Report On:

Conservation of Musk Deer *'Moschus chrysogaster' in Annapurna Conservation area of Mustang* district of Nepal

(Marpha Village Development Committee (VDC), Mustang)

Submitted BY:
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CAMC of Marpha deserves thanks for their cooperation during surveys and participatory conservation action plan. All other informants are thanked for sharing their information.

Finally, my greatest recognition goes to my beloved parents and my wife Hari M. Chhetri, for their inspiration and moral support for this study.

Achyut Aryal
2007

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Abstracts of the project:

Himalayan Musk deer '*Moschus chrysogaster*' **is vulnerable species of Nepal. The project entitled "*Conservation of* Musk Deer *'Moschus chrysogaster' in Annapurna Conservation area of Mustang* district of Nepal "** was carried out in Marpha **Village Development Committee (**VDC) of Mustang district, Nepal.

Research part:
The survey was carried out by direct field inventory, population/pellet count and questionnaire survey. Pellets groups were counted in transect line with the help of local people. Vegetation analysis was carried out in musk deer habitat by using sample plots of 10m X 10m for tree layer, 4m X 4m for all woody undergrowth up to 3m in height, and 1m X 1m for the herb layer.

In Mustang district Musk deer is found in Tukuchhe, Marpha, Muktinath, Kobang, and Kagbeni VDCs and is suspected in Jomsom, Ghasa, Kunjo and Lete VDC.
15 musk deer (5 male, 9 Female, 1 unclassified) were counted in Lumbubiyo forest area through silent drive count. Pellet group density in Chichugan forest was 7.26/ha. Therefore using regression model developed by Aryal, 200, it was estimated that there was 2.4 musk deer/sq. km. Local people strongly believe that population of musk deer is being declined from the forest of Marpha VDC. Majority of the school's students were unknown about its legal status and only 2% of knew about that.

Forest land is most preferred habitat types by musk deer. The preferable altitude of the Musk deer in study area was 3300-3700m. There was increasing encounter rate of pellet 10◦ to 45◦ of angle of slope in study area then gradually decreasing. Moderate crown cover (50-70%) was highest in study area and pellet group were found in moderate crown cover. Total 5 species of tree, 4 species of shrub and 7 species of herb were recorded. *Abies sp.* (IVI=108.35) was most prominent followed by *Betula utilis* (IVI=91.95), *Juniperus sp.* (IVI=36.1), *Cupressus torulosa* (IVI=31.49), *Pinus wallichiana* (IVI=32.11). Snare/trap was preferred method of poaching. In the past, poachers used guns, poison and dogs for killing Musk deer. There were high threats to Musk deer habitat due to overgrazing by domestic livestock, forest fire, timber and other forest product collection, etc

Conservation Action Plan part:
Participatory Musk deer conservation action plan was prepared by participation of local people specially Conservation Area Management Committee (CAMC), Marpha. Local people demand for alternative source instead of not disturbing musk deer habitat. They demanded for different programme specially focusing on

income generating activities. Total cost for implementation of proposed action plan was nearly $ 82,500.00.

Conservation Education parts:
Conservation education activities like art and essay competition, were carried out in school of the study area. Students from Class 6, 7, 8, 9, 10 participated in the activities. Total 21 and 23 students participated in art and essay competition respectively. Two days conservation education classes on introduction of musk deer, distribution range, status of Musk deer in Nepal, and ACA, threats on it habitat, our role and responsibility in Musk deer conservation etc, were conducted for students of class 6 to 10. The class was expected to change attitude of local people towards the conservation of musk deer in study area.

Poster and Brochure Publication: The Project had published poster entitled as ***Save the Himalayan Musk deer*** and distributed it to schools students and local people so that it could convey the message of saving the musk deer for our future. Similarly, musk deer information brochures were published to provide information regarding musk deer and its status in Nepal, which had been published in Nepali language.

