is banned so is it not available in the area. Meloxocam was recorded in all the agro vets in the forms of injection and bolus. They are using Meloxicam since from last year only, before that they used to sell Diclofenac as anti inflammatory drug.

5.9.2.2 Attitude on Meloxicam

Agro-vet professionals were supporting the Diclofenac brand because of its low price, and rapid effectiveness then the Meloxicam but they agreed with its effect to Vultures through carcasses. They believed that though expensive and slow effects of Meloxicam it has no side effect as Diclofenac. The difficulties with Meloxicam in comparison to Diclofenac, on the basis of the information given by the Agro-vet professionals are in Table 8.

Table 8. Comparison of Meloxicam with Diclofenac

S.N.	Characters	Meloxicam	Diclofenac
1.	Price	Expensive NRs 10-25/bolus NRs 64-76.8/injection	Not very expensive NRs 5-10/bolus NRs 35-60/injection
2.	Action	It is both anti-inflammatory and anti-pyretic	It is only anti-inflammatory but not anti-pyretic
3.	Effect	Slow	Rapid
4.	Effective Period	1-2 days	4-5hours

5.9.2.3 Attitude of local agro-vet professionals

All of the local agro-vet professionals were agreed with the decline in Vulture population from their areas. They were agreed with the Diclofenac as the main cause of Vulture decline. They were not aware about Vulture conservation before our program. They all were in the favour of need of Vulture conservation.

5.10 Community outreach education programs

I have conducted the community education program in Siddhadeep Primary School, Siddhashor, Khodpe, Baitadi and Janata Secondary School, Aaruwata, Baiadi. 39 primary students with 3 staffs and 48 secondary students with 6 teachers were awared during the programs (Fig. 14). Altogether 96 local people were educated. In the program, introduction and identification of Vulture, their significance, main causes of their decline and need of their conservation were discussed. Beside this the local respondents and the agro vet professionals were also awared informally.

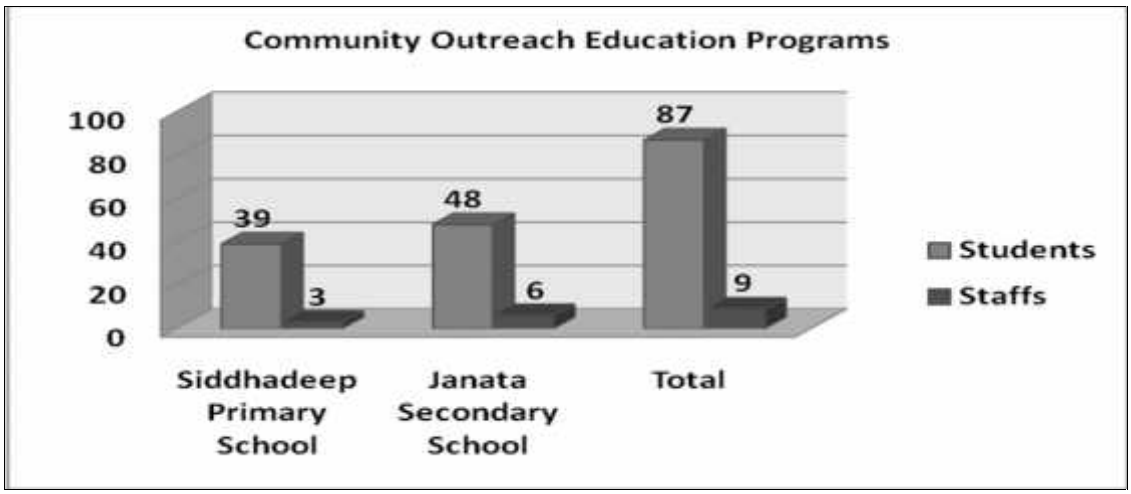


Fig. 14 Community Outreach Education Programs.

