HABITAT PREFERENCE, THREATS AND DISTRIBUTION OF HIMALAYAN BLACK BEAR (*URSUS THIBETANUS*)

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REPORT
SUBMITTED TO
APEE NAMPA CONSERVATION AREA OFFICE,
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ABSTRACT

Himalayan Black Bear (Ursus thibetenus) lives in the dense coniferous mixed with Quercus incana and Rhododendron arboretum forests. Himalayan Black Bear (Ursus thibetanus) is listed as vulnerable by the IUCN primarily because of illegal killing for bear parts (Garshelis and Steinmentz, 2008; Servheen, 1990). It is also included in Appendix I of CITIES and list of protected animals by National Parks and Wildlife Conservation Act 1973, Nepal. The proposed study has objectives of identifying the status and distribution of Black Bear and identify the habitat preference of Himalayan Black Bear, identify threats and People's perception towards Himalayan Black Bear conservation in the Api Himal Rural Municipality. For the completions of this research various methodologies were used. Primary data collection were applied for the collection of various types of data required to meet my objectives and proceed secondary data collections for gathering relevant information. During the analysis process Arc GIS tool and excel tools used.

Himalayan Black Bear found to be distributed in the middle and low belt of Rural Municipality. The preferable altitude of the Himalayan Black Bear is 1500 m- 3500 m. It prefers the moderate slope (15 degree – 60 degree). Himalayan Black Bear prefer tree species of Berberis aristata, Abies, Quercus, Pinus roxburghii, Betula, Drepanostachum and Rhododendron. Himalayan Black Bear prefer the south, west and north aspect and avoid east aspect as well as flat zone 58.70% respondent said that major threats for black bear is habitat destruction 30.18% by poaching 11.20% by food scarcity. People's perception towards Black Bear conservation strongly agree 18.4%, agree 23.9%, neutral 33.8%, disagree 14% and strongly disagree 9.9%. The most preferable habitat for Black Bear was moderate slope upper subtropical to lower sub alpine zone. Major threats was habitat destruction and most of the people not interest either conserve or nor to Black Bear. For Black Bear conserve, conservation awareness program should be done.

Key words

Himalayan Black Bear Habitat, Habitat preference, Distribution, Threats, Conservation,

सोध-सार

हिमालय कालो भालु सल्ला, खसु, गुँरास, निगालोको मिश्रण भएको वनमा पाइन्छ | यस भालुको शरीरको विभिन्न भागहरुको अबैध व्यापारले गर्दा हिमालय कालो भालुलाई आइ.यु.सी.एन ले भल्नरेबलको रातो सुचिमा समावेश गरेको छ | साथै राष्ट्रिय निकुन्ज तथा वन्यजन्तु संरक्षण क्षेत्र ऐन -२०२९ले संरक्षित जनावरको रूपमा समावेश गरेको छ |

यस अध्ययनको मुख्य उदेश्य हिमालय कालो भालुको वितरण, अवस्था, वासस्थान, यसको खतराको पहिचान गर्नुको साथै यसको संरक्षणमा जनताको विचार पत्ता लगाउनु हो | यसको अध्ययन अपि हिमाल गाउँपालिका (६१३.९५ वर्ग कि.मि.) क्षेत्रमा गरिएको थियो |

यो अध्ययन पुरा गर्न धेरै पद्दतिहरु प्रयोग गरिएको थियो | प्रारम्भिक डाटा संकलनको लागि प्रत्यक्ष फिल्ड अध्ययन, स्यम्प्लिंग पद्दति, घरधुरी सर्वेक्षण, मुख्य व्यक्तिको अन्तर्वार्ता गरिएको थियो | त्यस्तै द्वितीय डाटा संकलन गर्न विभिन्न प्रतिवेदन अध्ययन तथा प्रयोग गरिएको थियो | त्यस प्रकारको डाटा जी.आइ.एस र एम.एस. एग्सेल बाट विश्लेषण गरिएको थियो |

हिमालय कालो भालु अपि हिमालको बीच तथा तल्लो भागमा १५०० मि. देखि ३५०० मि. उचाइमा पाईएको थियो | यसलाइ १५ डिग्री देखि ६० डिग्री सम्मको भिरालोपन उपयुक्त देखिन्छ, साथै निगालो, चुत्रो, सल्ला, गुराँस, खसु, प्रजातिको वनस्पति उपयुक्त देखिन्छ र यसको लागि दक्षिण पश्चिम र उत्तर पक्ष उपयुक्त थियो | ५८.७०% मान्छेले वासस्थान विनासले, ३०.१८% मान्छेले सिकारबाट र ११.२०% मान्छेले खानेकुराको अभावबाट हिमालय कालो भालु लाइ खतरा परेको देखिन्छ | साँचै भालु संरक्षणमा एकदमै सहमतमा १८.४ %, सहमतमा २३.९ % तटस्थमा ३३.८% र असहमतमा १४% र एकदम असहमत ९.९ % रहेको देखिन्छ | भालुको मुख्य खतरा वासस्थान विनासले गर्दा भएको पाइन्छ र धेरै मान्छेहरु भालु संरक्षणमा चासो नदिएको र संरक्षण कार्यक्रम संचालन गर्नु पर्ने देखिन्छ |

मुख्य शब्दहरु :-

हिमालय कालो भालु, वासस्थान, वासस्थान प्राथमिकता, वासस्थान वितरण, संरक्षण

ACRONYMS

ACA	Annapurna Conservation Area
ACAP	Annapurna Area Conservation Project
BPP	Biodiversity Profile Project
B. Sc.	Bachelor of Science
BZ	Buffer Zone
CITIES	Convention on International Trade of Endangered Species
DNPWC	Department of National Park and Wildlife Conservation
Fig.	Figure
GIS	Geographical Information System
GPS	Global Positioning System
HMGN	His Majesty's Government of Nepal
FoF	Faculty of Forestry
IUCN	International Union for Conservation of Nature
IV	Ivelv's Electivity Index
IVI	Important Value Index
KCA	Kanchenjunga Conservation Area
Km.	Kilometer
LNP	Langtang National Park
m.	Meter
MFSC	Master Plan for Forestry Se
NBS	Nepal Biodiversity Strategy
NPWA	National Park and Wildlife Act
NRDB	National Red Data Book
PA	Protected Area
RD	Relative Density
RF	Relative Frequency
SPSS	Statistical Package for Social Science
Sq. km.	Square Kilometer
VDC	Village Development Committee

CHAPTER 1: INTRODUCTION

1.1 Background

Himalayan Black Bear ranges from Pakistan through Nepal and Sikkim to Bhutan and into China, Southeast Asia and the Amur region of the USSR. Himalayan Black Bear primarily occurs in the upper subtropical and lower moist temperature zones. These inhabitants of steeps forest and hills and Georges may range up to the tree line during summer but rarely much spend time in the alpine zone. It is a medium sized species of bear, largely adapted for arboreal life, seen across much of Himalayans. This species is morphologically very similar to some prehistoric bears, and is thought by some scientists to be the ancestor of other extant (Blandford, 1888). Himalayan Black Bear (Ursus thibetanus) is listed as vulnerable by the IUCN primarily because of illegal killing for bear parts (Garshelis and Steinmentz, 2008; Servheen, 1990).