ACRONYMS

ACA :	Annapurna Conservation Area
ACAP :	Annapurna Conservation Area Project
CITES :	Convention on International Trade of Endangered Species of Wild Flora and Fauna
CAMC :	Conservation Area Management Committee
NTFPs :	Non-Timber Forest Products
cm :	centimetres
GPS :	Global Positioning System
ha :	Hectare
Km2 :	Square kilometre
HMG/N :	His Majesty's Government of Nepal
IOF :	Institute of Forestry
IUCN :	International Union for Conservation of Nature and Natural Resources
IVI :	Importance Value Index
m :	meters
OIC :	Office-in-Charge
pers. comm.:	personal communication
RD :	Relative Density
Rdom :	Relative Dominance
RF :	Relative Frequency
UCO :	Unite Conservation Office
VDC :	Village Development Committee

Chapter: One

Research Part

Introduction:

Musk deer '*Moschus chrysogaster*' belongs to order- Artiodactyla, family- Moschidae is found in Asia. Musk deer is a protected mammal and listed as an endangered species by the National Parks and Wildlife Conservation Act 1973 in Nepal. It is listed in Appendix I for Afghanistan, India, Nepal and Pakistan, and in Appendix II for Bhutan and China under CITES. It is distributed in Afghanistan, Bhutan, China, India, Myanmar, Nepal, and Pakistan. In Nepal, it is found in the Annapurna Conservation Area (ACA), Kanchenjunga Conservation Area (KCA), Sagarmatha, Langtang, Shey Phoksundo, Rara, Khaptad and Makalu Barun National Parks and Manaslu Conservation Area, where a major problem is poaching (HMG/N, 2002). In these areas, they are distributed in Alpine forest and the vegetation is oak, fir, rhododendron, blue pine, juniper, grass, lichens and scrub between elevations of 2,200 to 4,300 meters (7,250-14,200 feet) on the eastern and southern edge of Tibet and the southern slopes of the Himalayas. *M. chrysogaster* usually lives in forests with moderate to steep slopes (Green, 1987, Kattel, 1992).

Himalayan Musk deer are essentially solitary animals having 12-20 year life span. The male is highly territorial. But females appear to be noticeably tolerant of other individuals. Average home range of males is larger than that of females (Kattel, 1992). The presence of the musk gland (pod) is one of the characteristics features of the species, which is present only in the male (Shrestha, 1989).

Musk deer is reported to face predator pressure from Leopard (*Panthera pardus),* Clouded leopard *(Neofelis nebulosa*), Snow leopard (*Uncia uncia*), Lynx (*Felis lynx*), Wolf (*Canis lupus*) and Wild dog (*Cuon alpinus*) (Shrestha, 1981). Populations of musk deer are poached for the musk gland that fetches enormous amounts of money through illegal international trade. Population of Musk deer is decline due to poaching, high human and domestic livestock pressure, consequent degradation of habitat and, in respect of poaching, it has been estimated that for every male deer that yields one musk pod, four deer are killed. (Green, 1986; HMG/Nepal, 2002).

The musk produced by this genus of primitive deer is highly esteemed for its cosmetic and alleged pharmaceutical properties and can fetch US$ 45,000 per kilogram (2.2 pounds) on the international market. Although this musk, produced in a gland of the males, can be extracted from live animals, most "musk-gatherers" kill the animals to remove the entire sac, which yields only about 25 grams (1/40 of a kilogram) of the brown waxy substance (Green, 1986; Knowler, 2000).

Conservation status and protection of Musk deer:

The conservation status of species of Musk deer is recorded as follows in the *IUCN Red List of Threatened Animals* (IUCN, 1996):
Siberian Musk deer: Vulnerable (VU)
Forest Musk deer: Lower Risk (nt)

Himalayan Musk deer: Himalayan Musk deer is placed in Appendix I of CITES and its IUCN Red list status is "Vulnerable" (IUCN, 2004).
Black Musk deer: Lower Risk (nt)

Global conservation and trade status of musk deer:

Taxa	**Global conservation status[1]**	**Global status under CITES[3]**
Musk deer Moschus spp.	LR/nt ver 2.3 (1994)	Appendix II (1979) [5]
Forest musk deer Moschus berezovskii	LR/nt ver 2.3 (1994)	Appendix II (1979) [5]
Alpine musk deer Moschus chrysogaster	LR/nt ver 2.3 (1994)	Appendix II (1979) [5]
Black musk deer Moschus fuscus	LR/nt ver 2.3 (1994)	Appendix II (1979) [5]
Siberian musk deer Moschus moschiferus	VU A1acd ver 2.3 (1994)	Appendix II (1979) [5]
Anhui musk deer[6] Moschus anhuiensis	not recognised	Appendix II (1979) [5]

1 Global conservation status is based on the IUCN Red List. The **bold symbol** indicates the population trend: declining for tiger and uncertain for Asiatic black bear. Ver refers to the version of the Red List Categories and Criteria used to classify a taxon, but not the year in which it was classified.
3 Global protection status in based on the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES). The year of listing is in brackets.
5 All species of musk deer are listed in CITES Appendix II, except Himalayan populations of Afghanistan, Bhutan, India, Myanmar, Nepal and Pakistan, which are listed in Appendix I (1983).
6 This species is not recognised in the IUCN Red List. Some authorities consider it to be the same as *M. fuscus*.

Vulnerable (= VU) means: threatened because of an observed, estimated or anticipated reduction in population in the past or future. Lower Risk signifies that the species is not included in the three categories of "threat" but "nt" (= near threatened) classifies them as approaching a threatened level. All Musk deer species have been included in the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1979. Populations of Siberian Musk deer *Moschus moschiferus* occurring in the countries of the Himalayan region (Afghanistan, Bhutan, India, Myanmar, Nepal and Pakistan) were included in Appendix I (although Green (1998) considers these populations to be of Himalayan Musk deer *Moschus chrysogaster* and Black Musk deer *M. fuscus*), while all other Musk deer species are listed in Appendix II. Musk

deer is a protected mammal and listed as endangered species by the National Parks and Wildlife Conservation Act 1973 in Nepal.

Overall Objectives of the project:

1. Determine the population Status of musk deer in study area.
2. Assess the present habitat structure.
3. Assess past and present the poaching activities and trade pattern of musk deer in study area.
4. Map out distribution and potential poaching area in ACA.
5. Find out current threats to musk deer population and their habitats.
6. Conduct conservation education awareness class for local people and know the perception of local people towards the conservation of musk deer.
7. Preparation of Musk deer conservation education kit (Brochures and poster).
8. Prepared the participatory musk deer conservation action plan.

Methodology:

Study Area

Study area was lies within the Annapurna Conservation Area (ACA), the first conservation area and the largest protected area of Nepal, has adopted a new approach and concept in protected area management. It is managed by the King Mahendra Trust for Nature Conservation (KMTNC) as the Annapurna Conservation Area Project (ACAP).

Mustang district

Mustang (Long. 83.29-84.15 degree and Lat. 28.29-29.06 degree) is one of the northern remote districts of high altitude Himalayan region of Nepal and second in terms of sparsely distribution of population, bordering to the Tibetan Autonomous Region (TAR) of China. It is flanked by the Nepalese districts of Manang to the east and Dolpo to the west; the Tibetan frontier stretches north from Mustang's borders. Almost all the districts lies above 2500 m with cold and strong desiccating windy weather, high altitude steppe and falls into the rain shadow of the Dhaulagiri Himalayas to the west and the Annapurna massif to the east. The climate in Mustang is arid, with most of the precipitation in the form of snow. Temperatures range between 0 to 20 degrees in summer and –30 to 0 degrees in winter. Depending on altitude regimes, Mustang is geographically divided into two sectors; Lower and Upper Mustang (Long. 83.653-84.28 degree and Lat. 28.887-29.34 degree). Intensive study was carried out Marpha VDC of Mustang district, intensive field survey was carried out in Chicheghan and Lambiyo forest of Marpha VDC which covered 2 sq. km area (see map of study area below).