CHAPTER 6: DISCUSSION AND CONCLUSION

Most of the studies are concerned with OWRV and SBV. Only very little studies are found regarding HG Vultures to compare my study with them. This is the first intensive study of HG Vultures in mid hills of far western Nepal. This study has set the foundation for the long term study on HG vultures. There is no report of large HG colony in the mid hills of Nepal till date. Most of the HG colonies are recorded from the higher Himalayan regions so this is the first records of large HG Vultures colony in mid hills of Nepal.

6.1 Population status and species of Vulture

On the basis of Jacknife technique the estimated population size of Vulture in Khodpe, Baitadi was 20 individuals among them Himalayan Griffon (HG) was estimated to be 12. The average flock size of Vultures recorded was 11.2 with Standard deviation (S.D.) 2.83 and that of HG recorded were 7.9 with S.D. 1.58 for 2010 field season. The size cannot be considered as small or large and population cannot be concluded as increasing or declining due to lack of previous study in this area but according to locals these are rapidly declining from the area.

Estimates based on road transect counts during 1996 and 2004 to 2007 by Lu et al. showed that 229,339 HGs (+/- 40,447) occupy over the 2.5 million km^2 of Tibetan plateau, indicating that this species has not experienced a major population decline, likely as a result of protection by Tibetan Buddhism and limited disturbances from human activities largely due to the remoteness of the plateau. In contrast, the maximum carrying capacity of the plateau, on the basis of the total biomass of potential food resources, is 507,996 Griffons (Lu et al. 2009).

Acharya et al. recorded 223, 145 and 68 HGs during 2002, 2004 and 2005 respectively in the mountainous region of Upper Mustang, Nepal along 188 km of transects. The number of birds recorded per day and per kilometre of transect were found declined by 67% and 70% respectively over the period of study (Acharya et al. 2009).

Baral et al recorded 15 HG in Koshi and nine in lowland during road transect survey in 2001-2002 survey season Vulture survey carried out in Annapurna Conservation Area, Langtang and Sagarmatha National Parks to assess the population of HG showed the lower numbers of this bird in all these places compared to earlier studies. They recorded. HG number in Annapurna area seemed to have declined starting from late 90s (Baral et al. 2002). Chalise recorded five HG during a study of wildlife and habitat analysis in the Siwalik area of Ilam district (Chalise 1999). Gurung et al. recorded 233 HG over 44 days between 23 October and 5 December, 2003 at Dhikur Phokhari, 10 km south of Annapurna Range (Gurung et al. 2004) and Virani et al. recorded 1307 HG over 109 days from November 2001 to May 2006 in Annapurna conservation area, Mustang. They found no evidence that their population is facing same magnitude of decline or threat as those of the three species of lowland *Gyps* Vultures (Virani et al. 2008).

According to the local people, flock size of HG is bigger in winter than the summer but, since, ¡ $^2_{cal}$ was found to be smaller than ¡ $^2_{tab,}$ the null hypothesis was accepted at 5% level of significance, it can be concluded that there was no significant difference in the flock size of Vultures in different months at Khodpe, Baitadi in 2010 field season. Their assumption may be due to the migratory Vultures.

During the study period only three species of Vulture (Himalayan Griffon, Egyptian Vulture and Lammergeier) were recorded. In the survey conducted by BCN in 2009 recorded above species with Cinereous and Red headed Vulture in the study area.

6.2 Nest Census and Breeding Success

Nine nests in January and two new nests in February were observed altogether 11 nests of HG were recorded in the cliff near Siddheshwor Temple, Khodpe, Baitadi for 2010 field season. Among 11 occupied nests four were active nests (having eggs) and only three nests were productive (fledged chicks)**.** Therefore, the site is an important nesting site of HG. Based on active nests as primary unit the breeding success was 75% indicating the site is favorable breeding site while based on occupied nest as primary unit the breeding success was 27% showing low breeding efficiency of HG Vultures for 2010 field season at Khodpe, Baitadi. The failure of the breeding success

may be due to the age factor as the young does not lay eggs and may be a response to environmental conditions (temperature and humidity) which are less conductive to breeding. Food availability also interferes in egg laying.

