

**STATUS OF HIMALAYAN GRIFFON *Gyps himalayensis* Hume, 1869  
AND ETHNO-VULTURE RELATIONSHIP IN UPPER MUSTANG, NEPAL**

By  
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A thesis report submitted in partial fulfillment of the requirements for the degree of Master of Science in Environmental Management

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## *Certification*

This is to certify that the thesis entitled “**STATUS OF HIMALAYAN GRIFFON *Gyps himalayensis* AND ETHNO-VULTURE RELATIONSHIP IN UPPER MUSTANG, NEPAL.**” Submitted by Mr. Raju Acharya Sharma towards partial fulfillment of Degree of Master of Science in Environmental Management is based on the original research and study under the guidance of Dr. Hem Sagar Baral. The thesis in part or full is the property of School of Environmental Management and Sustainable Development (SchEMS) and should not be used for the purpose of awarding any academic degree in any other institution.

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## Abstract

The main objective of the study was to find out the status of Himalayan Griffon *Gyps himalayensis* and conservation attitude of local inhabitants. The status of Himalayan Griffon based on transect count, nest observation, carcass number and vulture number in funeral sites were thoroughly analyzed. Secondary information and crude data recorded in various studies were analyzed. Different studies carried out in 2002, 2003 and 2006 showed that the number of Himalayan Griffon has been declining in the Upper Mustang, Nepal.

Studies on Himalayan Griffon were conducted for 24, 22, 22 days in 2003, 2004 and 2006 respectively in all the transects. Altogether 333, 235 and 185 Himalayan Griffon (including observed on the carcasses and baiting ) were observed during the study period.

A total of 58 and 61 nests were observed in the caves of vertical cliffs in 2004 and 2006 respectively. In 2006 altogether 9 nests were active, 16 nests were occupied and 36 nests were unoccupied. Similarly in 2004, 8 nests were active, 17 nests were occupied and 33 nests were found unoccupied. Only eight colony sites were identified as nest of Himalayan Griffon in 2002 but were not categorized into active, occupied and unoccupied.

Social surveys in relation to issues of etho-vulture relationship were carried out in the three Village Development Committees (VDCs) out of seven VDCs of the study area. Households of Lomanthang (15 HHs), Charang (14 HHs) and Chunuup (20 HHs) VDC were surveyed and the remaining VDCs i.e. Chuksang, Ghemi, Chosyar, Surkhang were not surveyed. Sample units were selected randomly based on the lottery method.

At least 46 types of veterinary medicines were found to be used in the study area, of which one was found to have Diclofenac (Voviram bolus; Diclofenac Sodium). These medicines are distributed in the area by the district livestock office and different local shops.

Regular monitoring, capacity building of the local people, conservation awareness programmes, information dissemination and testing of Diclofenac in the carcasses of Himalayan Griffon are recommended.

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### **List of Abbreviations/Acronyms**

ACA-	Annapurna Conservation Area
ACAP-	Annapurna Conservation Area Project
CAMC-	Conservation Area Management Committee
CE-	Conservation Education
CITES-	Convention on International Trade in Endangered species of Flora and Fauna
FON -	Friends of Nature
GEF-	Global Environment Facility
HHs-	Households
HG-	Himalayan Griffon
KMTNC-	King Mahendra Trust for Nature conservation
MRMG-	Mountain Resources Management Group
NGO-	Non Governmental Organization
SchEMS-	School of Environmental Management and Sustainable Development
UMBCP-	Upper Mustang Biodiversity conservation Project
UNDP-	United Nations Development Program
VDC-	Village Development Committee
WWF-	World Wide Fund for Nature Conservation



## **Chapter I**

### **Introduction**

#### **1.1 Himalayan Griffon**

The Himalayan Griffon *Gyps himalayensis* is one of the resident species of the Himalayan and Trans-Himalayan range of Nepal (Grimmett *et al.* 2000). This vulture species is distributed in Pakistan, India, Tibet, China, Myanmar (Thiollay 1994) and the northern part of Russia (Del Hoyo *et al.* 1994). Its occurrence has been described as common to fairly common in Nepal (Thiollay 1994; Grimmett *et al.* 2000 and Baral *et al.* 2002). The Himalayan Griffon is considered as a common species in Upper Mustang (Acharya 2003 and 2004; Suwal 2003). The Himalayan Griffon is not considered globally threatened; it falls in the CITES II category (Thiollay 1994).

#### **1.2 Study Area**

Upper Mustang with an area of 2667 km<sup>2</sup>, covers the northern half of Mustang district (Ale 2002). Upper Mustang extends up to Tibet, an autonomous region of the People's Republic of China. It consists of seven Village Development Committees (VDCs) i.e. Chuksang, Ghemi, Charang, Lomanthang, Chosyar, Chunup and Surkahang and contains 33 Buddhist settlements with a population of 6096 (Shah 2001). On the basis of topographical features, bio-climatic condition and floristic composition, the Annapurna Conservation Area (ACA) has been divided into seven Phyto-geographical regions (BCDP 1994). The Upper Mustang Area (i.e. Upper Kaligandaki valley) belongs to the arid, trans-Himalayan zone. The area is known to be rich in globally significant flora and fauna due to steppe habitat (Shah 2001). Trans-Himalayan zone receives an average rainfall of 132 mm. per annum (average of 1988-1992 in Jomsom). This area is drained by Kaligandaki River with numerous tributaries. The people of Upper Mustang practice a combination of livestock farming, agriculture and winter trade. This unique marginal land, lies between the east and west Himalayas; Tibetan Plateau and the Himalayas. The Upper Mustang Biodiversity Conservation Project (UMBCP) is executed by the King Mahendra Trust for Nature Conservation/Annapurna Conservation Area Project (KMTNC/ACAP) through United Nation Development Program/ Global Environment Facility (UNDP/GEF) to restore its ecology and economy through the sustainable use of its biodiversity.



Map of Upper Mustang, Nepal

### 1.3 Background and justification

Of 862 bird species recorded in Nepal, 79 species (9.2%) are “birds of prey” (Grimmett *et al.* 2000, Danphe 2005). The available checklist of birds suggests the occurrence of 134 species in Upper Mustang (Kazi 1977; Kazi 1978 ; Shah 2001; Suwal 2003; Chetri 2004). The available habitats in Mustang support 18 species of birds of prey which is 22.78% of the total birds of prey found in Nepal (Acharya 2003). Large numbers of birds of prey totaling nearly 9000 individuals of about 30 species have been observed during migration period in Khare, south of Annapurna (de Roder 1989). Birds were seen flying east – west south of the main Himalayan chain (Inskipp and Inskipp 2001; de Roder 1989).

After the launch of the ACAP, four scientific ornithological studies have been carried out in this area (Shah 2001; Shah 2002 pers. comm.; Suwal 2003; Acharya, 2004) and Himalayan Griffons have been recorded in all these study periods. Studies describing the total number of observations of the Himalayan Griffon have decreased by 30% within a period of two years in the study area (Acharya 2004). The number of Himalayan Griffon nesting in the Chhosyar area of Upper Mustang have been decreased by 75% and the vultures have disappeared from the cave of Ghemi and Yara. In addition to this, Himalayan Griffons have declined in the lower Kaligandaki valley of ACA between the late 1970s and 1998 and may still be declining (Baral *et al.* 2002b).

Recently Scientists have mentioned that the veterinary drug Diclofenac is the major cause of the decline of lowland vultures in Pakistan, India and Nepal (Oaks *et al.* 2004, Shultz *et al.* 2004). The effects of this drug on Himalayan Griffon is predicted to be as lethal as to the other lowland species of Gyps (Swan *et al.* 2005). Since livestock is an integral part of mountain ecosystems there may also be Diclofenac contamination in the Mustang area. In Mustang district, District Livestock Development Service, Jomsom and three other shops have been distributing veterinary medicines i.e. Albendazole, Algon tablet, Voviram bolus etc. The effect of these drugs and other NSAIDs currently available in Mustang district is not known. In Mustang district, the use of pesticides/insecticides/fungicides started from 1998 and the practice still exists, however ACAP advocates on organic farming. The District Agriculture Development Center has distributed Diesel oil, Dimethoate, Ravistin, Zinc phosphitezon and Diethane -45 in the area. Altogether 5083.3 liters of Diesel and 2.11 metric

tons of pesticides have been distributed in the Mustang district from 1998-2002 (Acharya 2004).

Though Bird Conservation Nepal has been conducting vulture research in lowland but the research is limited in the highlands of Nepal. In this context monitoring of Himalayan Griffon is essential and of utmost importance if we are to use large birds such as these as indicator of Himalayan ecosystem. This study aims to fulfill this gap, and sets baseline data on future work on Himalayan Griffons in this country.

#### **1.4 Research Goal and Questions**

The number of lowland vulture is drastically on decline while the status of highland vultures like Himalayan Griffon is unknown. The overall goal of the study is to discuss and analyze status of Himalayan Griffon and explore ethno-vulture relationship in the area. It is hoped both goals will help to prepare a specific management plan for the species in the future. My research procedures are guided by the following questions:

1. What is the population trend of Himalayan Griffon in the last three years in the study area?
2. How do local people perceive the relationship with vulture in the study area?
3. What are the measures that are to be considered in vulture conservation in the study area?

#### **1.5 Objectives**

##### *1.5.1 General objective*

To find out the status of Himalayan Griffon and ethno-vulture relation in the study area

##### *1.5.2 Specific objectives*

- ⇒ To assess the status of Himalayan Griffon in the study area
- ⇒ To find out the relation and perception of local people with reference to Himalayan Griffon in the study area
- ⇒ To recommend the conservation measures needed for Himalayan Griffon in the study area

## **1.6 Limitations of the study**

Status of Himalayan Griffon was analyzed based on the previous studies. Similarly, locals' perceptions were assessed with the help of random sampling using structural questionnaire. The study and monitoring of Himalayan Griffon covers all VDCs of Upper Mustang however social survey was done in three VDCs (selected randomly). Structural questionnaires were sent to the selected enumerators and were completed by themselves. Form filling techniques were made familiar to the enumerators.

Report is based on three studies (Acharya 2003, 2004, 2006) so that it provides general status and trend of population changes within this period only. Methodology and status are comparable to those areas only which are similar to Upper Mustang. Baiting status is not uniformly distributed within the study area so analysis is not made for it.

Social survey was made in 49 households which represent about 10% of total population. Survey data were analyzed using Microsoft Excel. Financial and technical (not able to analysis social data using SPSS) resources were also the limitations of the study.

## Chapter II

### Literature review

#### 2.1 Literature review

There are eight species in the genus *Gyps*: *Gyps africanus*, *G. coprotheres*, and *G. rueppellii* in Africa; *G. bengalensis*, *G. indicus*, *G. tenuirostris*, *G. himalayensis* in Asia; *G. fulvus* in Europe, Africa, and Asia. The ranges of many of these species overlap, and wintering *G. fulvus* overlap with several resident species in Asia and Africa. *Gyps* species share a similar feeding ecology, scavenging the soft tissues of large mammals, usually ungulates. They tend to be colonial nesters and communal feeders, feeding alongside conspecifics and other vulture species (Pain *et al.* 2003)

Annapurna Conservation Area (ACA) was established in 1986 and executed by the King Mahendra Trust for Nature Conservation (KMTNC). ACA is operated and supported by the Annapurna Conservation Area Project (ACAP). This project focuses on the participatory conservation with grassroot approach. Biogeographically, the Himalayas can be divided into eastern and western section. Kaligandaki valley that divide the Himalayas, runs from north to south of ACA (Baral and Inskipp 2005). The Kaligandaki Valley is a migration corridor for birds. About 40 migratory bird species have been recorded. There are two places (Khare and Upper Kaligandaki) within the ACA which are recognized as globally important site for raptor migration (Zalles and Bildstein 2000).