Photo: Study site ; Marpha VDC of Mustang district.

Methods

Silent drive and pellet count method were done to find out the population of musk deer. Silent drive count was used in Lumbubiyo forest area. Pellet count was done in Chichugan forest. Approximately 30 days pellets groups were counted in transect line with the help of local people (It was on the bases on past experience of local people).

Regression model developed by Aryal, 2005 was used for the predication of population through pellet density. Regression equation for the estimation of
Population density/km2 (X) was 0.59+0.003Y (where Y = pellet density/sq.km) (Aryal, 2005).

Formal and informal interviews were done to determine hunting practices, poaching areas, wildlife knowledge and hunting equipment and its threats. Distribution pattern was identified on the basis of direct observation, presence and absence of pellets and tracks and from interviews with local herders and other key informants.

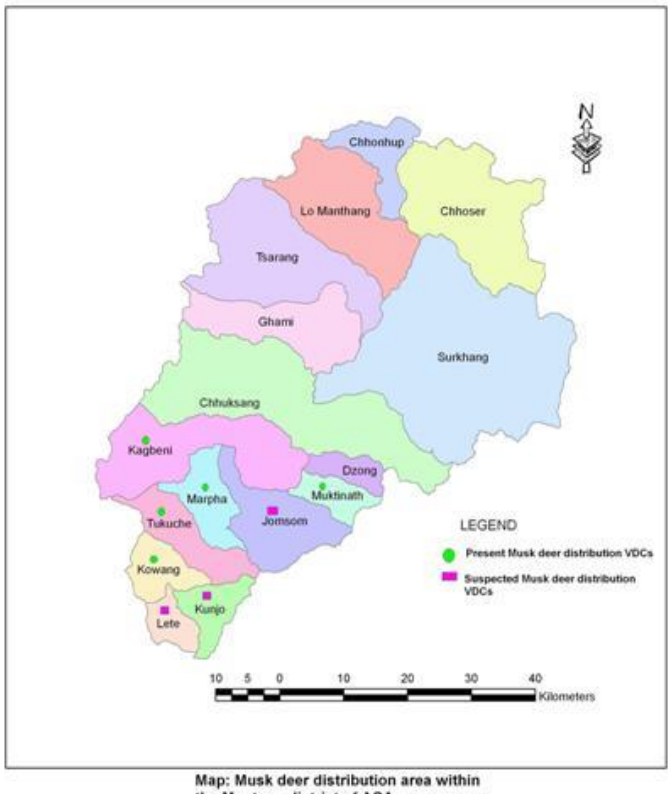
Vegetation analysis was carried out in Musk deer habitat. Vegetation survey was conducted with random sampling methods in all representative areas. Sample plots were laid where encounter with pellets occurred and also plots were laid where pellets were absent. Sample plot size for plants were used as suggested by Schemnitz, D.S, 1980: that is 10m X 10m for tree layer, 4m X 4m for all woody undergrowth to 3m in height, and 1m X 1m for the herb layer in composite plot. And calculated plant density, frequency, abundance etc.
Basal area of a species was a sum of basal area of individual trees of that species which will be calculated using the formula:
Basal area = 3.14 (d / 2)2
Where, d= diameter of tree at breast height

Importance Value Index (IVI) of a tree species was obtained by the summation of relative density, relative frequency and relative dominance.
IVI = relative density + relative frequency + relative dominance

Participatory Musk Deer Conservation Action Plan was prepared in with the involvement of local people and CAMC, Marpha through participatory way meeting, workshop for the effective management of Musk deer. Inputs were also taken from local people, local authorities of the surrounding VDCs and also from researchers and biologists. Series of focus group discussion were carried out with local people and their view points were taken for preparing the strategies. Technical, financial, administrative strategy was prepared with discussing with concerned Governmental and Non-Governmental organization of the district.