Acharya et al. observed 58 and 61 HG nests in caves on vertical cliffs of ACAP in 2004 and 2005 respectively. Increase in the nest is due to the more coverage (recording new nest sites) in 2005 than 2004.They observed eight active nests (14%), 17 occupied nests (29%) and 33 unoccupied nests (57%) in 2004 and nine active nests (15%), 16 occupied nests (26%) and 36 unoccupied nests (59%) in 2005 (Acharya et al. 2009).

No other previous study on breeding success of HG Vulture was recorded to compare with this study.

6.3 Threats

Most of the previous studies show the use of Diclofenac as the main threats for the Vultures. In the study area no Diclofenac was recorded due to the ban of production in Nepal. Most of the people (60%) in the area bury their livestock carcass for the sanitation purpose and only 17.5% people throw away this makes less availability of food for the Vultures. Due to miss concept regarding the Vultures, these birds are hunted in the area. Similarly large cliffs and forests were destroyed for the road construction, which are the habitat of these birds. Beside these, excessive use of poisons and pesticides in the agriculture and the climatic change are the main threats of these birds in the study area.

6.4 Prevalence of Diclofenac and Meloxicam

In Nepal production of veterinary Diclofenac was banned in 2006 and promoted Meloxicam as a Vulture-safe alternative to it. The Diclofenac replaced areas were declared as Vulture safe zone due to this, no Diclofenac was recorded in the agro vets of study area and only Meloxicam was recorded in the forms of injection and bolus indicating the area as ‘Vulture safe zone’.

The survey in the Mustang conducted by Acharya et al. 2009 recorded one general pain killer and anti-inflammatory drug, the NSAID Voviram bolus, which contains Diclofenac sodium as the active ingredient, for the treatment in Jomsom area.

6.5 Breeding behavior

This study was conducted from January 2010. Several nests with eggs were recorded since from the study period so the pre breeding period was missed. According to Ali and Ripley, 1968, the breeding season is chiefly from January to March or April so I started this study from early January. According to Shrestha 2001, Whistler 1986 the breeding season is from December to March. Egg is a singleton, white and unmarked (Shrestha 2001, Whistler 1986, Ali and Ripley 1968) but from my study I have recorded two nests with two eggs in each during early February which was the very rare case in HG. The two eggs may be for the biological insurance. In late February only one chick was emerged from each nest. One egg from each nest having two eggs was dropped by unknown factor, may be by the chick to reduce the biological competition as found in Lammergeier, the bearded Vulture (WWF, 2011).

CHAPTER 7: RECOMMENDATIONS

Though HG is least concerned species, conservation measures should be given equally to protect them and prevent them from being endangered in near future.

Following consideration should be made to conserve the Vultures and prevent from extinction in the area.

1. The regular monitoring of Vulture population and study of breeding success in the area is highly recommended.
2. There is an immediate need to establish Vulture restaurant or carcass dumping sites near Ghatekhola, far from the human resident to provide sufficient food.
3. There might be other potential nesting sites in the nearby area. Efforts should be made to identify those areas.
4. As the area is not in protected area system, separate participatory conservation approach should be develop.
5. Awareness programs should be conducted to local villagers, and Agro-vet professionals regarding the lethal effects of Diclofenac to Vultures and the role of Vultures in the environment.

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ANNEXES

Annex 1. Nest Census in Khodpe, Baitadi for field season 2010.