Habitat is defined as the natural home or environment of an animal, plant or other organism. Habitat selected by the animal according to their suitability is habitat preferance (Panthi, 2015). Himalayan Black Bear (Ursus thibetenus) lives in the dense coniferous (cedrus deodara) mixed with Quercus incana and Rhododendron arboretum forests. The proposed study has objectives of identifying the status and distribution of Black Bear in the ANCA and the existing status of people-bear conflicts therein. Located in the eastern region of Nepal the Kanchenjunga District is the globally well known for its formidable peaks, high mountains, deepest gorge and several fauna and flora. It occupied 56% area of total area of Taplajung District.Hemitragus jemlahicus, Pseudois nayur, Semnopithecus entellus, Canis aureus, Ursus thibetanu,Ailurus fulgens, Uncia uncia, Moschus chrysogaster and Naemorhedus gora are most important mammals found in the area (DNPWC, 2010).

Conflict between human and Wildlife is one of the most widespread and intractable issues facing conservation biologist today. This issue encompasses a huge diversity of situation and species, from grain-eating rodents to man-eating tigers Pantheria tigris

(Pimentel Zunigia and Morrison, 2005, Barlow 2009). According to the local people several Himalayan Black Bear are in this area. Human-Black Bear conflicts occur frequently within the District and specially crop raiding by this species are frequently reported but no any documents related to its status was existing and no any scientific research was conducted up to date in this area. In this project I document the status of the Himalayan Black Bear, Status of Human-Black Bear conflict, habitat types and distribution of this species within KCA. Wildlife conservation in Nepal has been quite successful in terms of achievements in safeguarding the habitat of several threatened species (Mishra et.al 1992). The earlier concept of conservation was the protection of the declared areas with armed guards without people's involvement but now it is shifted to involve them for their benefits. From the conservation point of view, increase in number of wildlife within PAs shows success of conservation, but some animals like deer, bear, wild boars, leopards often make loss to the people living nearby parks/reserves. The main losses suffered by the local communities are primarily crop damage, livestock depredation and human loss and casualties due to wild animals.

Crop-raiding and livestock killings by bear is a major cause of concern and communities sometimes retaliate through traps and snares and even through loaded guns. Retaliatory killing and poaching particularly of the Black Bear for gall bladder are major setbacks for the conservation of the species in KCA and ANCA.

1.2 Rational of the study

Himalayan Black Bear (Ursus thibetanus) is listed as vulnerable by the IUCN primarily because of illegal killing for bear parts (Garshelis and Steinmentz, 2008; Servheen, 1990). It is also included in Appendix I of CITIES and list of protected animals by National Parks and Wildlife Conservation Act 1973, Nepal. Other factors such as habitat fragmentation, habitat loss and destruction, conversion of bear habitat into agricultural land as well as other anthropogenic pressures were found to significantly influence the Black Bear population and its habitat (Aryal, 2011; Garshelis and Steinmetz, 2008; Hwang et al., 2000; Sathyakumar, 2001). However, there has been very little information on the Black Bear status and its distribution in Nepal (Stubblefield and Shrestha, 2007). The issue of the human-bear conflict, which is also threatening the Black Bear population

and its distribution, has been raised in Nepal (Aryal et al., 2010; Aryal 2011; Aryal et al., 2012; Garshelis and Steinmetz, 2008; Sathyakumar, 2001; Stubblefield and Shrestha, 2007). In Darchula no any kind of research related this is conducted yet. Status of this species is still unknown. This information gap is one of the major problems for in-situ conservation of this species. To overcome problem of information gap this project is going to explore the scientific facts related to habitat preference, distribution and threats of this species. This information will be very much useful for in-situ conservation of this species in study area

1.3 Objectives

General objective is to identify the habitat preference, threats and distribution of Black Bear in study area

The specific objectives are-

1. To prepare the distribution map of Black Bear in study area.
2. To identify the habitat preference of Himalayan Black Bear
3. To identify threats and People's perception towards Himalayan Black Bear conservation.

1.4 Limitations of the study

1. Due to the academic schedule, the survey was conducted between Magh to chaitra. This was not a sufficient period of time for a complete detail analysis.
2. Some plant species could not be identified in the field and some specimens collected were also not identified due to the absence of flowers.

CHAPTER 2: LITERATURE REVIEW

Human-Black Bear Conflicts probably have occurred since human first inhabited North America (Garshelis 1989). Since that time, problems between humans and Black Bears have evolved in a variety of ways. However,the Black Bear also has substantial ecological, aesthetic and economic value (Jonker et al.1998,Belant et al.2005). (Conover, 2002) opines that a vast majority of wildlife species provides a net benefits to society-that the problems wildlife often create for humans are overshadowed by the many benefits these bears provides to ecosystems and society is immense and far surpasses the problems they sometimes creates. The body of scientific work regarding Black Bears is impressive, particularly in the arenas of natural history, biology, ecology, and population dynamics. Pleton (2002), Lariviere (2010) and more recently, Feldhamer et.al (2003) has compiled excellent summaries for individuals wanting an exhaustive review of scientific literature pertaining to the biology and ecology of Black Bear.

The Himalayan Black Bear (Ursus thibetanus) is an omnivore that occurs throughout the mid-hill region of Nepal. Globally, it is listed as vulnerable; in southern Asia it is considered threatened and in Nepal it is identified as endangered. Himalayan Black Bear are diurnal by nature, though the majority of them have become nocturnal in order to avoid human. They often spend days in caves or hollowed out trees. They are omnivorous creature and will eat just about anything. Their diet consists of acorns, nuts, fruits, roots, honey, roots, rhizomes, plants and various insects such as termites and beetles larvae. It found in scares they may turn to eating livestock such as sheep, goats, and cattle.

Although female Black Bears reach sexual maturity from 2 to 8 years of age (Poelker and Hartwell 1973, Rogers 1987, Etter et al.2002), Females usually are sexually mature at 3 to 5years of age sexually mature at 3 to 5 years of age (Pelton 1982).They have, however, reportedly bred at 2 years of age in portions of their range as far North as Michigan(Etter et al.2002).Females often breed earlier and have above- average litter sizes in portions of their geographic range with abundant food.

Breeding season for Black Bears occurs during summer, the peak being from mid-June to mid-July(Alt 1982,1989) but it can extend until September(Lariviere 2001). Multiple matingis practiced by both male and females (Schenk and Kovacs 1995). Female exhibit delayed implantation(Wimsatt 1963), with the ova being fertilized almost immediately after the copulation but development of the embryo being suspended at the blastocyst stage. In Pennsylvania, implementation typically occurs between mid- November and early December (Kordek and Lindzey 1980) with gestation lasting 60 to 70 days (Kolenosky and Strathearn 1987, Hellgreen et al. 1990). Delayed implantation postpones any nutritional investment until after the critical fall foraging period (Ternet 2005). If a fall food shortage results in a reduction in fat reserves, the blastocysts can be absorbed with little energy cost to the female. A reduction in Nutritional investment in a poor food year allows the female to breed again the following summer if nutritional resources are more favorable (Ternent 2005).