Result and discussion:

Musk deer in ACAP region:
Annapurna Conservation Area project provides significant habitat for Himalayan Musk deer. In Manang district they are distributed in Thoche, Tache Bagarchap, Dharapani, Chame, Manang, Tanki Manang, Khansar, and Nar VDCs (Aryal, 2005). Nyeshang valley (which is the largest valley of Manang and starts from Pisang VDC to Throng Phedi and covers the six VDCs) harbours high density of Musk deer population (Aryal, 2005). In Mustang district Musk deer is found in Tukuchhe, Marpha, Muktinath, Kobang, and Kagbeni VDCs and suspected in Jomsom, Kunjo and Lete VDC. Musk deer also found in Parche and Namarjung VDC of Kaski district with in ACAP region (Aryal, 2005).

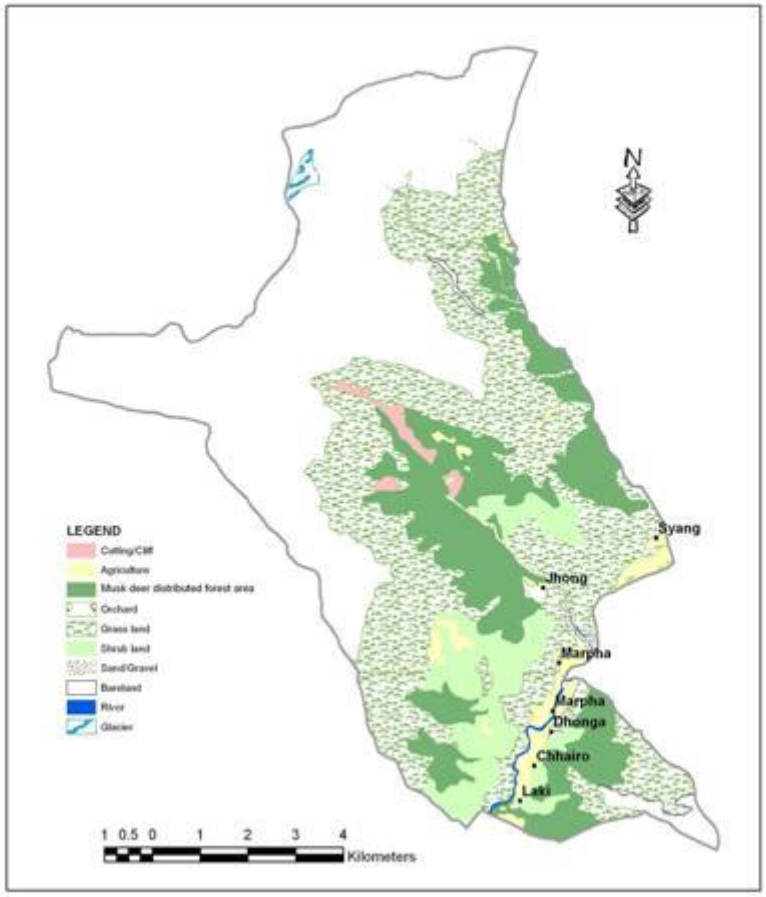


Map: Musk deer distribution area within the Mustang district of ACA.

Musk deer; distributed in different forest of Marpha VDC:

Marpha VDCs is covered by 745 sq.km area which is surround by Kagbeni, Tukuche, and Jomsom VDCs. Marpha is one of the potential site for the Musk deer habitat, out of it total area, 60 sq.km is Musk deer potential distribution area. Musk deer are found in different site forest within the VDCs. Musk deer distribution forest site within the VDCs are:

1. Phong
2. Chicheghang
3. Napang Danda
4. Miprakiu
5. Kuplithang
6. Thalche
7. Lumbuniyo



Map: Musk deer distribution potential area within the Marpha VDC of Mustang district