SN	Location	Cliff No.	Nest No.	Latitude	Longitude	Altitude	Species	State
1	Siddheshwor Temple	1	1	N: 29°26'18.8"	E: 80°37'35.2"	2140m	HG	Incubation
2	Siddheshwor Temple	1	2	*	*	*	HG	Incubation
3	Siddheshwor Temple	1	3	*	*	*	HG	Incubation
4	Siddheshwor Temple	1	4	*	*	*	HG	Resting
5	Siddheshwor Temple	1	5	*	*	*	HG	Resting
6	Siddheshwor Temple	1	6	*	*	*	HG	Resting
7	Siddheshwor Temple	1	7	*	*	*	HG	Resting
8	Siddheshwor Temple	1	8	*	*	*	HG	Resting
9	Siddheshwor Temple	1	9	*	*	*	HG	Resting
10	Siddheshwor Temple	1	10	*	*	*	HG	Incubation
11	Siddheshwor Temple	1	11	*	*	*	HG	Resting
12	Siddhadeep School	2	**	N: 29°26'0.7"	E: 80°38'13.6"	2183m		
13	Harichan Mod	3	**	N: 29°26'29.2"	E: 80°36'56.5"	2070m		
14	Ranga Jujuna	4	**	N: 29°26'50"	E: 80°36'23.9"	1990m		

* All 11 nests were in the same Cliff No. 1.

** No nest but several new and old droppings were recorded.

HG= Himalaya Griffon

Annex 2. Population Monitoring Form Model

Bird Conservation Nepal

Vulture Conservation Program

Population Monitoring Form

S.N.	DATE (Y/M/D)	TIME	SITE NAME	GPS READING	VULTURE SPECIES	NUMBER	STAGE	REMARKS

Annex 3. Nest Monitoring Form Model

Bird Conservation Nepal

Vulture Conservation Program

Nest Monitoring Form

Nest No.: **Observer:** **VDC/ City:**

Vulture Species: **GPS:** **District:**

Cliff/ Tree No.: **N:** **Zone:**

Cliff/Tree Height: **S:**

Nest Height: **Altitude:**

Nest location:

S.N.	DATE (Y/M/D)	TIME	STATE OF MOTHER			STATE OF CHICK	REMARKS
			NESTING	INCUBATING	OTHER		

Annex 4. Carcass Monitoring Form Model

Bird Conservation Nepal

Vulture Conservation Program

Carcass Monitoring Form

S. N.	DATE (Y/M/D)	TIME	LOCATION	GPS READING	TYPE OF CARCASS	NUMBER	VULTURE SPECIES	NUMBER	OTHER SCAVENGERS	REMARKS

Annex 5. Dead Vulture Monitoring Form Model

Bird Conservation Nepal

Vulture Conservation Program

Dead Vulture Monitoring Form

S.N.	DATE (Y/M/D)	TIME	LOCATION	GPS READING	VULTURE SPECIES	TIME SINCE DEATH	REMARKS

Annex 6. Veterinary Survey Form

नेपाल पंछी संरक्षण संघ
गिद्ध संरक्षण कार्यक्रम
भेटेरिनरी सर्वेक्षण फारम

मिति: .....
नाम: .....
पेशा: .....
शिक्षा: .....
सम्पर्क टेलिफोन: .....
पसलको नाम: .....
ठेगाना: .....
गाउँ: .....
जिल्ला: .....
भौगोलिक अवस्थिति: .....

फारम भर्नको लागि सल्लाह

- एउटा भेटेरिनरीको लागि एउटा फारम भर्नुहोस्
- प्रत्येक प्रश्नको उत्तर भर्नुहोस्
- उत्तर क) ख) ग) आदि भएको खण्डमा आफ्नो उत्तरमा गोलो लगाउनुहोस्
- खाली ठाँउ..... दिएको भए आवश्यक जानकारी भर्नुहोस्

१. तपाईं कति वर्ष देखि भेटेरिनरी पेशामा संलग्न हुनुहुन्छ ?

क) १ – ५ वर्ष ख) ५ – १० वर्ष ग) १० वर्ष भन्दा धेरै

२. तपाईं कुन कुन जनावरको उपचार गर्नुहुन्छ ?

क) चौपाया ख) अन्य घरपालुवा ग) दुवै

३. तपाईं कुन कुन चौपायालाई उपचार गर्नुहुन्छ (क्रमैसँग धेरै देखी थोरै तिर सूचीकृत गर्नुहोस्)

.....