Cubs are born fully furred and with eyes closed, typically in January while females are in the den. Black Bear litter sizes range from one to five (Kasworm and Thier 1994, Doan-Crider and Hellgren 1996, McDonald and Fuller 2001), with sex ratios of cubs generally 50:50 (Elowe and Dodge 1989). Cubs weigh 0.62 to 0.99 pound (280 to 450 grams) at birth, but because of the high fat content in their mother's milk, they grow quickly (Ternent 2005). By the time the female and cubs exist the den (generallt from mid-March to late April); the cubs weigh between 5.1 kilograms). By the end of their first summer, cubs typically weigh 51 to 60 pounds (23 to 27 kilograms). Cubs stay with their ubs stay with their mother for about a year and a half, dinning together the winter after birth and separating in late May to July the following spring. The inter birth interval for adult females ranges from 1 to 4 year. Variability in age at first reproduction. Litter size, and inter birth interval has been attributed to variability of fall food, particularly hard mast (Rogers 1976, Elowe and Dodge 1989, Kasbohm et al.1996).

Encroachment of habitat, forest fire, deforestation and poaching reduce the Black Bear habitat. There is also high mortality rate among the new born, an even though hunting of Himalayan Black Bear since 1977 AD (Annual DNPWC). Forty three household of the

study site lost 55number of livestock in Manaslu from 2009-2012, Total loss from livestock killing by Black Bear is equivalent to US dollar 23,882 (Madhu Chetri 2013Manaslu report). Conflict between people and animal is one of the main threats to the continued survival of many species in different parts of the world and is also a significant threat to local human population. If solutions to conflict are not adequate, local support for conservation are also decline.

Human-Wildlife and other conservation related conflicts are serious obstacles to wildlife conservation effort worldwide. The Conflict is often as much a conflict between people about the wildlife, as it conflict between people and wildlife. (Marc Kenyon). One of the most serious causes of human-wildlife conflict is the fear of being killed by seven wildlife (Thirgood et al., 2005). Damage by wildlife can change people's perception towards wildlife especially when damage exceeds a level of tolerance (Hill, 1998). Safety of self and family is the major concern that determines the attitude of people towards wildlife and the higher level of fear generally result in more negative attitudes (Roskaft et al., 2007). Attitudes of local people are vital in wildlife conservation and the attitude may vary according to gender, age, and education and past experiences with the particular species of wildlife (Hill, 1998, Roskaft et al., 2007). Older people generally have more negative attitudes, as do people who have experienced damage from wildlife while people with higher levels of education tends to be more positive towards wildlife (Roskaft et al., 2007).

Human-Wildlife and other conservation related conflicts are serious obstacles to wildlife conservation effort worldwide. The Conflict is often as much a conflict between people about the wildlife, as it conflict between people and wildlife.(Marc Kenyon). One of the most serious causes of human-wildlife conflict is the fear of being killed byseven wildlife (Thirgood et al., 2005). Damage by wildlife can change people's perception towards wildlife especially when damage exceeds a level of tolerance (Hill, 1998). Safety of self and family is the major concern that determines the attitude of people towards wildlife and the higher level of fear generally result in more negative attitudes (Roskaft et al., 2007). Attitudes of local people are vital in wildlife conservation and the attitude may vary according to gender, age, and education and past experiences with the particular

species of wildlife (Hill, 1998, Roskaft et al., 2007). Older people generally have more negative attitudes, as do people who have experienced damage from wildlife while people with higher levels of education tends to be more positive towards wildlife (Roskaft et al., 2007). The wildlife conservation history in Nepal started since the time of late king Surendra (1847-1881). Some legal provisions were established to penalize and fine poachers. Wildlife protection activities have been practiced in Nepal since 1960. Although seven different Royal hunting reserves were gazette under the Wildlife Protection Act in 1969, wildlife management was practically initiated only after the enactment of National Park and Wildlife Conservation (NPWC) Act of 1973. The Act prioritizes the conservation of Nepal's natural eco-systems and genetic resources and provides the fundamental bases for the establishment of protected areas and conservation of wild animals including their habitats. Conservation of biological diversity is an integral part of Nepal's national policy. To show its commitment to conservation,Nepal Government of established a network of protected areas following the promulgation of the National Parks and Wildlife Conservation Act in 1973 with the aim of conserving wildlife and biological diversity. The Ministry of Forests and Soil Conservation (MFSC), through its Department of National Parks and Wildlife Conservation (DNPWC), assumed the lead role in this conservation campaign.

Although the country has been highly successful in conserving indigenous fauna and flora, most of the national parks and reserves of Nepal today suffer from the incipient conflicts between local people and park management (Upreti, 1991), But the extent of conflicts differ among different reserves (Heinen, 1993). The problem of park – people conflicts is not an old issue, it is becoming more and more critical and can be observed anywhere in the parks and reserves (Shrestha, 1994). People used to graze their livestock in the forest before the establishment of District. But after the declaration of the PAs, all these activities became illegal, as people are not allowed to collect resources from the park creating a conflict between people and park or reserve.

The MFSC, through the DNPWC, was successful in bringing about a healthy growth in wildlife population since then. It soon became apparent, however, that unless another important element was taken into account, it would be difficult, if not impossible, to

bring about balance in the conservation process. This was the human element - represented by the communities living at the periphery of the protected areas that directly affected. This was because of the restriction imposed on the local communities in the use of CAs resources after their declaration as protected areas, on the one hand, and the increased incidence of livestock depredation and crop damage by wild animals with an increase in their number, on the other, which ultimately resulted in park-people conflict. Since 1973's Nepal started to establish a network of gazette protected areas representing different eco-system and bio-diversity of the country. Currently, Nepal has total 20 PAs which include 10 National Parks, 3 Wildlife Reserves, 6 Districts and 1 Hunting Reserve, encompassing about 23.23% of the land area of the country in the three different ecological zones i.e. terai, mid-hills and mountain (NBS, 2002).

Wildlife conservation in Nepal has been quite successful in terms of achievements in safeguarding the habitat of several threatened species (Mishra et.al 1992). The earlier concept of conservation was the protection of the declared areas with armed guards without people's involvement but now it is shifted to involve them for their benefits. From the conservation point of view, increase in number of wildlife within PAs shows success of conservation, but some animals like deer, Black Bear, wild boars,snow leopards often make loss to the people living nearby protected area. The main losses suffered by the local communities are primarily crop damage, livestock depredation and human loss and casualties due to wild animals. Sometimes local people are also killed or injured by wildlife not only during collection of forest resources but also in their settlements. The local farmers feel entitled to compensation for these losses that are an outcome of habitat protection in the parks and reserves. Cropraiding by nuisance animals leads to the development of negative attitudes among locals towards the conservation particularly that of endangered animal.

The execution of different activities by local inhabitants particularly livestock grazing in the pastures which are also the habitat of different predator species leads to the incidence of the livestock to the predators resulting in the economic loss. On one hand, the damages even in a small extent may affect them seriously and on the other, people who are suffered from these damages are not getting direct compensation of what they have

actually lost. This is very crucial issue and is very difficult to resolve. It has been shown that human deaths, injuries, livestock depredation, crop damage and human harassment by wild animals have led to increase conflicts between park-people (Sharma, 1986, Jnawali, 1989, Heinin, 1993) in general and wildlife-human conflict in particular.

The existence of this sort of condition results in the unhealthy relationship between the wildlife particularly the predators and the local people. And the people may undertake retaliatory killing in response to the economic loss incurred by livestock depredation resulting the reduction in the population of the wildlife.