Mustang is symbolized by Lomanthang, one of the last walled cities in Asia. Of nine endemic butterflies of Nepal, eight species of butterfly come from Mustang area (Yonzon 2001). Out of 28 species of mammals, 13 are listed in different threat categories including rare species like argali (*Ovis amman hodgsoni*), brown bear (*Ursus arctos isabellinus*), Tibetan gazelle (*Procapra picticaudata*) etc. (Shah 2001). Altogether 134 species of birds have been recorded from Mustang (Kazi 1977; Kazi 1978 ; Shah 2001; Suwal 2003;; Acharya 2003, 2004, 2006).

Eight species of vultures have been recorded from Nepal (Grimmett *et al.* 2000). Of these Himalayan Griffon and Lammergeier *Gypaetus barbatus* breed at higher elevation (Gautam *et al.* 2003). Himalayan Griffon inhabits in the Himalayas of Pakistan, Nepal, India and Bhutan.

Its habitat lies mostly in between 1500 -4000 meters above the sea level (Thiollay 1994). The global distribution of the Himalayan Griffon lies along the Himalayan belt.

The vultures help to maintain the sanitation of our villages and towns where we live in. It is vital that we maintain a healthy population of vultures to stop outbreak of epidemics and to keep sound environment around us (Gautam *et al.* 2003). Concurrently vultures especially Himalayan Griffon benefit from the sky burial of human corpse practiced by the local Buddhist community in Mustang (Suwal 2003). So that, Vulture have always been important—ecologically, traditionally and aesthetically (Virani 2002).

Though Himalayan Griffon is not a globally threatened or near-threatened species but recent studies reveal that the species has declined in the ACA between the late 1970s and 1998 and may still be declining (Baral *et al.* 2002). Reasons for the decline are not known. Monitoring of Himalayan Griffon to assess future population changes if any as advocated by Baral *et al.* (2002) would be useful (Inskipp and Inskipp 2003).

Annapurna area is probably the best known stronghold for the Himalayan Griffon with high density (Baral *et al.* 2002b). Distribution of Himalayan Griffon have been found to be distributed all over the Annapurna region however their breeding status have been confirmed in Kaski (Ghandruk VDC), Manang and Mustang district (Shah 2001; Baral *et al.* 2002b; Suwal 2003; Tucker *et al.* 2005; Acharya 2003, 2004, 2006; *Per.* Observation in Manang).

The nesting habitat is varied such as the cliff ledge and abandoned cave in the Mustang area (Suwal 2003; Acharya 2003, 2004, 2006). The cliff ledge above Chuksang is a regular nesting site for Himalayan Griffon and eastern part of Kaligandaki river is also one of the best places for nesting (Suwal 2003, Acharya 2003, 2006).

Status of Himalayan Griffon is unknown in other parts of Nepal but it is suspected that the number has started to decline (Baral *et al.* 2002). Along with the other ornithological study, Himalayan Griffon is being studied. Some Himalayan Griffons descend to the low lands during winter and have been noted feeding together with other vulture species in mixed flocks (Baral *et al.* 2002a; Chaudhary and Pariyar 2004). In one of the observations, 27 Himalayan Griffons with other vulture species including 23 White-rumped Vultures were found feeding in the same carcass near Pokhara (Chaudhary and Pariyar 2004). Possible decline of the

vulture in the lowland may bring yet another crisis in the Gyps species such as the *Gypaetus barbatus* (Baral *et al.* 2002a).

Two species of vulture are declining in the lowlands of Nepal. *Gyps bengalensis*, *Gyps tenuirostris* are supposed to have extinct from Royal Chitwan National Park, once famous as an important breeding area. (Baral *et al.* 2002a and 2002b).

A large flock over 110 of Himalayan Griffon were recorded at a horse carcass above Chungjung in Upper Mustang (Suwal 2003). Upper Mustang is significant place for nesting vultures. Current study shows that number of Himalayan Griffon is decreasing in transect, nest and carcass site (Acharya 2006)



## Chapter III

### Materials and Methodology

#### 3.1 Methodology

##### *3.1.1 Literature review*

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.

##### *3.1.2 Status of Himalayan Griffon*

Status of Himalayan Griffon was analysed with the help of data collected from the previous studies with a comparison to this study (Acharya 2003, 2004, 2006). All the secondary information were used to find out the density within unit area, numbers in the nests (Appendix 1) and on carcasses, to show the change in vulture population in the study area.

**Transect count: Himalayan Griffons** were surveyed along transects, which were the main trail used by the local people. Minimum length of transects covered per day is three Kilometers, which varied depending upon the settlement, altitude, weather etc. Birds observed 500 m on either side of transect were counted. Four transects i.e., north south (Jomsom to Nichung, approximately 89 km in total) and east west (Lomanthang to Samjung and Lomanthang to Yara; approximately 18 and 17 km respectively in total), south –North (Lomanthang to Jomsom approximately 64 km in total) were drawn and observed. Transects were followed and surveyed in the same season and month to make the surveys comparable.

##### *3.1.3 Ethno-Vulture relationship*

Random sampling was used to select three VDCs as sample out of seven VDCs where surveys were carried out previously. Lottery method was used to select the sample area and Lomanthang, Charang and Chunnup VDCs. Sampling frame was indicated by the total Households (HHs) of the study area. Altogether 9.82% households were selected randomly with the help of lottery method. Initially all the households were ranked by numbers (i.e. HH 1, HH 2 and so on) and were mixed together. Later on household numbers were pulled till required number of representation did not fulfill. Total 9.82 % of the population was

determined as sample. Survey was done by mobilizing local enumerators with the help of structural questionnaires. Non structural questionnaires were also used to get information from the area. To do so informal discussions were carried out in the five settlements of the area.

Randomly selected households were surveyed based on the questionnaire used in the Rampur valley of Nepal (Gautam and Baral 2004) with modification (Appendix-3).

#### *3.1.4 Threats and conservation measures*

Discussions with key informants were conducted to determine the threats, ecologically important sites, and management options. Informal discussions were conducted in various places to solicit local community support and to verify the perception obtained from the survey.

#### *3.1.5 Survey at sky burial sites*

The local people carry out sky burial of human corpse in Dhokyno of Lomanthang. The number of Himalayan Griffons was recorded with the help of the people who cut down human bodies into small pieces.

### **3.2 Data analysis**

#### *3.2.1 Descriptive statistics for density calculation*

Descriptive analysis was carried out to represent the collected data for further interpretation. Pooled mean was used to represent the overall status of the species in the area. As the sample sizes were not equal, the data were pooled into the same size on the basis of data obtained during the survey. All sampling plots (sub transect within transect) were converted into a 1 km<sup>2</sup> plot.

#### *3.2.2 Detection rate or encounter rate*

Detection rate or encounter rate of Himalayan Griffon was calculated by summing the total number of recorded bird in transect and then divided by the total number of survey days.

$$\text{Entire detection rate} = \frac{\sum x \text{ (total number of particular species recorded during the trek)}}{\text{sample size (24 or 22 days)}}$$

**Note: 24 days in 2003 and 22 days in 2004 and 2006**

### *3.2.3 Nest observation*

In order to provide an estimate of the total number of birds in the area, active nests was assumed to contain three birds (the male and female of the nest and the chick) and occupied nests that had fresh faeces was assumed to contain two birds (non breeding male and female of the pair).

### *3.2.4 Carcass observation*

Data related to the carcasses were incorporated in transects analysis. Number of birds encountered in the carcass sites were mentioned with their geo spatial reference. Due to variation in the distribution of the carcass point, further analysis was not made.

### *3.2.5 Social survey*

All questionnaires were scrutinized to detect errors and omissions. Before processing, data were stored in Microsoft Excel. Graphs were plotted and later transferred to the word document. Data were analyzed mostly in comparison basis (same response versus different responses)

## **3.3 Assumptions of the study**

Data were collected and analyzed on the basis of following assumptions provided by Bibby *et al.* (1998) and Acharya 2003, 2004 and 2006

- Birds exactly on the route and were all detected.
- Birds don't move before detection.
- Distance is measured accurately.
- Individual birds are counted only once.
- Individual birds are detected independently.
- Transects are representative with respect to bird species and density.
- The numbers of birds found in carcass were from the entire study area.
- Fresh faeces in the nest shows that the nest supports at least one pair of vulture.

### **3.4 Criteria for the active, occupied and unoccupied nests**

An occupied nest was referred to as the one which has at least fresh dropping on its rim or underneath (Postupalsky 1974), which occurred with whitish color in case of Himalayan Griffon however unoccupied nest was referred to as one with old dropping on its rim or underneath which occurred with light whitish or brown. Occupied nests were assumed to support at least one pair of vulture. Active nest was referred to as a nest where young was being raised or occurrence of egg at the time of study.

## Chapter IV

### Results and discussions

#### 4.1 Results

##### *4.1.1 General status*

Himalayan Griffon was surveyed for 24, 22, 22 days in 2003, 2004 and 2006 respectively in all transects. Altogether 333, 235 and 185 Himalayan Griffons (including vultures attending carcass and those who came to baiting) were observed during the total trek. Birds detected in the transects, nests, carcasses, and baitings were recorded.

##### *4.1.2 Nest status*

Nests of Himalayan Griffon were observed during the survey. New nesting sites of Himalayan Griffon were observed in Chungshi and Samjung area in 2005 (Acharya 2006). These nesting sites were found to be active and chicks were being raised by Himalayan Griffon pair. Chungshi is the new site whereas Samjung was previously visited area. Nest of Himalayan Griffon were seen in abandoned cave (whitest at the edge and below the cave made it identifiable from a considerable distance) due to deposited faeces materials at rim and underneath the cave. Those nests were abandoned. Nesting materials were not used by Himalayan Griffon in the study area. A total of 58 in 2004 and 61 Himalayan Griffon nests in 2006 were observed in the caves in the cliffs. Increase in the nest is due to the more coverage (recording new nest sites) in 2006 than 2004. In 2006 altogether 9 nests were active, 16 nests were occupied (showing signs of fresh faeces) and 36 nests were deserted. Similarly in 2004, 8 nests were active, 17 nests were occupied (showing signs of fresh faeces) and 33 nests were found deserted. Only eight colony sites were identified as nests of Himalayan Griffon in 2002 (Acharya 2003) but were not categorized i.e. active, occupied and unoccupied.



Nest of Himalayan Griffon in a cave near Chosyar

#### 4.1.3 Density

In 2002 (Acharya 2003), average detection of Himalayan Griffon was 14.48 per day and density along transect was estimated as 0.779/km<sup>2</sup>. In 2004 (Acharya 2004), average detection was 11.75 per day and density along with transect was estimated as 0.26/km<sup>2</sup>. Similarly in 2005(Acharya 2006) Average detection of Himalayan Griffon was 8.41 per day and density along transect was estimated as 0.052/km<sup>2</sup>.

#### 4.1.4 Griffon Population at nest

For the Himalayan Griffon, a total of 9 active nests was found each of which contained a breeding pair and a chick, and a further 16 occupied nests were found which showed sign of fresh faeces. Assuming that nests with fresh faeces contained a pair (see method and data analysis), then the total population is estimated to be 50 adult Himalayan Griffons and nine chicks in 2005 (Acharya 2006). By using same methods total population of Himalayan Griffon in 2004 (Acharya 2004) was estimated about 50 adults and eight chicks. Insufficient information in 2003 led to the difficulties in population estimate.

#### 4.1.5 Carcass observation

Only a single carcass of a mule was located near the Chungjung area where 110 Himalayan Griffons were recorded in 2002 (Acharya 2003). However in 2004 (Acharya 2004) a total of 3 carcass sites were visited and the numbers were recorded. Similarly a single mule carcass was located near Samar village in 2005 (Acharya 2006). At that period a total of 35 Himalayan Griffon was found near the carcass and three Lammergeiers were seen soaring above the carcass.