४. तपाईं दुखाई कम गर्न प्रायजसो कुन औषधि (NSAID) दिनुहुन्छ ?

क) डाइक्लोफेनेक ख) मेलक्सीक्याम ग) अन्य

यदि अन्य भएमा नाम.....

५. तपाईं कुन औषधि प्रयोग गर्नुहुन्छ ?

क) सुई ख) बोलस ग) दुवै

६. तपाईं दुखाई कम गर्न कुन कुन औषधि (NSAID) कति वर्ष देखि प्रयोग गर्दै आउनु भएको छ ?

१.....क) १–२ वर्ष ख) २–५ वर्ष ग) ५वर्ष भन्दा धेरै

२.....क) १–२ वर्ष ख) २–५ वर्ष ग) ५वर्ष भन्दा धेरै

३.....क) १–२ वर्ष ख) २–५ वर्ष ग) ५वर्ष भन्दा धेरै

४.....क) १–२ वर्ष ख) २–५ वर्ष ग) ५वर्ष भन्दा धेरै

७. तपाईंले गत महिना दुखाई कम गर्ने कुन कुन औषधि (NSAID) को कति कति मात्रा बेच्नु/प्रयोग गर्नुभयो ?

औषधिको नाम १.....क) मात्राको संख्या:..... ख) थाहा छैन

औषधिको नाम २.....क) मात्राको संख्या:..... ख) थाहा छैन

औषधिको नाम ३.....क) मात्राको संख्या:..... ख) थाहा छैन

औषधिको नाम ४.....क) मात्राको संख्या:..... ख) थाहा छैन

८. तपाईंले गिद्धको संख्या घटेको अनुभव गर्नु भएको छ ?

क) घटेको छ ख) घटेको छैन ग) यस बारेमा थाहा छैन

९. यदि घटेको हो भने तपाईं के को आधारमा गिद्धको संख्या घटेको भन्नुहुन्छ ?

.....

१०. के गिद्धको संख्या घट्नु डाईक्लोफेनेकसँग सम्बन्धित छ ?

क) छ ख) छैन ग) थाहा छैन

११. के तपाईंले मेलक्सीक्याम नामको नयाँ औषधिको बारेमा सुन्नु भएको छ ? (यदि नसुनेको भए सिधै प्रश्न १२ मा जानुहोस्)

क) सुनेको छु ख) छैन

११.१ क) यदि सुन्नु भएको छ भने, के तपाईंले मेलक्सीक्याम औषधिप्रयोग गर्नुभएको छ ?

क) छ ख) छैन

११.२ ख) यदि प्रयोग गर्नु भएको छ भने, के तपाईंलाई मेलक्सीक्याम औषधिको प्रभावकारीता राम्रो लाग्यो ?

क) लाग्यो ख) लागेन

ग) यदि लागेन भने किन ?

.....

१२. तपाईंले दुखाई कम गर्ने औषधि (NSAID) कसरी /कहाँबाट प्राप्त गर्नुहुन्छ ?

.....

१३. के तपाईंले गिद्ध र दुखाई कम गर्ने औषधि (NSAID) को बारेमा पहिले पनि अन्तर्वार्ता दिनुभएको छ ?

क) छ.....(कति पटक).....ख) छैन

१४. गिद्ध संरक्षणको लागि कस्ता किसिमको कार्यक्रमहरु प्रभावकार होलान् ?

.....

.....

..... सहयोगको लागि धन्यबाद !

Annex 7.

LOCAL COMMUNITY QUESTIONNAIRE

Your participation in this survey is voluntary. You will not get any direct monetary benefits for participating, nor will you be penalized for not answering some or all of the questions. Any information gathered in this survey will be only used for the purpose of the study. The interview is completely confidential; your name will never be associated with your answers. The purpose of this study is to evaluate local community attitudes to the conservation of vultures.