The problem of human-Black Bear conflicts is emerging issue in Kanchenjunga District, it is becoming more and more critical and can be observed anywhere in the protected area of terai to Himalayan area. People used to graze their livestock in the forest before the establishment of protected areas. But after the declaration of the protected area, all these activities became illegal, as people are not allowed to collect resources from the park creating a conflict between people and park or reserve. The disturbance of natural habitat and lack of food available inside the CA causes attract the Black Bear towards residential area ultimately the human-Black Bear conflict issue became rising.

Due to isolation of the local people from the park management and ignorance of their subsistence requirement from park resources, most of the PAs in Nepal are facing park – people conflict (Sharma 1990). Similarly, human casualties, victimization, agricultural crops and livestock depredation caused by animals (especially by Black Bear) also influenced the local people to behave adversely towards park management (HMG/UNDP, 1995). It was realized that without good relations and co-operations of the local people, no conservation measures would be successful.

CHAPTER 3: STUDY AREA

3.1 Background

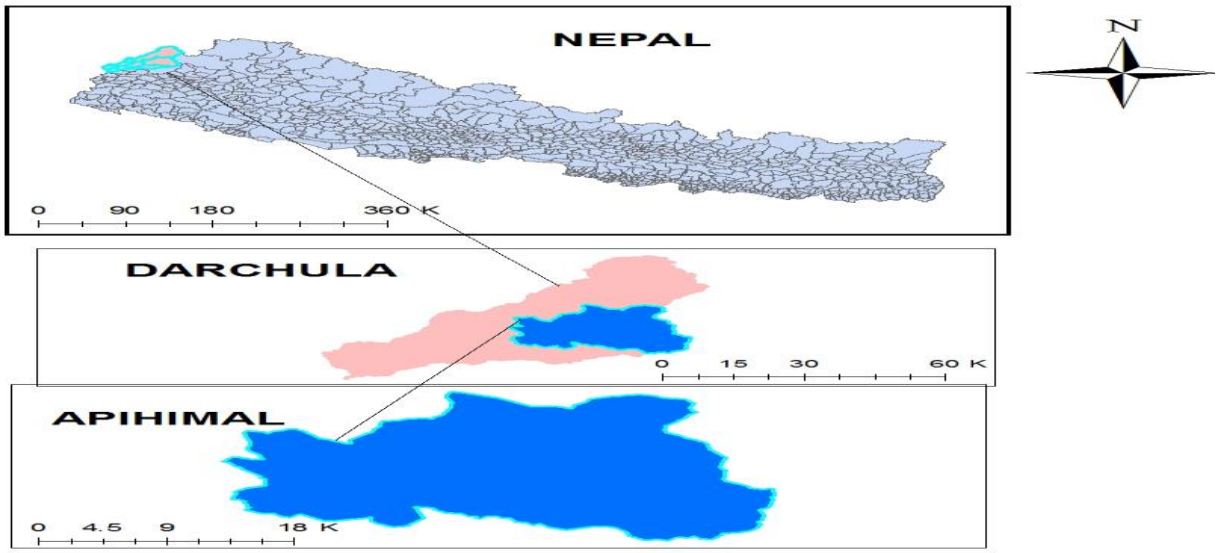


Fig- 1. Map of Study Area

About the Api Himal Rural Municipality of Darchula District

- **Darchula District** a part of Province No.7, is one of the seventy-seven districts of Nepal. The district covers an area of 2,322 km² and has a population of 133,274 (National population and housing sensus, 2011). Api Himal Rural municipality is situated in Chaulani river Zone of Darchula district of far-western development region and covers an area of 613.95 sq. km. Elevation: 1282 - 7132 m

3.2 Climate

The monsoon season starts from June and lasts until the beginning of October. Daytime temperatures are very low during winter due to strong winds. Higher elevations remain covered by the snow through the year. Snow may occur even at low elevation until early April, however, it soon melts. The best time to visit the area is March to April because the snow fall is stopping in this time.

3.3 Flora

The Area is characterized by subtropical, temperate, sub alpine, alpine vegetation. Common plant species include fir (*Abies pindrow),* blue pine (*Pinus wallichina),* birch (*Betula utilis*), rhododendron (*Rhododendron spp),* hemlock *(Tsuga domusa*), oak (*Quercus semicarpifolia),* juniper (*Juniperus indica),* spruce (*Picea smithiana),* maple *(Acer caesium),* okhar (*Jugalns regia),* yew *(Taxus bacata)* and chirpine *(pinus roxburghii),* chutro (*Berberis aristata)* (ANCA, 2015).

3.4 Fauna

The area is one of the prime habitats for *Hemitragus jemlahicus, Pseudois nayur, Semnopithecus entellus, Canis aureus, Ursus thibetanu, Ailurus fulgens, Uncia uncia, Moschus chrysogaster and Naemorhedus gora* are most important mammals found in the area (ANCA, 2013).

3.5 Demography

The human settlements within the reserve include Bishowkarma, Tinkari, Sauka, and Bhotias (Tibetan refugee) with a few Brahmin and Chhetri. People are dependent on traditional agricultural practice in the lower parts. In the upper parts of the area, animal husbandry and trans-boundary trade is a major source of livelihood (ANCA, 2015).

CHAPTER 4: METHODOLOGY

4.1 Distribution Map

A distribution map was prepared on the basis of ground truth GPS data. Local knowledge was used to identify potential Himalayan Black Bear habitat. A focus group discussion survey was conducted with the local people to establish areas of presence and absence throughout the area. Presence-absence of Himalayan Black Bear was verified in each block and forest area and locations recorded with GPS. At each potential site, general habitat characteristics including elevation, distance from settlement, river and road connection was noted. ArcGIS-10.2.1 software were utilized to produce a Himalayan Black Bear distribution based on the current distribution area, forest types and habitat use.

4.2 Habitat Preference

Hall et al. (1997) defined "habitat use" as the way an animal uses (or consumes in a generic sense) a collection of physical and biological components (i.e., resources) in a habitat. Hall et al. (1997) defined "habitat availability" as how accessible and procurable physical and biological components of a habitat are to animals.

Random sampling was used to collect different habitat parameters from the field. Habitat use and availability plots were laid throughout the study area. Habitat use plots (U) were laid out in areas that contained Himalayan Black Bear signs (scats, hair, foot prints, resting sites, etc). Parameters including slope, altitude, Aspect, vegetion cover and land features were recorded for these plots. Simultaneously, habitat availability plots (A) were laid out in a random direction with a distance of 100-150m between each plot (Aryal and Kreigenhofer, 2009) and the same parameters noted above were also recorded in these plots. Where signs of Himalayan Black Bear were observed in the habitat availability plots, those plots' status were changed to "habitat use" as "habitat availability" plots should not contain any signs of Himalayan Black Bear.

The quadrat size was selected as suggested by Schemnitz, D.S, (1980) for vegetation analysis in both the use and availability plots, being: 10m ×10m for the tree layer, (plants above 3m height and 5cm DBH), 4m × 4m for the shrub layer (woody plants below 3m in height), and 1m × 1m plots for herbs (plants up to 1m in height). In each plot DBH,

height and crown cover of trees were recorded as well as ground cover, number of trees, frequency of shrubs and herbs, signs of other animals, and any anthropogenic pressures. Different livestock signs were recorded in each plot to analyze any habitat overlap between other livestock and Himalayan Black Bear.