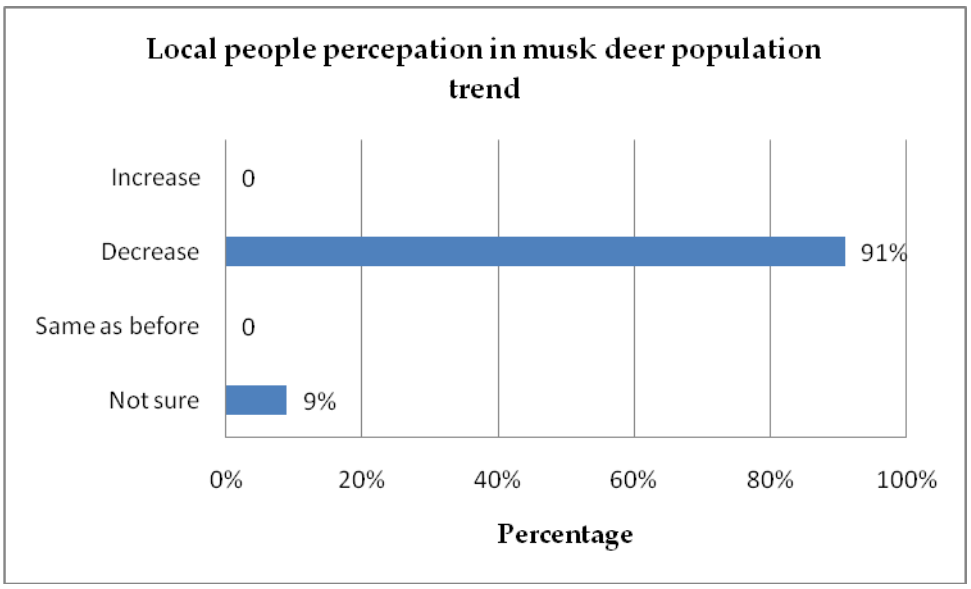
Population Status:

15 musk deers (5 male, 9 Female, 1 were unclassified) were counted in Lumbubiyo forest area. Pellet count was done in Chichugan forest. Approximately 30 days pellets groups were counted in transect line with the help of local people (It was on the bases on past experience of local people). Pellet group density in Chichugan forest was 7.26/ha therefore by using regression model developed by Aryal, 2005, it was estimated that there was 2.4 musk deer/sq.km. Aryal, 2005 estimated that 4.5 individual/Km2 in Humde area of Manang district so that population density of musk deer in study area is less than Humde area.

Chichugan forest is more human-livestock pressure than Lumbubiyo forest. Thanche and Phong forest which less human-livestock pressure area and frequency of pellet

observation was high in this area. So highest number of musk deer population is present in Thanche and Phong forest of Marpha VDC.

Perception of schools student and local people of Marpha VDC:
Local people strongly believed that population of musk deer is declining from the forest of Marpha VDC. About 86 % of local people said that the population of musk deer is decline high rate.



Interviews were taken from herders and other local people of the study area. According to them main cause of population declining is poaching; every year large number of snare is collecting from study site. Last year, 97 snares were collected by patrolling team so it seems that there is high rate of poaching activities. Many respondents blamed poaching, killing by predators, human and livestock disturbance in its habitat as the main cause of population decline. Schools student emphasis to launch conservation awareness camp to focus to herder and uneducated people of village. All the schools students were not known its legal status and only 2% of respondents know its legal status. Villager were agree that poaching activities less in this year as compare to past year, it was due to strong punishment of CAMC and ACAP who work illegal activities. Therefore, there was urgent need to conduct conservation awareness activities both for schools students as well as villagers.