Name of Respondent:…….
Address: ……Age: ..…Occupation: …….
Name of Facilitator:……

1. Do you have your own livestock? Which one? How many?

Name and Number……
……..

2. Are you agree on the increase of the livestock number in your area?

Yes…….. No……
Why…….

3. Do you call any vet when your livestock become ill?

Yes……. No ……
If not, why……

4. What do you do when your livestock dies?

Bury…… Eat…… Sell…… Throw…….Other please specify…….

5. Have you ever seen the vulture?

Yes……. No ……

6. Have you heard of hunting vulture in your area?

Yes…… No……. No idea…….

7. Do you know about Diclofinac and Meloxicam?

Yes…… No…….

8. Do you believe that Himalayan vultures are declining from your area?

Yes…… No……. No idea…….

9. What may be the possible reasons for their decline from the area?

Climate change……. Habitat destruction..…… Lack of food……. Hunting…… Chemical Fertilizer and Pesticides……..….. Drugs……...

10. Will it affect your life if vulture will decline from your area?

Yes…… No……. No idea…….

11. Do we need to conserve vultures?

Yes…… No……. No idea…….

Why? ……

12. Do we have any benefits from the vulture? Please list them, if agree with statement?

Yes…… No…….

List ……..

13. Are you aware of the use of any part of vulture used for disease treatment?

Yes…… No……

If yes please list them as below,

Part of vulture	For which disease	How do you use?	How effective?
……	…..…….	……..	…….
……	…..…….	……..	…….

14. Have any individuals/organizations tried to aware you to conserve wildlife or birds including vulture?

Yes…… No……...

List the name of individuals/organization……..

Annex 8. In papers

Bird Conservation Nepal
नेपाल पंक्षी संरक्षण संघ

जो जससँग सम्बन्ध छ ।

त्रिभुवन विश्वविद्यालयमा स्नातकोत्तर तह जीव विज्ञान शास्त्रमा अध्ययनरत श्री दिक्पाल कृष्ण कर्माचार्य ज्यू, बैतडी र डडेल्धुरा जिल्लामा गिद्ध सम्बन्धी वैज्ञानिक अध्ययन तथा अनुसन्धान गर्दै हुनुहुन्छ । उहाँलाई यस कार्यमा आवश्यक सहयोग प्रदान गरिदिनुहुन हार्दिक अनुरोध गर्दछु ।

डा. हेम [illegible]
प्रमुख कार्यकारी अधिकृत

Road Transect Survey

Road transect survey was successfully carried out from 11 - 24 May 2010 starting from Narayanghat to Mahendranagar. Also three mountain legs were incorporated reaching Arghakhachi, Baitadi and Salyan. Anand Chaudhary, Bhupal Nepali, Khadananda Paudel, Ishwari Chaudhary and Jatayu scholars were on the survey team. [Source: BCN, Danphe, Vol. 19, PP. 12, 2010]

NEPAL - NEWSLETTER

This project is funded by RSPB and Darwin Initiative and will be implemented in collaboration with a local NGO named EARTH. This brings the total number of vulture safe zones in Nepal to six.

Vulture Conservation and Management Training

This training was provided to develop local resource persons at district and community level. Representatives from district forest office, district livestock service office, Nepal para veterinary and livestock association, department of national parks and wildlife conservation, conservation organizations from ten districts of Nepal along with Jatayu Scholarship winners and new project staff were trained in two trainings held at Butwal and Thakurdwara/Bardiya. The training was supported by CEPF, RSPB, Darwin Initiative, ZSL and NBPT.

27th Annual General Meeting

BCN organised its 27th Annual General Meeting (AGM) in Kathmandu on 19 December, 2009. The AGM was attended by government officials, patrons, advisors, members, supporters of BCN and representatives from various conservation organisations. President of BCN, Mr. Shree Ram Subedi chaired the meeting.