4.2.1 Ivelv's Electivity Index

The habitat preference of Himalayan Black Bear was analyzed using Ivelv's electivity index (IV) where positive values indicate preference, negative values indicate avoidance, and 0 values indicate random use. Values of this index range from -1.0 to +1.0. Following the IV, the following formula was used to calculate of habitat preference of Himalayan Black Bear:

IV= (U% - A %) /U% + A %) (Ivelv, 1961).

Where "A" represents "availability plots" and "U" represents "use plots". Habitat preference based on different habitat parameters such as elevation, slope, trees, shrubs, herbs was analyzed. A one-way ANOVA was used to test for significant levels of preference for the different habitat parameters with the null hypothesis being that all habitats are used in proportion to their availability.

4.3 Threat Identification and People's perception towards Himalayan Black Bear conservation

Information was collected through informal discussion with local people and ANCA staff to tentatively list possible issues concerning Himalayan Black Bear conservation. Threats and conservation practices were also assessed based on the direct observation in the field, Key informant interview and focus group discussion. Disturbances in the habitat, signs of grazing and felled tree stumps were recorded in the plots. Human dependency on the forest was assessed through interviews with key person.

4.4 Camera trapping:

Only five camera installed in this area. Camera installed when sign of Himalayan Black Bear found in five plots.

CHAPTER: 5 RESULTS

5.1 Distribution of Himalayan Black Bear in Api Himal Rural Municipality

Himalayan Black Bear were found to be distributed in the middle belt of Api Himal Rural municipality of Darchula. The potential Habitat preferable species of the Himalayan Black Bear such as Berberis aristata, Abies, *Quercus*, *Pinus* roxburghii, Betula Rohododendron, Drepanostachum. Himalayan Black Bear mainly found in Block of Makarighat, which located upper parts of Makarighat River. Next Plot was Dharamghar Block which located around the path of Dharsmghar. Kshetti is also another block for the Himalayan Black Bear but found few sign than other which located in east upper parts of khandeshwari. Sign of Himalayan Black Bear mostly found in Dharamghar block.

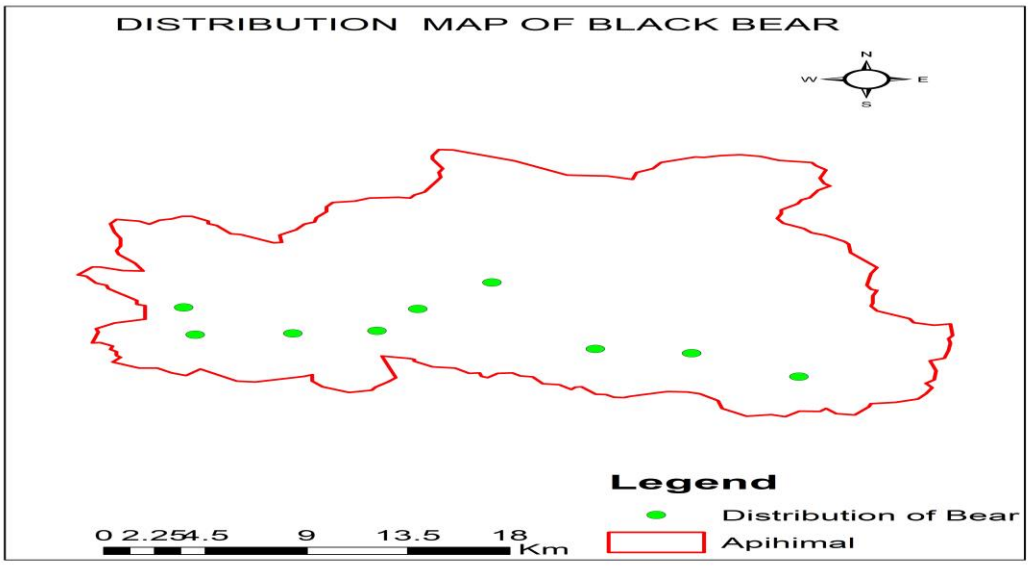
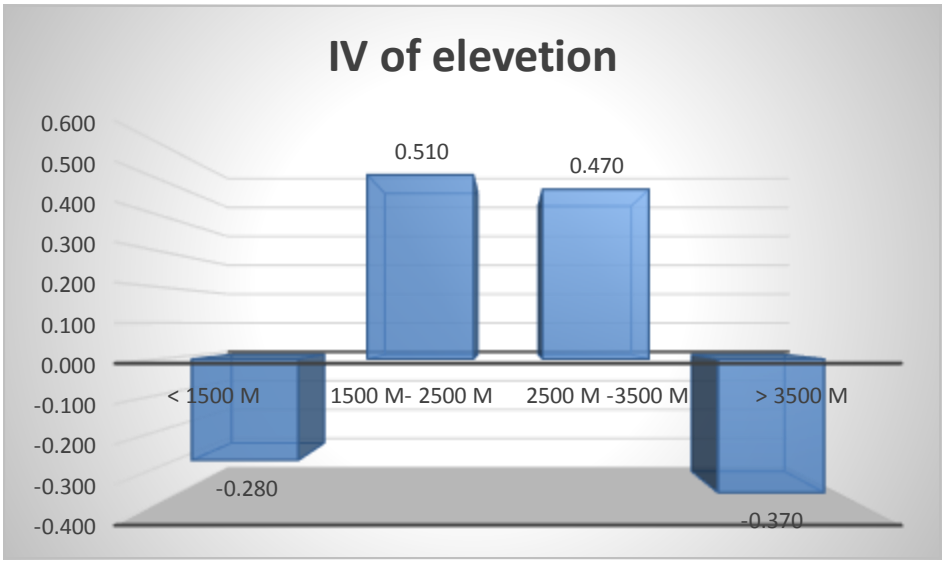


Fig. 2: Distribution map for Himalayan Black Bear in Api himal Rural Municipality

5.2 Habitat preference

5.2.1 Elevation

Himalayan Black Bear signs were recorded at elevations between 1282 and 3710m in this area (fig 3). Himalayan Black Bear avoided elevations below 1500m, and above 3500 m. It preferred elevation between 1500 m to 3500 m (Figure 3).