Study year	Reporting period	Type of carcass	Habitat	State of carcass	Vulture at carcass	Human Traffic	Other scavengers	GPS records
Aug-Sep 2002	Acharya 2003	Mule	Pasture near Chungjung	Fresh and whole body was there	110	Medium	Dog	N 29°11'47.1'' E 083°56'43.5''
July-Aug 2004	Acharya 2004	Mule	Pasture near Jahite	Trace amount of bone and head	8	Moderate	Red Fox	N 29°01'55.6'' E 083°50'30.3''
		Cat	Near Thigar	Fresh	8	High	No	N 29°11'47.1'' E 083°56'43.5''
		Mule	Syangbochen	One day old	12	High	-	Per. Comm. Madhu Chetri
Aug-Sep 2005	Acharya 2006	Mule	Pasture near Samar	Trace amount of bone, meat and head	35 (Soaring and sitting)	High	Dog	N 28°57'33.6'' E 083°48'04.8''

**Table 1: Details of the observed carcasses and numbers of vultures attending it**

#### 4.1.6 Baiting

Mustang is famous for its sky burial culture and Himalayan Griffon is the major component of such traditional activities. Data was collected only from the Lomanthang area; however there were 33 settlements in the area where such ritual was adopted. The area where native people performed such activities baiting was permitted in 2004 (Acharya 2004) however it was not permitted in 2005 (Acharya 2006). So a new site, six meters below from the funeral site, was selected for baiting. In 2005 (Acharya 2006), a female goat was baited in the area and processes were followed as followed by local people only for human cadaver. The entire process was completed after three hours however it took only 30 minutes in 2004 (Acharya 2004). Numbers of vultures in baiting and funerals activities are mentioned here;

Type of Bait	Sex	Himalayan Griffon	Golden Eagle	Lammergeier	Date	Remarks
Human	F	54	2	-	Feb, 2004	Data collected by corpse piece maker
Human	M	65	2	-	Oct, 2003	“ “
Human	M	58	-	-	Feb, 2004	“ “
Human	M	60	-	-	March, 2004	“ “
Human	M	70		-	Feb 2005	
Goat (Bait)	F	62	2	-	2 <sup>nd</sup> July, 2004	N 29° 10' 57.6" (3733m.) E 083° 58' 17.3"
Goat ( Bait)	F	82	-	3	14 <sup>th</sup> Sep, 2005	N 29° 10' 57.6" (3733m.) E 083° 58' 17.3"

**Table 2: Details of the baits and funeral sites**

#### 4.1.7 Hunting and Snaring

Local people have reported raiding of agricultural crops by the Himalayan Marmot *Marmota bobak*. For the diminution of such loss, Mountain Resources Management Group (MRMG) has encouraged local people to kill them. Due to the political conflict in the country, lots of outsiders from other district work in Upper Mustang. They were involved in killing such mammals, Chukar Partridge *Alectoris chukar*, and other prey species. The team suspects few high level personnel are involved in hunting and also act as illegal traders to send wildlife body parts from Mustang to Tibet. The team had recorded illegal trades of Yarsa Gunpa *Cordyceps sinensis* to Tibet, which they had bought from Manang and Dolpa districts. There is high demand of such products in China for which Nepal continues to be a major trading route.

On 18 May 2002, the Nepal Army in Mustang seized 22 skins of common leopard (*Panthera pardus*) heading to Tibet via Lomanthang. The data reveals that there were several other seizures of leopard skins in the last five years in the mid-hills including Annapurna Conservation Area (Aryal 2003). These data indicate that hunting and snaring are still common in Upper Mustang. Such activities might have cyclic effects on the Himalayan Griffon as it lies on the top of the food chain.

#### 4.1.8 Pesticides/insecticides/fungicides

The use of pesticides, insecticides, and herbicides in Mustang district started in 1998 and the practice still exists. District Agriculture Development Center has distributed Diesel oil, Dimethoate, Ravistin, Zinc phosphitezon and Diethane -45 in the area. Altogether 5623.3 liters and 2.57 metric tons of pesticides/insecticides and fungicides were distributed in the Mustang district (1998-2004) (see detail below). There are four shops that provide medicines for the livestock. The team was able to record 46 types of vet medicine which they sell in the village. However, only one type of veterinary medicine does contain Diclofenac. In the name of agriculture production MRMG has been distributing pesticides. They were found unaware about the effect of such pesticides which ultimately affects the vulture through their prey species. Local people are using trace amount of pesticides in their vegetables and horticulture field.

Name of the pesticides and herbicides	Year	Liquid (Liter.)	Powder (Metric ton)	Remarks
Diesel oil (scale insecticide, probably use for apple farming) Dimethoate(insecticide) Ravistin (fungicide) Zinc phosphitezon (fertilizer) Diethane -45 (fungicide)	1998	1500	0.72	Use of pesticides, insecticides and fungicides started from 1998 in Mustang
	1999	540	0.46	
	2000	765	0.34	
	2001	839.3	0.29	
	2002	540	0.05	
	2003	899	0.25	
	2004	540	0.46	
	Total	5623.3	2.57	

**Table 3: Use of pesticides in Mustang District**

Source: District Agriculture Development Center and District livestock Development Center, Jomsom, Mustang



Supplier	Address	Annual transaction in Nrs	Types of medicines
Jomsom Agro-vet	Jomsom	20000	See appendix 5
Syang Medicine shop	Syang	18000	
Kobbhang Medicine shop	Kowang	15000	
District livestock service center	Jomsom		

**Table 4: Suppliers of veterinary medicines in Mustang**

Source: District Agriculture Development Center and District livestock Development Center, Jomsom, Mustang

#### 4.1.9 Social survey

##### 4.1.9.1 Structural questionnaire

Social surveys in relation to issues of etho-vulture relationship were carried out in the three Village Development Committees (VDCs) of the study area out of seven VDCs. Lomanthang (15 HHs), Charang (14 HHs) and Chunuup (20 HHs) VDC were surveyed and remaining VDC i.e. Chuksang, Ghemi, Chosyar, Surkhang were not. Sample units were selected randomly based on the lottery method. Altogether 49 households representing male (83.33%) and female (16.67%) were interviewed based on the structural questionnaire. Average family size was 6.25 members in each household were found.

VDC	Total Population	Total household	Sample size HHs	Sample representation (%)
Lomanthang	753	160	15	9.38
Charang	661	142	14	9.86
Chunnup	1070	197	20	10.15
Total	2484	499	49	9.82

**Table 5: Details of the population and sample size**

Source: KMTNC/ACAP, Jomsom

Local people identified the four species of vulture found in their area. Out of them 17 respondents (34.69%) identified one species, 13 respondents (26.53%) identified two species, 3 respondents (6.12 %) identified three species and 15 respondents (30.61%) identified four species of vultures in the study area. 46 respondents (93.88%) disagreed with the statement that vulture have diminished from the study area, however three respondent (6.12%) agreed with the statement. Three respondents believed colorful species (locally known as Jhyarnyung) bigger than vulture used to occur once in Mustang area but is extinct now.

Majority of respondents (83.67 %) did not believe that the number Himalayan Griffon has declined from the study area but minority of respondents (16.33%) believed on it. Out of them two respondents (4.08%) strongly agree, seven respondents (14.28%) agree, five respondents (10.20%) don't know, 32 respondents (65.31%) disagree and three respondents (6.12%) strongly disagree that Himalayan Griffon are on decline from the study area. 11.11% of respondent indicate disease, pesticide and immature death are the reasons behind the decline, however majority of respondents (66.67%) did not have any idea of the decline of Himalayan Griffon from the area.

Twelve (12) abandoned nests were identified by the respondents. Of which, five were situated in Lomanthang, four in Charang and rest of other in the Chunnup VDC.

Name	Location	Distance from the village (km)
Lomanthang	Chojung	3
	Samjung	3
	Lomanthang	0.5
	Nyanul cave	0.5
Charang	Chuku Dhokyo	1.5
	Chongwalla	1
	Chimikama	1
	Syanghah	
Chunuup	Charkyo	1
	Dilinn Khola	0.5
	Roholungh Khola	0.5
	Nyulen Khola	0.5

**Table 6: Abandoned nests of Himalayan Griffon observed in the area**

Majority of respondents (81.63%) did not see any dead vulture in their life time whereas 18.37% respondents had seen dead vulture in their life time. Maximum of two dead vultures were detected and two vultures were killed by local youths while vultures fed on carcasses. Respondents expressed (63.26%) that vultures have benefited to them while minority of respondents (36.73%) did not opined any benefits from the vulture conservation. Out of them 32.65 % respondents strongly agree, 32.65 respondent agree, 12.24 % of respondent din't know, 22.45% respondent disagree and 0% respondent strongly disagree with the statement that any loss in the vulture's population will affect the human population in the area. Vultures are found to have benefits to the area. Cultural and ecological benefit was indicated by the respondents. 16 respondents (32.65%) argued that vultures enjoy the sky burial process, 10

respondents ( 20.41%) argued it has religious value and rest of others (46.94%) argued it maintains the environment by cleaning the carcasses of livestock.

35 (71.43%) respondents did not use the pesticides in farm but 14 (28.57%) respondents used pesticides in agriculture and horticulture farm. Among them 55% brought the pesticides from the Agriculture office, 2.04% respondents bought from different cities of Nepal and 16.33% bought from Mustang Resource Management Group, a NGO working in Upper Mustang. Increase in the Pesticide use tendency in the study area was detected by 21 respondents (42.86%) and 28 respondents did not agree with the statement. 27 (55.10%) respondents were not aware on the effects of pesticides while 22 respondents (44.90%) are aware of the effects of the pesticides. Among the aware respondents, 13(65%) knew the effects of pesticides from ACAP, 2 respondents (2.04%) by the self study, 3 (6.12%) by the water god, 2 respondents (4.08%) got information by self experience, 1 respondent (2.04%) by Lama and rest 2 respondents got information by the village leader. ACAP is the organization working for participatory biodiversity conservation in the area.

30 respondents were found to be aware of the benefits of bird conservation (61.22%) while 19 respondents (38.78%) were not aware. Majority of the respondents (60%) were of the view that ACAP is a conservation organization for birds. Beside this 3 % respondent prioritize WWF Nepal, 6.67 % respondent prioritize conservation activities conducted by different organizations, 16.67% respondent prioritize self experience, 6.67% prioritize religious value and rest 6.67 % prioritized training for dissemination of effect of pesticide in the study area.

89.79% did not worship vulture however 10.2% respondent worship vulture as an embodiment of god. Similarly 39 respondents (79.59%) did not accept vulture as incarnation of god however 7 respondents (14.28%) were found to believe on it and 3 respondents did not have any idea on this issue. 26.53% respondents use some parts (intestinal, bone etc) of vulture as traditional medicine while 55.10% of respondent do not use for medicinal purpose and remaining 18.37% did not have any idea on this aspect. Most of the respondents have recognized intestinal part of vulture as beneficial for the human digestive system. Some of them were reported to make flute using bones of the vultures.

Hunting of vultures in the area was found minimum. 47 respondents (95.92%) were not aware of the killing of vulture in the study area but only 2 respondents (4.08 %) reported the killing

of vulture. As the study area and Tibetan plateau are adjoining part, killing of vulture in Tibet was also not reported dominantly. Total of 39 respondents (79.59%) did not hear killing of vulture in Tibet, 2 respondent (4.08%) have heard the killing of vulture where as 8 respondents (16.33%) had no idea on killing of vulture in Tibet.

As Mustang is the area where sky burial practice is still followed and vultures as consumer are the key participator of the activity. 43 respondents (87.75%) were of the opinion that the higher number of vultures took part in carcass than funeral activities (12.24%). Reasons of majority participation in funeral activities are open space, amount of carcass and good behavior (sin less) of livestock. Majority of respondent (59.18%) did not call the vet when livestock fall ill but 40.82 % respondent call the vet. Livestock illness is common in winter while all vet personal shift to the lower part of study area. Major reason behind people's indifferent attitude is the absence of vet whenever required. Most of the people use the local medicines as local vet is available in every incident. When livestock die, majority of the locals throw the carcass away (81.63%), some give the carcass to tanner for skin (2.28%), some use for food (26.76%) and some bury it (14.08%). Such practices depends on the type of livestock i.e. mule is thrown away and goat are taken as food. Livestock herding is increased in the area (67.35%) but 26.53% do not agree on the increase of livestock in the area while 6.12% detected same as before. Increase in the livestock farming is due to the good market, high profit and growth of human population.