On the occasion, Chief Guest Mr. Gopal Prasad Upadhyay, Director General of the Department of National Parks and Wildlife Conservation, handed over the Jatayu scholarship certificates to three M.Sc. students from the Tribhuvan University. The scholarship carries a purse of 25,000 rupees. The scholarship winners were Dikpal Krishna Karmacharya, Hemanta Dhakal and Krishna Bhusal for undertaking research on the behavioural patterns of vultures, its habitats and the management and

10

गिद्ध संरक्षणको लागि रेष्टुरेण्ट

Source: Tourism Guide, Fortnightly Newspaper, March 1st, 2010 [fortnightly daily ...] ... daily, February ..., 2010 | ... daily ...

Annex 8. Status of Vultures in Indian sub continent

SN	Species	Range Countries	Resident/Migratory	Conservation Status
1	White-rumped vulture	Nep, Ind, Pak, Ban	Resident breeder	Critically Endangered
2	Slender-billed vulture	Nep, Ind, Ban	Resident breeder	Critically Endangered
3	Long-billed vulture	Ind, Pak	Resident breeder	Critically Endangered
4	Himalayan griffon vulture	Nep, Ind, Pak	Resident breeder	Unspecified
5	Eurasian griffon vulture	Nep, Ind, Pak	Winter visitor	Unspecified
6	Red-headed vulture	Nep, Ind	Resident breeder	Critically Endangered
7	Egyptian vulture	Nep, Ind, Pak	Resident breeder	Endangered
8	Cinereous vulture	Nep, Ind, Pak	Winter visitor	Near Threatened
9	Lammergeier	Nep, Ind, Pak	Resident breeder	Least Concerned

(IUCN, 2000 and DNPWC/MoFSC/GoN, 2009)

PHOTO PLATES

Plate No. 1

A: Nesting Sites

B: Nesting cliffs

C: Incubating

D: Incubating

E: HGs in the nests

F: HG with its egg

Plate No. 2

G: Sun basking

H: Homing

I: Lammergeier

J: Nest monitoring

K: Education outreach program

L: Questionnaire with locals

Plate No. 3

M: Silence Tower of Mumbai, pre 1990s.
(Photo: Gautam Narayan)

N: Visceral gout in Vulture.
(Photo: Richard Cuthbert)

O: Millions of vultures in Nepal and India in 1980s..
(Photo: Gautam Narayan)

P: Vultures population in India during pre 1990s
(Photo: Gautam Narayan)


JATAYU Scholarship
Bird Conservation Nepal
This is to certify that
Mr. Dikpal Krishna Karmacharya
has been awarded the Jatayu Scholarship (2009-2010)
to support Masters level research on
vulture conservation in Nepal.
Shree Ram Subedi
President
BCN
Gopal Prasad Upadhyay
Director General
DNPWC
Hum Gurung, PhD.
Chief Executive Officer
BCN
RSPB
DARWIN
JATAYU
Restaurant

Certificate

Students' Conservation Conference and Exhibition

5 - 7 June, 2011

BEST STUDENT PAPER AWARD

FIRST

This certificate is awarded to

Mr./ Ms./ Miss..... Dikpal ....Karmacharya.....

Organized by

National Trust for Nature Conservation

Dr. Siddhartha B. Bajracharya
Executive Officer
NTNC

Judhha Bahadur Gurung
Member Secretary
NTNC

Rt.Hon. Subas Chandra Nembang
Chairman of the Constituent Assembly

ICIMOD

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अब थन्किँदैनन् मास्टर्सका 'थेसिस'

राष्ट्रिय प्रकृति संरक्षण कोषले ललितपुरमा गरेको स्टुडेन्ट कन्जरभेसन कन्फ्रेन्स' मा थेसिस प्रस्तुत गर्दै विद्यार्थी ।

'विद्यार्थीले गरेका उत्कृष्ट सोधपत्र प्रस्तुत गर्ने परिपाटी थालेका छौँ, यसले विद्यार्थीलाई 'एक्सपोजर' दिन्छ'

Source:Nagarik Daily, 8th June 2011 (25th Jestha 2068), Wednesday, page 8