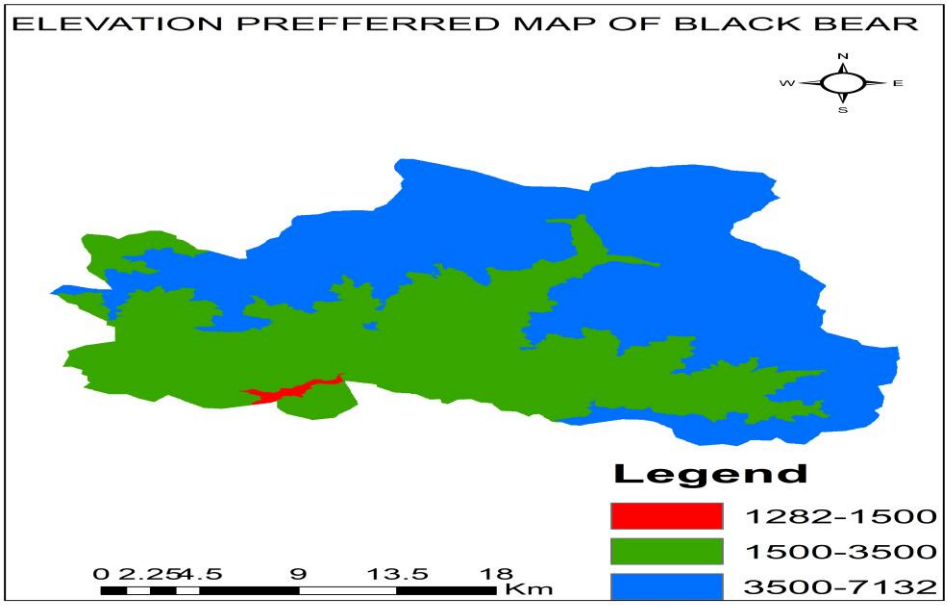
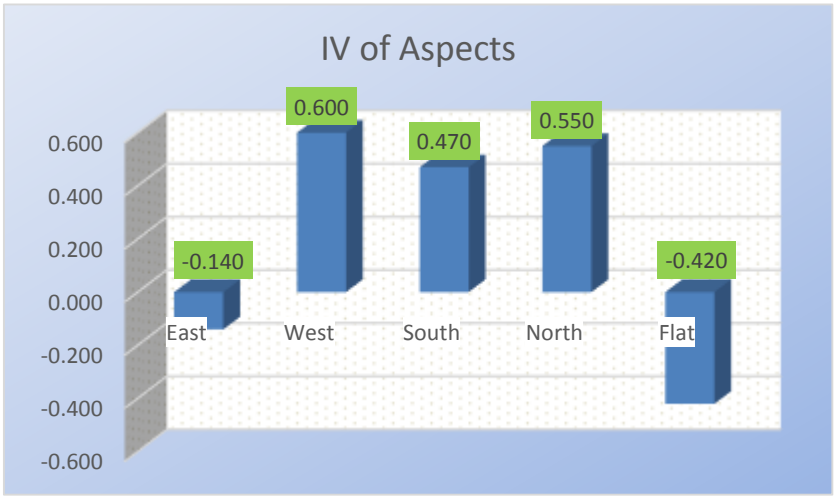


Fig. 3: Elevation distribution of Himalayan Black Bear

5.2.2 Aspect

Himalayan Black Bear avoided flat land (IV=-0.420) and east facing aspect (IV=-14). It preferred the North, West and South facing aspect (figure 4).



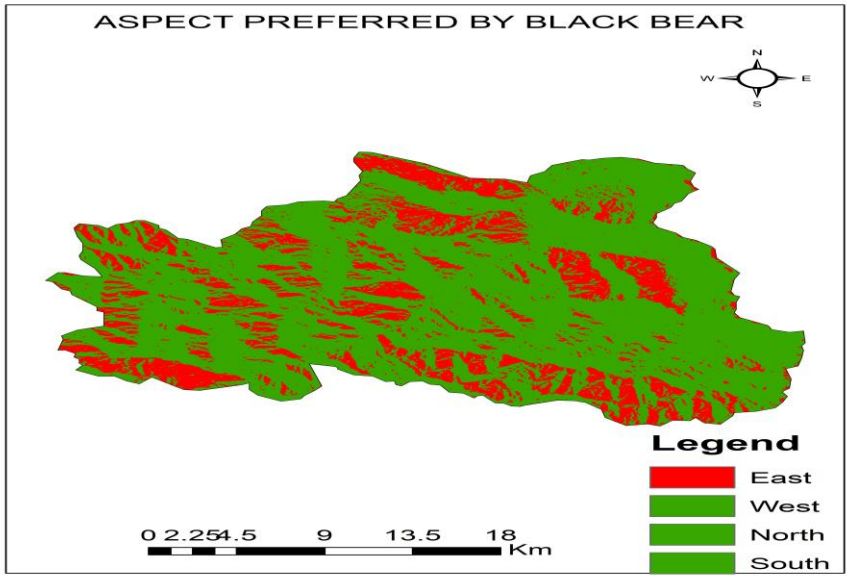
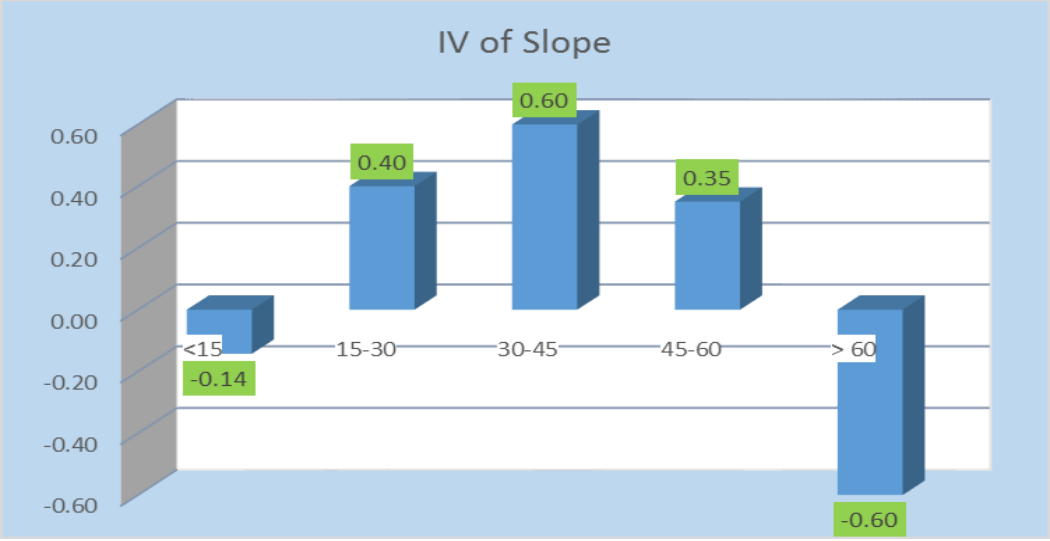


Figure 4: Aspect preference of the Himalayan Black Bear

5.2.3. Slope

Himalayan Black Bear signs were recorded along slopes between 0° to 82°. Himalayan Black Bear preferred the slope range of 15° - 60° and avoided areas with a slope above 60° (IV = -0.60) and below 15 ° (IV = -0.14).



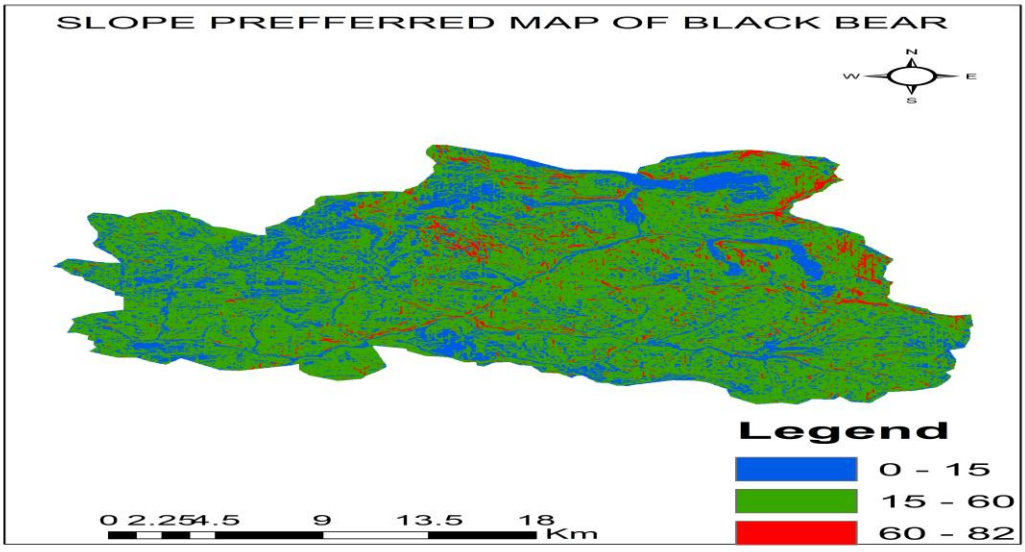


Fig 5: Slope preference of Himalayan Black Bear

5.2.4 Plant Preference

A total of 11 species of plants were recorded. Himalayan Black Bear showed a preference for 7 of the 11 species, including Berberis aristata. They avoided the three species and they used one species randomly (figure 6).