Climate change is the global issue and by realizing its impact on migratory birds, statement on the effect of climate change and bird migration was done. 89.79% respondent have not detected the migration pattern of crane however minority of respondents (10.20%) detected a change in the migration period. Based on their information crane migrate prior to 7 days-20 days than usual migration time. Results of the conservation efforts of different organization shows positive change in the area. 40 respondents (81.63%) agree that there is an increase in the number of wildlife after conservation measures were adopted. But 5 respondents did not believe on it while 4 respondents (8.16%) were found to have no idea. Respondents emphasized conservation activities and legal provision made possible for the wildlife conservation.

#### *4.1.9.2 Non Structural questionnaire*

With structural questionnaire different informal discussions were carried out in 5 settlements. During that period study team found that vulture and culture are the associated parameters of the area. Before conducting any conservation measure on the group in the area, first we should know the relation between vulture and culture in the area.

After hanging the head of Golden eagles and Lammergeier on the main entrance it is believed that the house is safe from evil. A dead Lammergeier corpse and intestine is also an effective medicine for the treatment of diarrhea for the local people and this is still believed and widely practiced in the area. There is a significant relationship between the culture and vulture in Upper Mustang. Such ritual performance involves Himalayan Griffon, Eurasian Griffon, Golden Eagle and Lammergeier, however Himalayan Griffon is given more importance.

When a local person dies, the Lama, a local cultural leader and the most respected person of the area, decides how to carry out funerals-rites after reading his /her astrological calendar. A few specific castes like Bista usually burn the part of the dead body but the major caste of the area, Mustangi Gurung that constitutes more than 90% population, chop down the dead body into many pieces and offer the vultures. Lama calls the vulture by praying and blowing his trumpet. There is a belief that a skilled lama can invite only the required number of vulture in accordance to the weight of a dead body to feed them sufficiently. When the vultures finish eating up the entire corpse it is said that they bath in the river before flying away. If vultures do not visit the site then locals believe that the person had committed some sorts of sin during his lifetime. Same tradition is followed in the working caste, Biswokarma too. Here ritually, a vulture is a medium to take a soul of a dead person to the heaven.

The ritual of funeral-rites is prohibited during the agricultural harvesting season but followed by cutting the body into many pieces and throwing into a river. During this season, it is seen that instead of feeding the dead body to the birds of prey it is offered to aquatic life like fishes and insects. This ritual has been practiced here since time immemorial.

Major responses in figure during the social survey

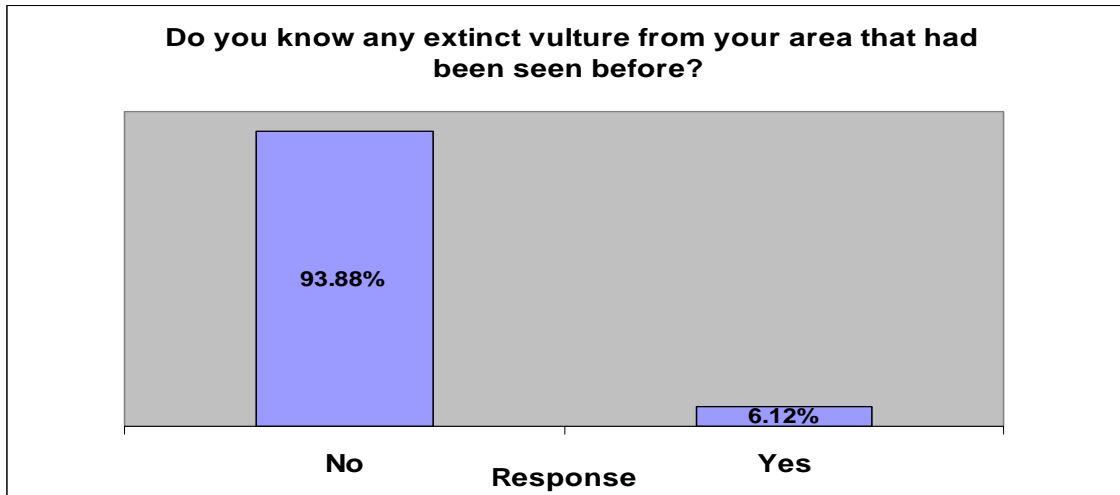


Fig 1: Extinction of vulture species

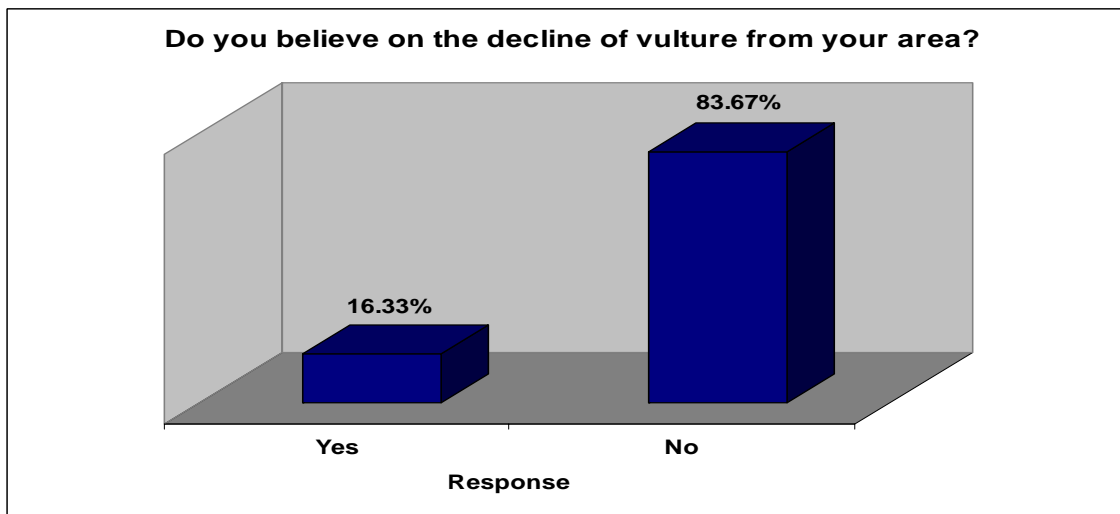


Fig 2: Decline in vulture population

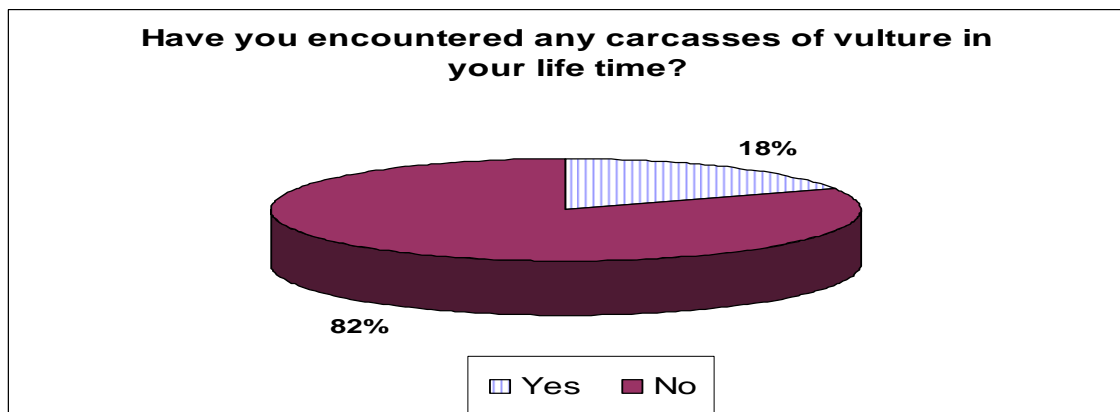


Fig 3: Encounter with carcasses of the vulture

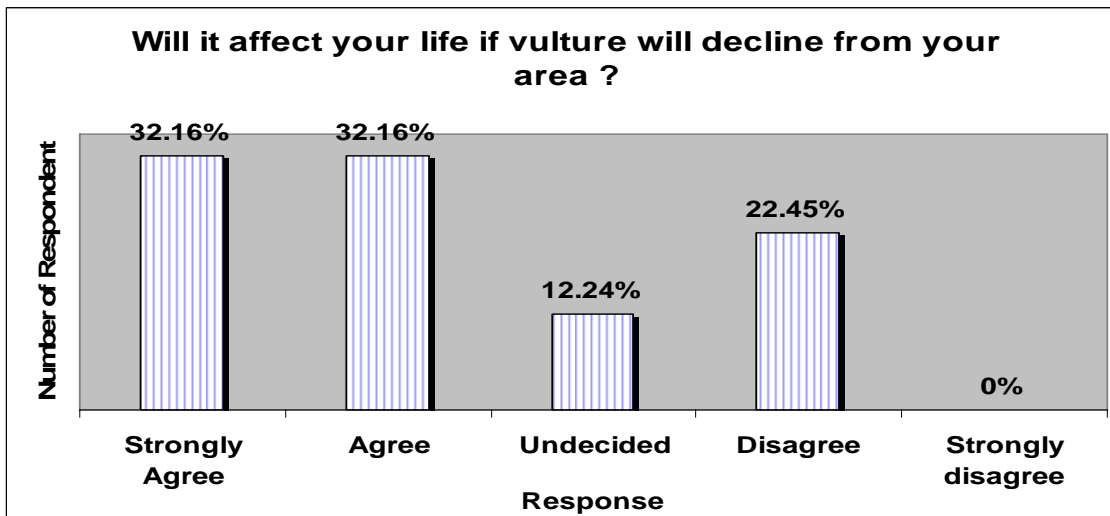


Fig 4: Any impact if vulture decline in the area

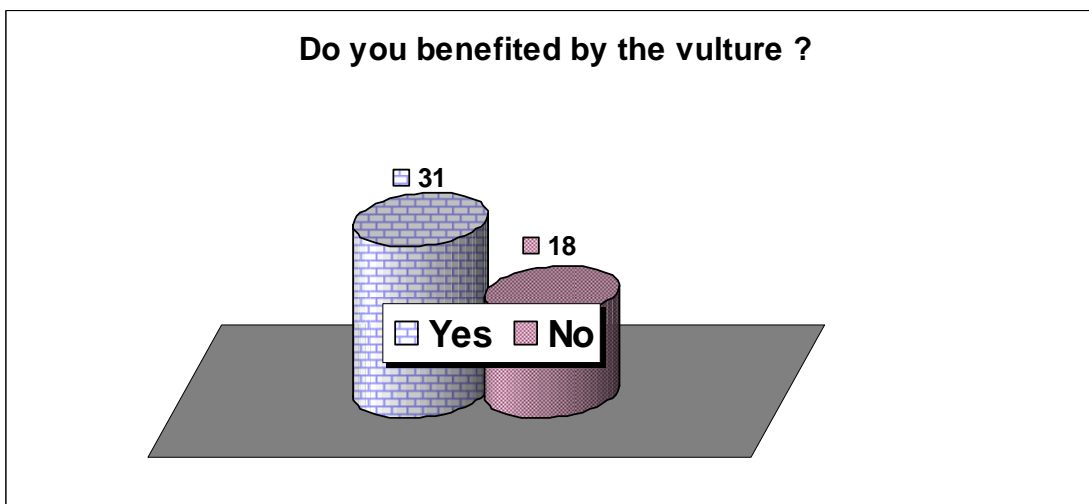


Fig 5: Benefits of vulture

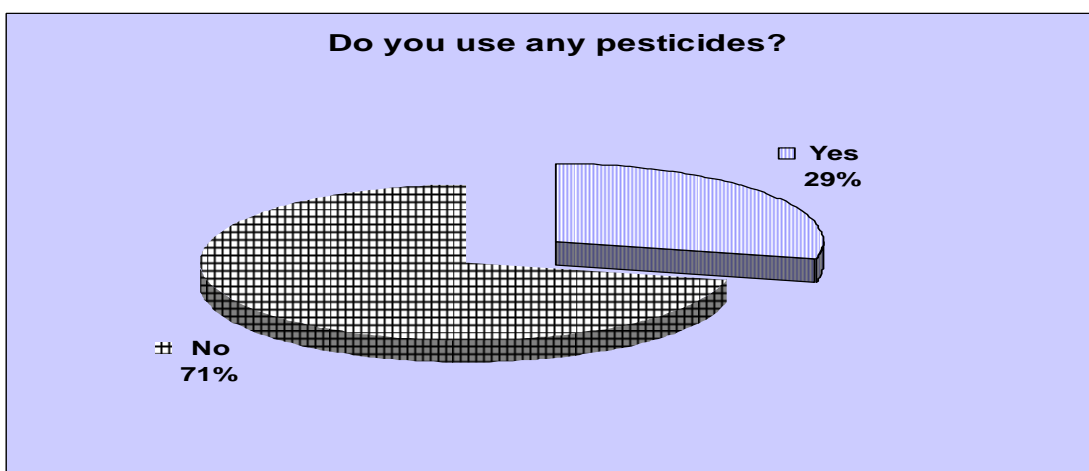


Fig 6: Use of pesticides

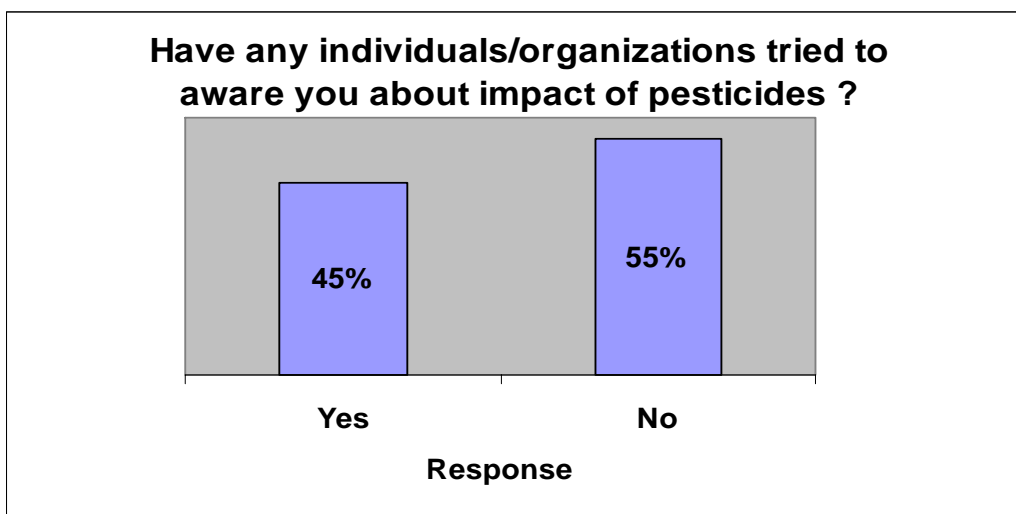


Fig 7: Awareness about pesticides

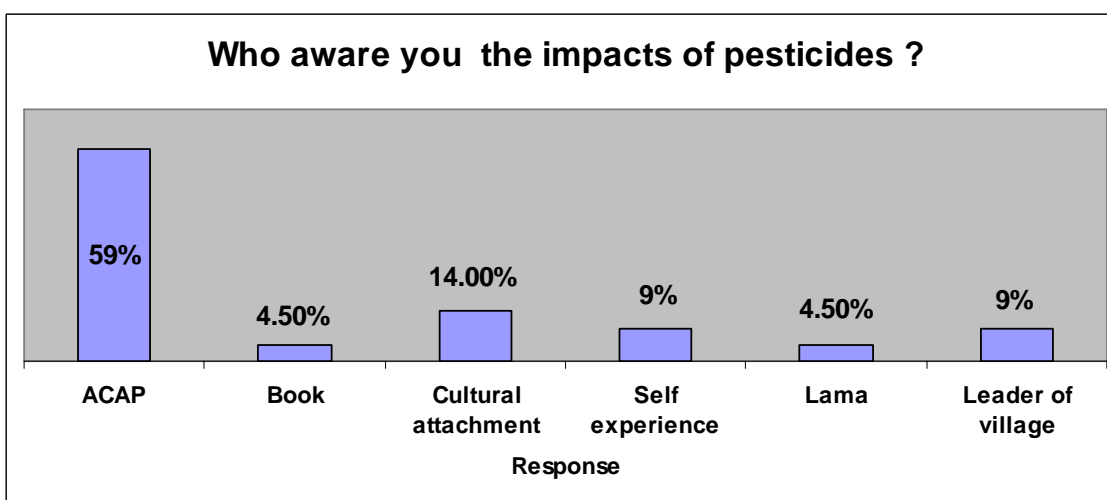


Fig 8: Who create awareness about Pesticides



Fig 9: Role of culture in religion



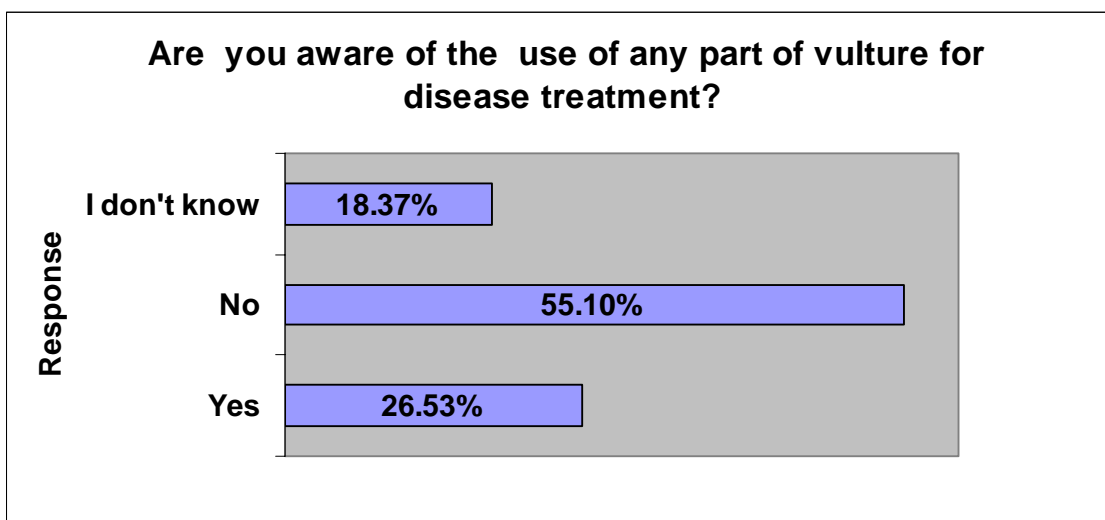


Fig 10: Traditional treatments through vulture's body parts

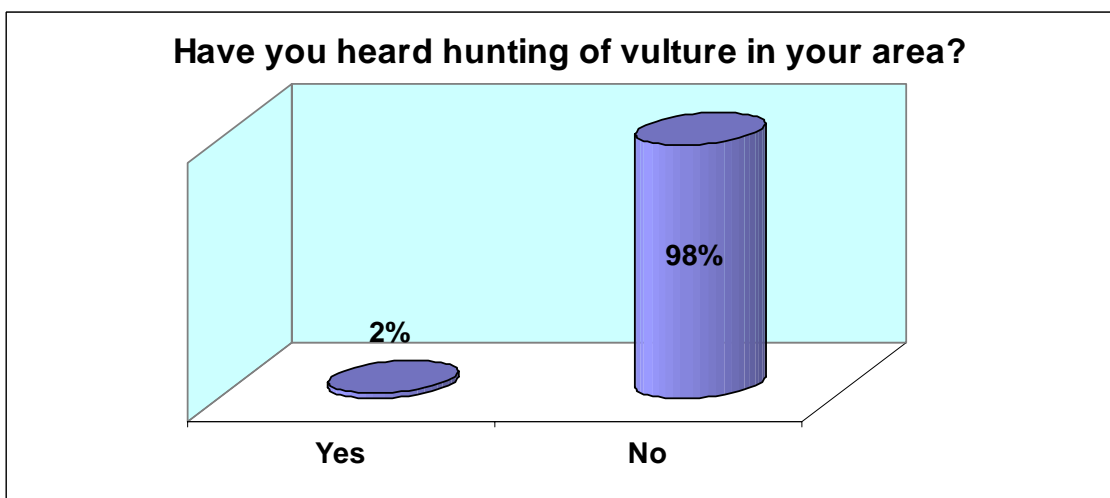


Fig 11: Hunting of vulture

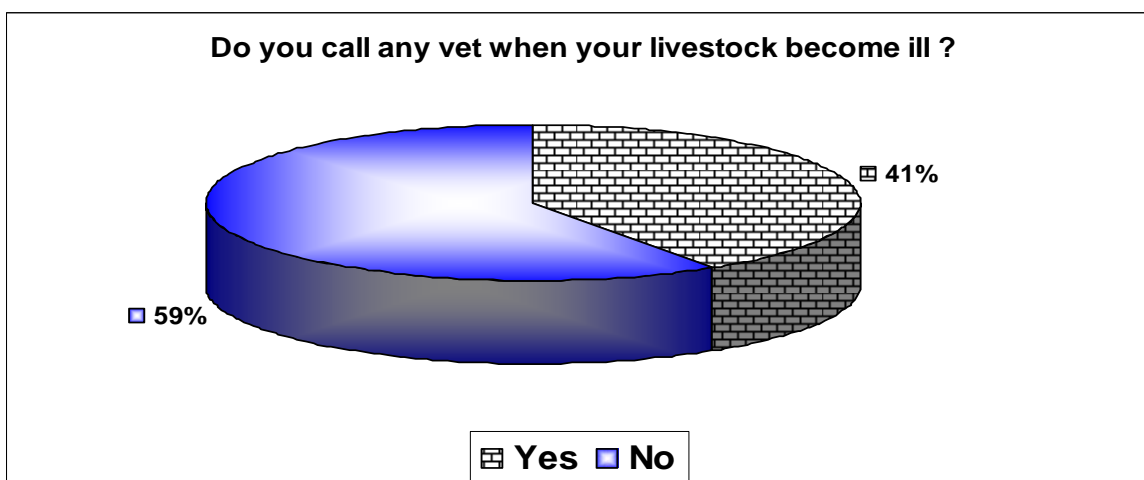


Fig 12: Use of veterinary services

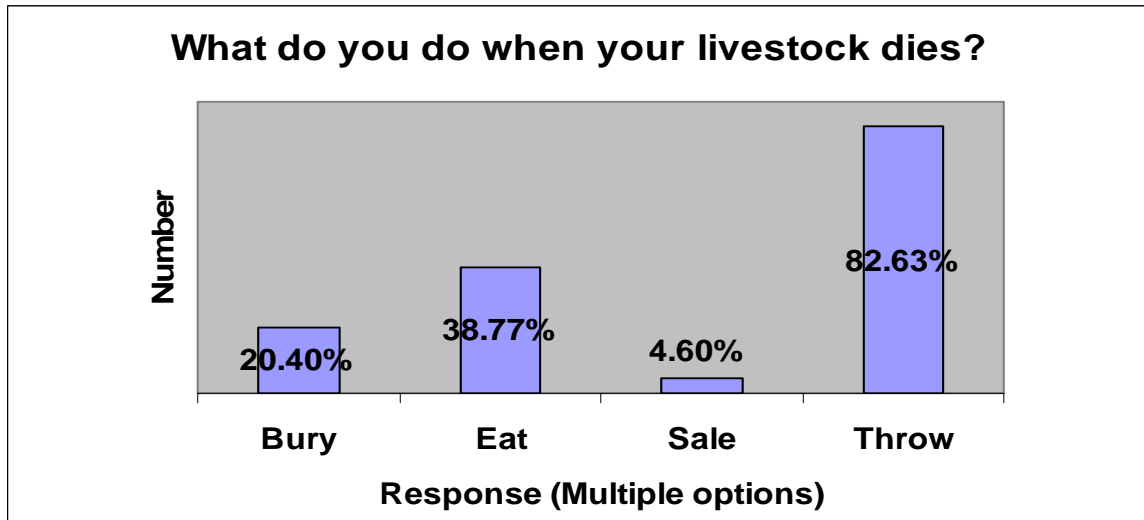


Fig 13: Response to dead livestock

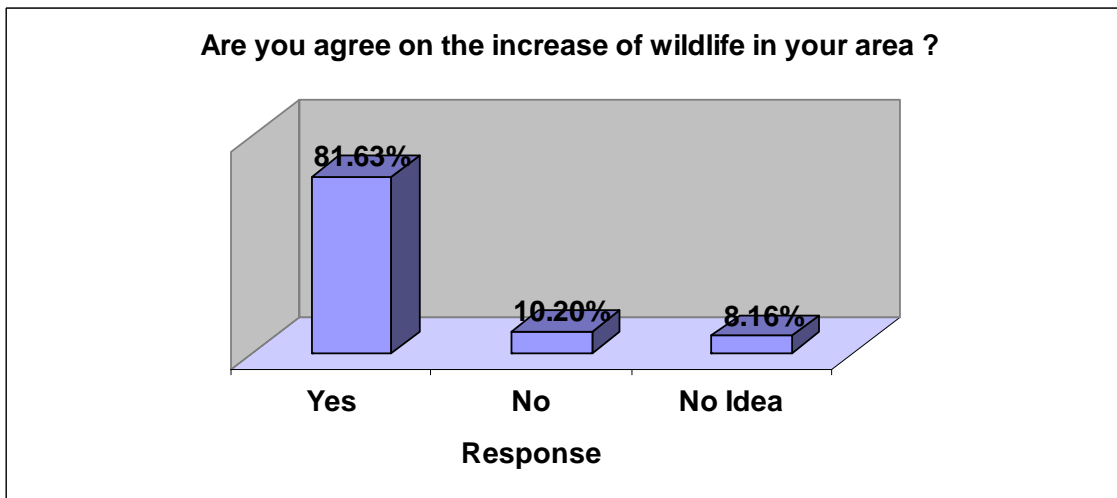


Fig 14: Wildlife conservation

## 4.2 Discussion

Permanent nesting sites of Himalayan Griffon have been observed in cliff edges and abandoned caves at Chojung and Ghemi, respectively. The caves and cliff edges of Chungsi Gonpa, Ghemi, Garphu, are very important locations for Himalayan Griffon. Abandoned caves were found in most of the village and birds were found near the settlements which helps us to conclude that Himalayan Griffons are closely associated with human beings in the area. The strong wind is eroding good vantage for Himalayan Griffon provided by the abandoned caves. The Upper Mustang area is facing massive wind erosion problem and some nests are being destroyed by the wind. Nesting behavior is quite surprising because a single nest of Himalayan Griffon was recorded in Dhalung area in 2004 but three nests at the same place

were recorded in 2006. Similarly in Chosyar nesting site additional two Himalayan Griffons were recorded than recorded in 2004.

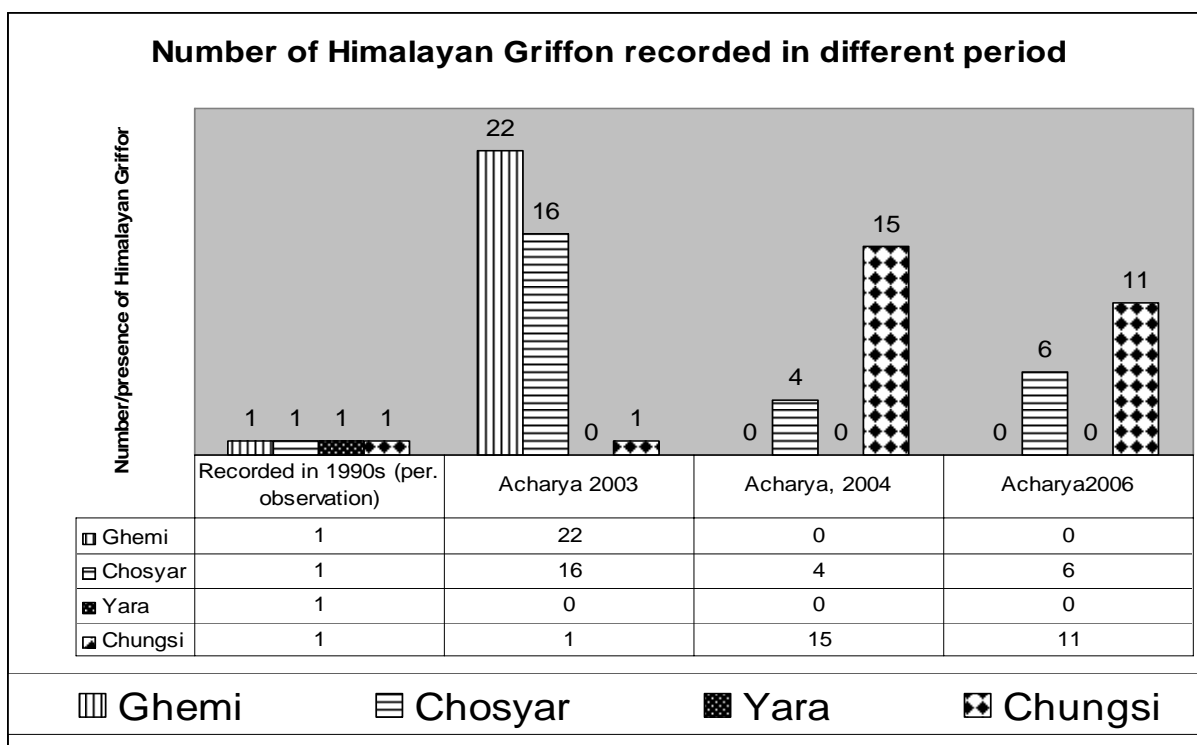