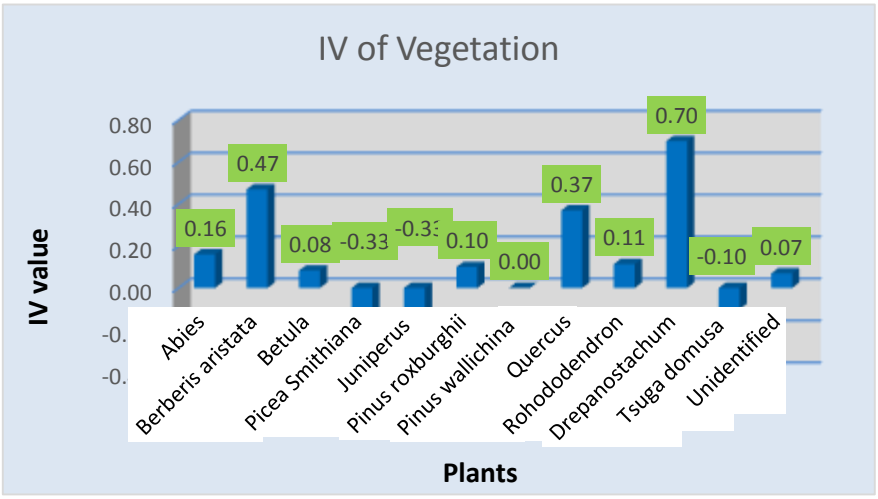


Fig:-6 Plant preference of Himalayan Black Bear

5.3 Threats

The major threat of Himalayan Black Bear in Api Himal municipality of Darchula was habitat destruction. The habitats of Himalayan Black Bear were destructed by firing and felling also. A. spectablis and Pinus wallichiana were felling for building construction and other local uses viz. fencing, fuel wood, wooden bridge construction and furniture making. Headers were directly responsible for firing. They use fire for producing good quality of grass. Poaching and netting were others threats of the Himalayan Black Bear in the reserve. Especially Himalayan Black Bear wasn't target species of poachers but in many cases they were killed by mistake. The grazing is next threats of Himalayan Black Bear in this area. Other causes of Black Bear threats are: population increase, poverty, lack of awareness programmed, illiterate etc.

58.70% respondent said that major threats for black bear is habitat destruction, 30.18% respondent said that major threats for black bear is poaching, 11.20% respondent said that major threats for black bear is food scarcity

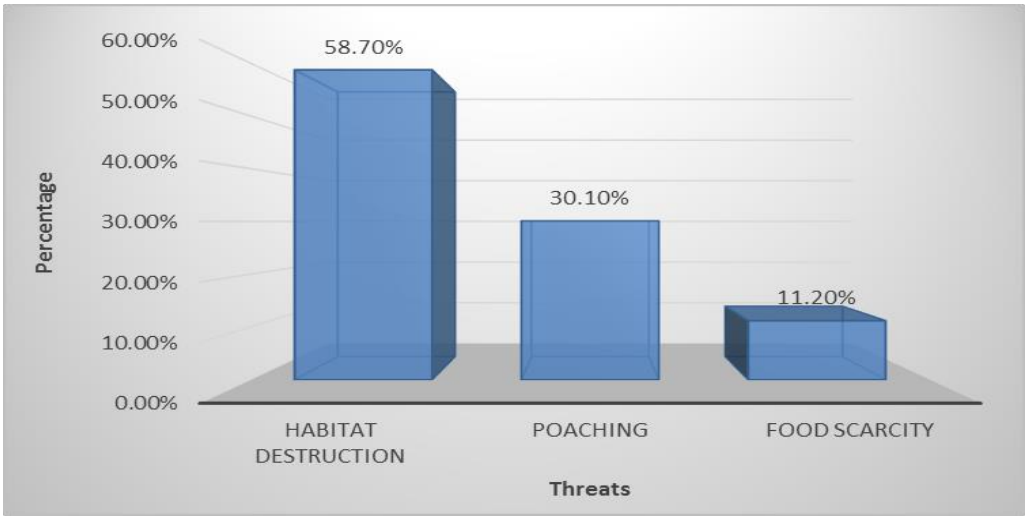


Fig: 7 Major Threats

5.4 conservation

To measure the attitude of peoples towards Black Bear conservation; a five point liker scale was adopted in which 18.4% represent strongly agree and 9.9% represent strongly disagree. (See Table)

People's perception towards Black Bear conservation					**Total**
Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**	
13	17	24	10	7	71
18.4%	23.9%	33.8%	14%	9.9%	100%

Information is shown in the following pie chart as well.

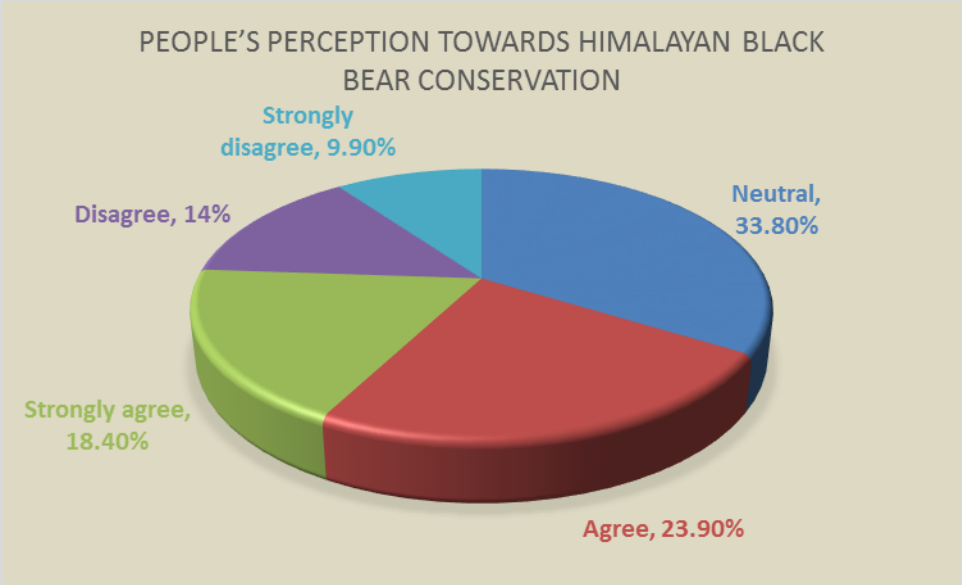


Fig. 8: People's perception Black Bear conservation

CHAPTER: 6 DISCUSSIONS

6.1 Distribution

Himalayan Black Bear ranges from Pakistan through Nepal and Sikkim to Bhutan and into China, Southeast Asia and the Amur region of the USSR. Himalayan Black Bear primarily occurs in the upper subtropical and lower moist temperature zones. In Nepal, KCA, ANCA and other part of upper subtropical and temperate zone. In Api Himal, middle and lower part is more prefer by Himalayan Black Bear.