Fig 15: Number of Himalayan Griffon recorded in nests

**Note: 1 indicates the presence of Himalayan Griffon but number was not counted**

The number of Himalayan Griffon that has been observed in the period of 1993-1997 (per. observation) in Yara cave were not recorded in last three study periods. Similarly 22 Himalayan Griffon recorded in 2003 (Ghemi cave) were not recorded in 2004 and 2006. The number in Chungsi and Chosar shows the decline of vulture from the nest. These four nest colony (see fig. 15) clearly indicate in declining of Himalayan Griffon. Declining of Himalayan Griffon in Lower Kaligandaki valley as advocated by Baral et al. 2002b match with the nest result of Upper Kaligandaki valley (the study area). But if we compared the nest number of 2004 and 2006, it seems stable number. This is because of wider range coverage by the study team in 2006 where team observed new nesting sites which were not recorded in 2004. This means that although the population of vulture at nest remaining the same the overall population has declined.

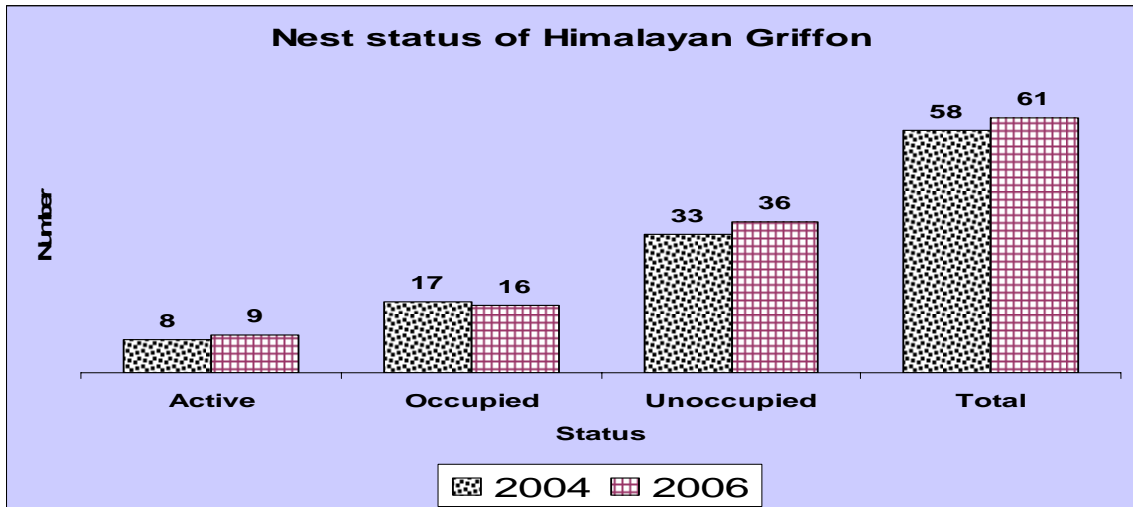


Fig 16: Nest status of Himalayan Griffon

Total observation and density of Himalayan Griffon found in transect have sharply declined during the study period of three years. Population density of Himalayan Griffon is declined by 94 % in between 2003 and 2006.

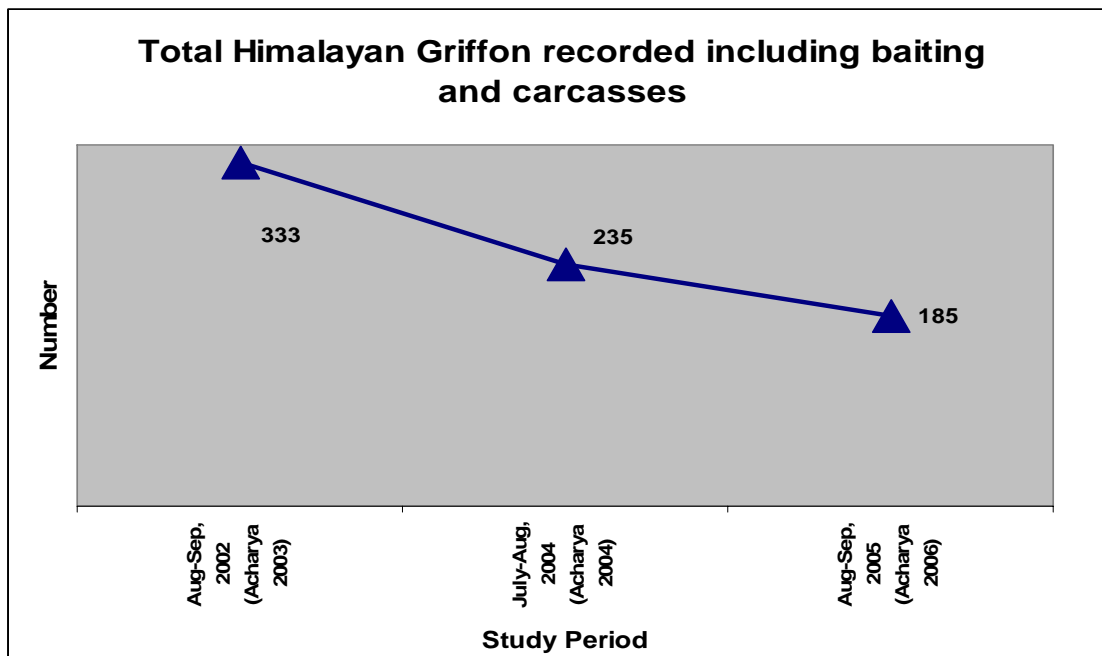


Fig 17: Total observation of Himalayan Griffon in different study period including baiting and carcass

Baiting results shows that numbers of Himalayan Griffon have not declined from the area while comparing with the studies in between 2004-2006. However sample size, exact date of baiting, same amount of food and other climatic condition are in question. A total of 82

Himalayan Griffons visited the baiting site in 2006 and 62 visited in 2004. Baiting data and number in funeral site shows that population of Himalayan Griffon is almost stable in the area however all of these numbers are fewer than the Chungjung village where team had observed 110 number of Himalayan Griffon from a single carcass site in 2003 (Acharya 2003, Suwal 2003 and Acharya 2004 ).

In year 2004 it took one hour to complete the whole process (15 minute for baiting process and 45 minute for preparation) (Acharya, 2004). But during 2006, team had to spend for three hours ; however 82 vultures stayed away from the baiting site (30-100 meters) and did not consume the bait. The higher number recorded is probably due to the long time period in 2006 that the team had spent on the funeral site compare to 2004. During the baiting period (2006) the team had recorded vulture which were across from Dolpo area and Damodar kunda valley, however, in 2004 none of the Himalayan Griffon was across from the same valleys..

Number of vultures that visited the funeral activities was recorded with the help of local people (who chop down human cadaver). Since 2003, a local inhabitant Mr. Norbu Pasang Gurung was paid for the counting of Himalayan Griffon during the funeral activities. Based on his information human cadavers were completely finished in every occasion.

The use of pesticide, herbicide, and insecticide are found to be common. Which ultimate effect seen in apex level species through food chain effect, however need to verify through intensify study. Use of pesticides may be used to kill the predators of livestock, which may eventually affect the carrion feeders of the entire locality of Mustang (Suwal 2003). Ironically ACAP give emphasis on the organic farming, unfortunately the rate of pesticide consumption in the area is increasing (Acharya 2006 ). Along with this 47 type of vet medicine are being distributing in the region, of which only one contain Diclofenac (Voviram bolus; Diclofenac Sodium). Scientists have recently found out that the veterinary drug Diclofenac is the major cause of the decline of lowland vultures in Pakistan, India and Nepal (Oaks *et al.* 2004, Shultz *et al.* 2004). The effects of this drug to Himalayan Griffon is predicted to be as lethal as to the other lowland species of Gyps (Swan *et al.* 2005). The declining of the Himalayan Griffon in the Mustang Valley may be due to the use of Diclofenac. However the decline in number of Himalayan Griffon and use of Diclofenac in the area suggest us to take immediate step for it's ban and to conserve the group.

Some communities in India, such as the Zoroastrians, and Buddhists in Tibet, use vultures for disposing of human corpses. With the declining number of vultures, these corpses have not been consumed as has been observed at the Towers of Silence at Malabar Hill in Mumbai. Today crows and kites fulfil this function, albeit less efficiently ([http://www.khandro.net/animal\\_bird\\_vulture.htm](http://www.khandro.net/animal_bird_vulture.htm)) . Sky burial practice still exist in Mustang, Dolpa and Upper Manang, Tibet (Achayra 2006, Caravan movie, [http://www.khandro.net/animal\\_bird\\_vulture.htm](http://www.khandro.net/animal_bird_vulture.htm) ). Declining in the vulture population from the Mustang would create the same situation as found in India. It would hampered the local culture, so that a conservation measure is essential before case repeated in Nepal.

Participatory raptor survey was undertaken in Siang river valley, a part of Tsangpo-Bhramaputra corridor in Arunachal Pradesh, India during summer and fall in 1999 and a comprehensive list of raptors of the area was prepared based on the previous study done by experts (Chetri *et.al* 2006). Further Chetri *et al.* explained about 60% of the survey records and past documented data were found similar to each other suggesting applicability of local knowledge in raptor conservation. As in Mustang symbiotic relation between ethnic group and vulture is still in existence. Using local people could be a great support for scientific arena. However, ACAP had prepared protocol for Himalayan Griffon monitoring programme. This protocol described vantage count based on the multistage sampling while carcass observation is based on the format prescribed by vulture decline project (Tucker 2005). This guideline have been developed and designed particularly for the Annapurna region however it's implications within and outside of ACA need to be explored. Even with in the ACAP previous three study did not follow the protocol, so abetment is essential in it. Protocol was prepared in 2005 however study of Himalayan Griffon started in Upper Mustang from 2002. To make result comparable, study did not follow the protocol.

## **Chapter V**

### **Recommendations**

#### **5.1 Monitoring and data base preparation**

##### *5.1.1 Baiting*

Until and unless, we obtain the baseline data, our effort towards the conservation of the species will be unsuccessful. For this purpose, at least 6-8 sites (Lomanthang, Yara, Dhey ,Chuksang and some sites in pasture land) should be chosen for baiting with safe food and Himalayan Griffon of the area should be counted on yearly basis.

##### *5.1.2 Transects*

The routes, which were used during the couple of surveys, should be used for counting different vulture species. It will provide the general idea whether population of the species is decreasing or increasing. It needs about 25 days for the monitoring of the vulture species along this route.

##### *5.1.3 Monitoring of the nests*

Most reliable monitoring method should be applied in the area after the detail inventory of the nests. Such inventories of nests will help to determine the required specific study of Himalayan Griffon in the area in future .

#### **5.2 Training to the local person who chops the dead bodies to monitor vulture population**

The local people who chop the dead bodies as a last rite easily identify vulture species and they also know birds local name. A count of large birds attending the area could be collected through these people. As a reward for this work a minimal amount should be provided as being provided in Lomanthang village. Giving them a simple training can start this data recording process. The local Conservation Area Management Committee (CAMC) may be used as a coordinator in this case.

### **5.3 Awareness**

Although the people are not involved directly in killing of the vulture species in the area and obviously not anywhere in Nepal, but their prey species are being threatened by the villagers and outsiders. Many people from outside are now staying in the area in search of work. They kill the birds, small mammals, which are rarely consumed by the vulture. Catapults are the common weapon for them. Some teachers of Chosyar and Chunup VDC were found hunting the galliform species. Since last few years ACAP is involving in the data preparation of the local biodiversity in the area. Its extension program and monitoring mechanism should be implemented properly throughout the area. While conducting such activities, ACAP should involve the local Lamas and other respected persons of the area, in many ways i.e. Data collection, motivation, tour, training, awards etc. Training in relation to the impact of pesticides and medicines should be given to local inhabitants, students and teachers.

### **5.4 Strengthening the CE Teachers**

ACAP has been launching its conservation education (CE) programs through the CE teachers. A teacher has the same responsibilities as ACAP has been performing in the area. Those teachers representing different VDCs should be motivated at least to stop the illegal hunting by their own colleague. The conservation booklets provided by ACAP are unable to create awareness about the local biodiversity especially about the birds. In 2001, a researcher observed some children pelting stones to the vultures that come for carcass. In that incident a Himalayan Griffon was killed near Jomsom (lower Mustang) airport which was near the study area. That Himalayan Griffon would come from the study area (upper Mustang). So the booklets should be revised and separate chapter for the birds should be included.

### **5.5 Testing of Diclofenac in the Griffon**

It has been proved that the reason for the decline of three species of Gyps vultures in Nepal, India and Pakistan (the White-rumped vulture *G. bengalensis*, Long-billed vulture *G. indicus* and Slender-billed vulture *G. tenuirostris*) is through the veterinary use of the Diclofenac (a drug commonly used as a pain killer and anti-inflammatory drugs for cattle and even people) (Shultz *et al.* 2004, Oaks *et al.* 2004). Recent research has shown that Diclofenac is toxic to at least four species of *Gyps* vultures (including the Eurasian Griffon vulture *G. fulvus*) and all vultures within the *Gyps* genus are likely to be affected including the Himalayan Griffon



(Swan *et. al* , Baral *et al.* 2000a). However, it's effect on populations of the Himalayan Griffon is unknown. Due to the fact that it shares the same carcasses and feeding methods as its common roost with White-rumped Vulture it might also be affected. Locating any dead bodies of Himalayan Griffons and testing these for the presence of Diclofenac is an important priority. ACAP could play a vital role to collect the carcasses of Himalayan Griffon. A simpler method will be to expose sick or injured Himalayan Griffons to Diclofenac (through contaminated meat or injection).

## **5.6 Information sharing**

Some important sites of the Himalayan Griffon should be made accessible and well known by providing adequate information i.e. sign posting, brochure preparation, poster and placement of CAMC notice board. Importance of birds, role of local people in the conservation of birds could also be written in those notice boards.

## **Chapter VI**

### **Conclusion**

#### **6.1 Conclusion**

Number of the Himalayan Griffon has decreased as shown by the transects count, total observed count, nesting number etc. Baiting information however did not show the decrease of Himalayan Griffon in the area during last two studies (2004 and 2006). But the key concern is to know 110 Himalayan Griffons observed in the carcass of mule in 2002 and reported in 2003 (Acharya 2003 and Suwal 2003). This information suggests that immediate steps should be taken to save the vultures in the area; otherwise the case may be similar to that of White-rumped vulture, Long-billed vulture and Slender-billed vulture in Nepal, Pakistan and India. Similarly, available vet medicine suggests that the use of Diclofenac is found in the study area which is proved to be a killer for the vulture in low land.

There is a symbiotic relationship between the vultures and culture in Upper Mustang. We do not have sufficient data to show that the vulture species are secured in Upper Mustang. On the basis of few studies, it can be concluded that the status of Himalayan Griffon is common to fairly common in Upper Mustang. However, they are found fewer than recorded by the survey carried in 2002 and 2004. Funeral activities could be hampered in future as seen in India already.

Especially the areas above Chhuksang and Chungshi should be considered for launching various programme related to vulture conservation. Detail study of the nests is required for sustainable conservation and monitoring program. Program should be focused on conservation i.e. awareness program on different levels in a wider area, habitat improvement, encouraging the organic farming, conservation of buffer species, establishment of the monitoring institution in the area. Transects based observation, nest based population count, counts of vultures at a wide sample of sky burial sites and environmental education on the importance of vultures in the Mustang District is essential.

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## Appendixes

### Appendix 1

#### General description of Nest in 2006

Spp.	Location	Aspect	Nearest settlement	Number of nests	Altitude (Meters)	GPS position	Status
HG	Chuksang	-	Chuksang	1	-	-	Confirmed through Villagers
	Below Samar	N/W	Samar	3	3684	N 28°58'06.2" E083°48'18.2"	Occupied
	Below Bhena	S/E	Bhena	1	3742	N 28°58'48.2" E083°48'40.6"	Unoccupied
	Chungshi	N/E	Syangbochen	9	3923	N 28°59'01.1" E083°49'09.3"	Three were active, Three were occupied and three were unoccupied
	Ghemi	S/W	Ghemi	12	3612	N 28°04'09.2" E083°51'59.8"	Unoccupied
	Above field	N/E	Ghemi	1	3612	N 28°04'09.2" E083°51'59.8"	Occupied
	Dhakmar cliff	S/E	Dhakmar	1	3709	N 29°04'52.4" E083°53'01.3"	Occupied
	Dhakmar cliff	S/W	Dhakmar	1	3709	N 29°04'52.4" E083°53'01.3"	Occupied
	Dhakmar cliff	N	Dhakmar	1	3983	N 29°05'23.2" E083°52'46.8"	Unoccupied
	Cliff	S/W	Charang	3	3680	N 29°05'23.2" E083°52'46.8"	Unoccupied
	Cliff	N	Charang	2	3680	N 29°06'02.3" E083°56'04.0"	Unoccupied
	Near Namgyal	W	Namgyal	4	3895	N 29°11'47.1" E083°56'43.5"	Roosting place
	Jhong	S	Choshyar	6	3935	N 29°14'07.7" E083°58'50.7"	Six matured and two chicks
	Way to Dhi	S	Lomanthang	5	4101	N 29°07'57.1" E083°57'54.8"	Occupied
	Yara cliff	N/E	Yara	10	3538	N 29°05'46.0" E083°59'24.9"	Unoccupied
	Samjung pass	S	Samjung	4	3907	N 29°12'13.8" E083°59'36.6"	Unoccupied
	Cliff	S	Samjung	3	3966	N 29°13'26" E083°01'31.5"	Active and Occupied (3 chicks And 7 matured)
	Cliff	E	Chaile	1	3090	N 28°55'52.5" E083°49'35.2"	Occupied