6.2 Elevation, Slope and Aspect

- Himalayan Black Bear are found throughout the Himalayan Mountains at an elevation range between 1620 and 3,800 meters (Roberts and Gittleman, 1984). In Api HImal Rural Municipality, Himalayan Black Bear are distributed 1500 - 3500m elevation. Himalayan Black Bear were found to be distributed in the middle and lower belt of Api Himal rural municipality of Darchula.

6.3 Threats

Major threats are:-

6.3.1 Habitat destruction

Habitat destruct by two way; Natural events (land slide, forest fire, erosion, climate change)

And manmade like deforestation and woodland degradation, land degradation, over grazing, shifting cultivation, encroachment, over cutting and over uses of prefer vegetation of Himalayan Black Bear etc.

Other causes of Black Bear threats are: population increase, poverty, lack of awareness programmed, illiterate etc.

6.3.2 Poaching

Poaching is main threat for the population of Himalayan Black Bear in the study area. The main reason for the hunting of Black Bear has always been the demand for Bear Bile

and Other bear parts. The price of Bear Bile in the international market is skyrocketing, leading to increase in the poaching and smuggling from the Himalayan habitat.

6.3.3 Food scarcity

Forest firing, illegal collection of forest product and natural events or hazard caused food scarcity. About 11.20% respondent said that threats by food scarcity.

6.4 Conservation

All the respondents are aware of conserving the Black Bear as they have a sense of ownership towards the conservation of Black Bear as well as CA. They feel the CA is made for them and they are the people who are responsible to protect the CA for their existence. But, some of them are not satisfied from the management aspects such as they are suffered from crop and property damages and the compensation provision also not effective yet. In some time ago, most of peoples (approximate 70%) was involved in poaching of wild animals but now a days or after established ACNA reduced in 40% approximate in case of poaching but increasing in human pressure(key informant interview).

CHAPTER: 7 CONCLUSIONS

The most preferable altitude of the Himalayan Black Bear is 1500 m- 3500 m.

- It prefers the moderate slope (15 degree – 60 degree).
- Himalayan Black Bear prefer tree species of Berberis aristata, Abies, Quercus, Pinus roxburghii, Betula, Drepanostachum and Rhododendron
- Himalayan Black Bear prefer the south, west and north aspect and avoid east aspect as well as flat zone
- 58.70% respondent said that major threats for black bear is habitat destruction 30.18% by poaching 11.20% by food scarcity
- People's perception towards Black Bear conservation strongly agree 18.4%, agree 23.9%, neutral 33.8%, disagree 14% and strongly disagree 9.9%.

CHAPTER: 8 RECOMMENDATIONS

The following recommendations are made based on the study.

- The firing and felling should be controlled in this area so the preferable species of the Himalayan Black Bear such as Berberis aristata, Abies, Quercus may be conserved. So Mitigation measures should be applied immediately.
- The population survey of the Himalayan Black Bear should be conducted in ANCA.
- The monitoring mechanism of Black Bear poaching areas should be regularized, local initiatives such as anti-poaching unit should be encouraged and strengthened.
- Different awareness-raising programs targeting various groups such as youths, student, and herders should be designed and launched focusing on the importance of Black Bear and its conservation.
- A networking and coordination mechanism between different organizations that are working for the conservation of Black Bear should be initiated.
- Strict enforcement of wildlife related laws should be enacted. It is recommended that a Black Bear action plan should be prepared for specific sites.

Annex- 1. Key Informant Interview

1) Name…

VDC: Ward No.

Age: Sex:

Village:

2) Do you know about Himalayan Black Bear?
3) Do you see Himalayan Black Bear in forest? How often?
4) In which part of the forest do you see Himalayan Black Bear?
5) Which plants and animals do Himalayan Black Bear prefer for food? In which part of the forest majority of the species available?
6) How often the Himalayan Black Bear come in the village?
7) What is the status of Himalayan Black Bear in this area? Is there threats to it?
8) What are the major threats of Himalayan Black Bear in this area?
9) Are there any programs currently running for the conservation of Himalayan Black Bear?
10) What are the local people effort for Himalayan Black Bear conservation?
11) Is there any government rules and regulation for conservation of Himalayan Black Bear? Is it implement properly in this area?
12) Is there running any government or nongovernment agencies for Himalayan Black Bear conservation?

Annex-2. Questioner Survey

13) Name:……
VDC:…….., Ward No.: …….

Village:…….

14) Do you go to the forest ?

……

3) How many times you go to the forest in a week?

……..

15) For what purpose you go to the forest?

……
…….

16) Do you have any goats inside the forest? Yes ……, No …….
If yes then where...

17) Do ever seen the bear inside the forest?
If yes then,

In which side? ……..

How many? ……..

6. What kind of crop you grow?

……
…

7. Is there any damages caused by wild animals?
Yes ……., No. ……..

8. Which animal cause more damage to your crop?

……
…

9. Do the bear cause damage to your field?
Yes ……., No. …….

If yes then,

In which way, i.e. the pattern of damages. E.g.

By eating …... by mauling…….. Or by both……

10. Have you ever killed the bear inside your field?

Yes ……, No. …….

If yes then,

How many? ……

11. Do you know that men were killed by bear?

Yes ……, No. …….

If yes then,

How many? ……

12. Do the bear killed your cattle?

……
…...

Peoples' attitude towards Black Bear conservation

Please indicate your attitude towards following wildlife:

Particulars	**Strongly agree (1)**	**Agree (2)**	**Neutral (3)**	**disagree (4)**	**Strongly disagree (5)**
Black Bear should conserved					
Wildlife in general					

1. Why it is necessary to conserve? Give your opinion.

2. Awareness towards Black Bear conservation?

a. Increased=1, **b.** decreased=2

3. What are the major threats for Himalayan black bear? (Tick more than one)

a. Habitat destruction b. Food scarcity c. Poaching

4 Have you any recommendation/suggestion to reduce the livestock depredation, human casualties and property loss?

5. If yes, what are they?

6. Is the compensation scheme appropriate for Black Bear damage? Yes=1/No=2

7. What would be the future strategies to manage the Black Bear Conflict in this area?

8. Do you know about Himalayan Black Bear?

…….

8. 9. Have you ever seen Himalayan Black Bear in forest?

…….

9. Would you please provide the name of specific sites where Himalayan Black Bear are found inside the forest?

……

10. Could you please estimate the number of Himalayan Black Bear in this forest?

……

11. Do you know about the behaviors of Himalayan Black Bear? (Food, habitat, reproduction).

……

12. Do they harm people or livestock?

……

……

13. Do you know Black Bear being killed by human/animal in your area? (If yes Why?)

(Potential areas of poaching)

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PHOTOPLATES

Resting site of Bear

Scat of Himalayan Black Bear

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TCL	TU	2068-2070	1st Division
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