Note : HG: Himalayan Griffon

#### General description of Nests in 2004

Species	Location	Aspect	Nearest settlement	Number of colony	Number of nest	Altitude (Meter)	GPS position	Status
Himalayan Griffon	Chuksang	-	Chuksang		1	-	-	Confirmed through villagers
	Below Samar	N/W	Samar		3	3684	N 28°58'06.2" E083°48'18.2"	One was active
	Below Bhena	S/E	Bhena		1	3742	N 28°58'48.2" E083°48'40.6"	Occupied
	Chungshi	N/E	Syangbochen		4	3923	N 28°59'01.1" E083°49'09.3"	One was active and another occupied
	Chungshi	N/E	Syangbochen		1	-	Not worked	Occupied
	Ghemi	S/W	Ghemi	4	12	3612	N	Unoccupied

							28°04'09.2" E083°51'59.8"	
	Above field	N/E	Ghemi		1	3612	N 28°04'09.2" E083°51'59.8"	Occupied
	Dhakmar cliff	S/E	Dhakmar		1	3709	N 29°04'52.4" E083°53'01.3"	Occupied
	Dhakmar cliff	S/W	Dhakmar		1	3709	N 29°04'52.4" E083°53'01.3"	
	Dhakmar cliff	N	Dhakmar		1	3983	N 29°05'23.2" E083°52'46.8"	
	Cliff	S/W	Tsarang	1	3	3680	N 29°05'23.2" E083°52'46.8"	Occupied
	Cliff	N	Tsarang	1	2	3680	N 29°06'02.3" E083°56'04.0"	Occupied
	Near Namgyal	W	Namgyal	1	4	3895	N 29°11'47.1" E083°56'43.5"	Roosting place
	Jhong	S	Choshyar	1	6	3935	N 29°14'07.7" E083°58'50.7"	Four matured and one chick
	Way to Dhi	S	Lomanthang	3	5	4101	N 29°07'57.1" E083°57'54.8"	UOBF, and one have chick
	Yara cliff	N/E	Yara	3	10	3538	N 29°05'46.0" E083°59'24.9"	Unoccupied
	Samjung pass	S	Samjung	2	4	3907	N 29°12'13.8" E083°59'36.6"	Unoccupied
	Cliff	S	Samjung		1	3966	N 29°13'26" E083°01'31.5"	Occupied
	Cliff	E	Tsaile		1	3090	N 28°55'52.5" E083°49'35.2"	

**List of Plates**



Plate 1: Monitoring of Himalayan Griffon: A typical trans-Himalayan landscape of Upper Mustang is on the background.



Plate .2: Nesting habitat of Himalayan Griffon. A chick on the active nest is encircled





Plate 3: A baiting site; preparation before calling Himalayan Griffons



Plate 4: Himalayan Griffons consuming a bait





Plate 5: Use of pesticides; A common practice in lower Mustang but local farmers also use the pesticide in upper Mustang



Plate 6: Caves once used by humans are now best nesting habitat of Himalayan Griffon and other vultures.

## Survey form

### Questionnaire to know the people's perception on ethno-vulture relationship in Mustang

Your participation in this survey is voluntary. You will neither get any direct monetary benefits for participating nor penalized for not answering some or all of the questions. Any information gathered in this survey will be only used for the purpose of research. The interview is completely confidential; your name will not be associated with your answers. The purpose of this survey is to evaluate the perception of people on Ethno-vulture relationship in the Upper Mustang, Nepal. Your cooperation will help in the conservation of vulture in Nepal.

**Name of Respondent:**

**Age:**

**Address:**

**Occupation:**

**Family size:**

**Name of Facilitator:**

**1. How many types of vultures are found in your area? Please list them with their local name?**

- 1.
- 2.
- 3.

**2. Do you know any extinct vulture from your area that had been seen before?**

Yes.....(Please use √ for right answer)

No.....

Briefly describe their size, color and other distinct characteristics?

.....  
 .....

**3. Do you believe that vulture are declining from your area?**

Yes.....

No.....

**4. Have you noted any decline in the number of Himalayan Griffon from your area?**

Strongly Agree.....

Agree.....

Undecided.....

Disagree.....

Strongly disagree.....

**5. Please describe the reasons for their decline from the area?**

.....  
.....

**6. Do you know any cave which is left by the vulture? Please list the names of those caves?**

Name	Location	Distance from your village
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

**7. Have you encountered any carcasses of vulture in your life time? How many? When?**

Yes.....

No.....

When .....

How many.....

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

Strongly Agree.....

Agree.....

Undecided.....

Disagree.....

Strongly disagree.....

**9. Do you have any benefits from the vulture? Please list them, if agree with statement?**

Yes.....

No.....

List .....

**10. Do you use any pesticides?**

Yes.....

No.....

**11. Please list the sources if you use the pesticides?**

.....  
.....

**12. Do you agree that the use of pesticides has been increased in your area?**

Yes.....

No.....

**13. Have any individuals/organizations tried to aware you about the impacts of pesticides?**

Yes.....

No.....

If yes, give the name.....

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

Yes.....

No.....

List the name or individuals/organization.....

**15. Do you worship vulture in any traditional cultural activities?**

Yes.....

No.....

If Yes, in which festival.....

How do you do?

.....

.....

.....

.....

.....

.....

.....

.....

**16 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 ?

**16. Do you believe that vulture are an incarnation of god (Do you relate vulture with god)?**

Yes.....

No.....

If yes, which God.....

**17. Have you heard of hunting vulture in your area?**

Yes.....

No.....

**18. Have you heard of hunting vulture in Tibet?**

Yes.....

No.....

**19. Do you know any incident of vulture killing in Tibet?**

Yes.....

No.....

**20. During which activities do vultures come in large number?**

Funeral activities.....

Livestock carcass.....

Why ?

.....  
.....

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

Yes.....

No .....

If not, why.....

**22. What do you do when your livestock dies?**

Burn.....

Bury.....

Sell.....

Throw.....

Other please specify.....

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

Yes.....

No.....

Why.....

.....2

**24. Have you noted any changes in the pattern of Crane migration from your area?  
Compare with the last 20 years period. Could you please tell in brief whether  
migration occurs earlier or later than before?**

Yes.....

No.....

Time difference.....

**1. Have you noted any increase in the number of wildlife in your area?**

Yes.....

No.....

Why.....

.....  
.....

**Note: Please write other informations which you noted but not included in the  
questionnaire?**

.....  
.....

.....  
.....  
.....  
.....  
.....

(Locally Himalayan Griffon is known as “Cheyarkho,” Lammergeier known as “Chaya Kholdho” and Golden Eagle is known as Lhak in Upper Mustang area.)

Thanks

## Appendix -4

## Detail about the Respondents

VDC	Name	Sex	Age	Occupation
Charang	Maya Bista	Female	45	Hotel
	Karchung Gurung	Female	22	Shop
	Karma Dhoka Gurung	Female	34	Agriculture
	Chenga Gurung	Female	34	Agriculture/ livestock
	Dhawa Angjin Gurung	Female	50	Agriculture/ livestock
	Yanglahmu Gurung	Female	45	Agriculture/ livestock/ Shop
	Kunja Tenjin Gurung	Male	34	Teacher
	Pasang Gurung	Male	24	Telephone operator
	Tsering Gonpo Gurung	Male	46	Human dead body piece maker
	Ongdi Rapke Gurung	Male	62	Agriculture/ livestock
	Ram Bhadur Gurung	Male	30	Service in ACAP
	Angjuk Gurung	Male	43	Agriculture/ livestock
	Kunga Dhinduk Gurung	Male	42	Agriculture/ livestock
	Ghayacho Gurung	Male	26	Agriculture
Lomanthang	Norbu Pasang Gurung	Male	58	Agriculture and human dead body piece maker
	Tashi Angyal Gurung	Male	23	Agriculture
	Tharchin Lama	Male	68	Lama take part in funeral activities
	Pasang Gurung	Male	53	Human dead body piece maker
	Takla Gurung	Male	50	Agriculture
	Smtuk Gurung	Male	72	Agriculture
	Dhukke Bhote Gurung	Male	55	Service in post office and human dead body piece maker
	Tharchin Gurung	Male	53	Agriculture and shop
	Dev Gurung	Male	45	Shop
	Gyacho Bista	Male	55	Amchi
	Dhakpa Dhunduk Gurung	Male	63	Agriculture
	Wangdi Sangbo Lama	Male	35	Lama teacher
	Bhi Chiring Gurung	Male	38	Agriculture
	Indra Dhara Bista	Male	37	Shop and Hotel
	Chimi Rinjin Gurung	Male	33	Snow leopard research
Chunnup	Ghartuk Gurung	Male	52	Agriculture

	Chottar Gurung	Male	62	Agriculture
	Lahka Cheri Gurung	Male	27	Agriculture
	Chepten Gurung	Male	69	Agriculture
	Pema Norbu Gurung	Male	58	Agriculture
	Urken Gurung	Male	49	Agriculture
	Pema Sangmo Gurung	Male	52	Agriculture
	Ghirmi Tenjin Gurung	Male	42	Agriculture
	Pema Rinjin Bista	Male	63	Agriculture
	Samtu Gurung	Male	41	Agriculture
	Pema Chering Gurung	Male	56	Agriculture
	Tandin Gurung	Male	47	Agriculture
	Hai Tindhu Gurung	Male	47	Agriculture
	Dharke Gurung	Male	67	Agriculture
	Khenje Gurung	Male	41	Agriculture
	Wongdi Gurung	Male	61	Agriculture
	Pema ghyau Gurung	Male	56	Agriculture
	Karma Gurung	Male	55	Agriculture
	Chink Dharke Gurung	Male	66	Agriculture
	Chyangtenjing Gurung	Male	57	Agriculture



## Appendix-5

**Name of Vet medicines used in Mustang**

S.N.	Name	Chemical composition
1.	Albendazole	Albendazole
2.	Algon tablet	Albendazole
3.	Oxyclozanide	Oxyclozanide
4.	Exapar bolus	Herbal preparation
5.	Kepromec inj.	Ivermectin
6.	Atropine Sulphate	Atropine Sulphate
7.	Calomei	Calomei
8.	Glycerin	Glycerin
9.	Zink Oxide	Zinc oxide
10.	Tetracyclin bolus	Tetracycline
11.	Tincture iodine	Tincture iodine
12.	T.T. oil	Turpentine
13.	Dextrose Saline	Dextrose
14.	Distil water	Distil water
15.	Normal Saline	Sodium chloride
16.	Potash	Potassium Sulphate
17.	Plaster of paris	Plaster of paris
18.	Phenol	Phenol
19.	Belamyl inj.	Liver extract+ Vitamin B complex
20.	<b>Voviram bolus</b>	<b>Diclofenac Sodium</b>
21.	Boric acid	Boric acid
22.	Merquin	Erofloxacin
23.	Magsulf	Magnesium Sulphate
24.	Malathion	Malathion
25.	Gentamycin	Gentamycin
26.	Siquil inj.	-
27.	Himes ointment	Herbal preparation
28.	Lignocaine inj.	-
29.	Thical inj.	Calcium
30.	Tick out	-
31.	Piprazine	Piprazine
32.	Medimix forte	Mineral mixture
33.	Ridema inj.	Frusemide
34.	Sidex inj.	Dexamethazone Sodium
35.	Ivokil inj.	Ivermectin
36.	Bloatocil	Herbal preparation
37.	Timpol powder	Herbal preparation
38.	Himalayan Battisa	Herbal preparation
39.	Mediprim bolus	Cotrimoxazole
40.	Zeet inj.	Phenaramine Maleate
41.	Coghfo powder	-
42.	Tincture benzoin	Tincture benzoin
43.	Rumbion bolus	Herbal preparation
44.	Osef inj.	-
45.	Oxytetracycline LA	Oxytetracycline
46.	Neodox Powder	Neomycline sulphate Doxycycline