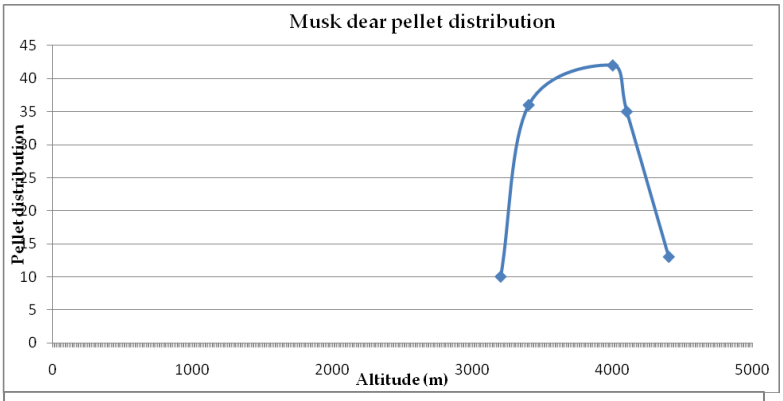
Habitat types preference by musk deer:
Four different types of habitats were selected from study areas for the observation of the Musk deer pellets. All together 57 plots were laid out in study area and pellet occurrence was recorded. Total 77 (old and fresh) pellets groups (TPP) were found in transect lines. Highest group of pellets were found in forest land (68%) followed by shrub land, grass land and open land.

Habitat types	Habitat preference (HP)	Reference
Forest land	68%	PPE HP= ---------- X 100
Shrub land	18%	TPP
Grass land	6%	Where,
Open land	8%	HP= Habitat preference PPE= Pellet present in each habitat in plots. TPP = Total pellet present of the all habitat types in plots.

Hence, forest land is most preferred habitat types by musk deer.

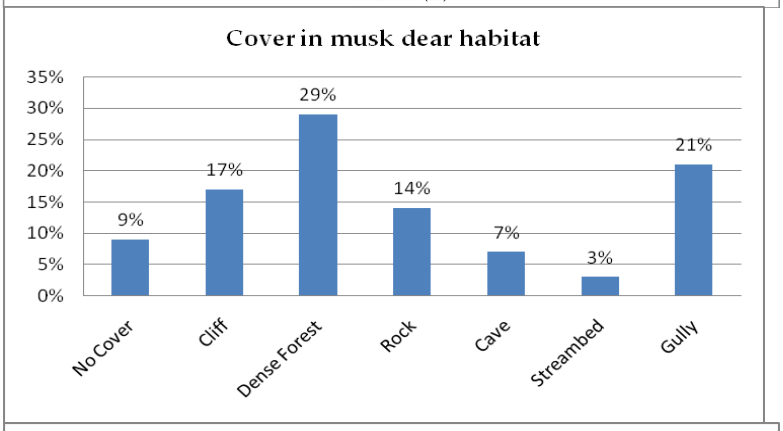
Altitude, Cover, Aspect/Slope preferred by Musk deer:

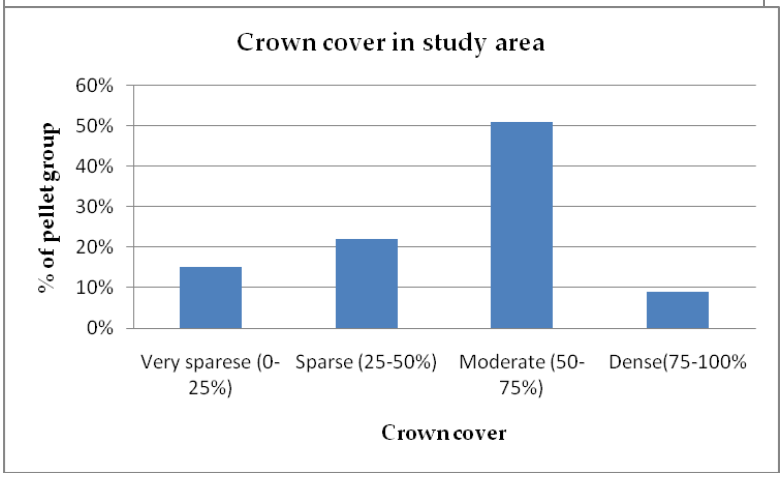
Pellet distribution is gradually Increased with respect to increase in altitude. Highest pellet groups (41%) were found in altitude range 3700-4100m and less number of pellets group were found in lowest altitude from 3000- 3300m. Musk deer frequented lower altitude during snow.



In conclusion, the preferable altitude of the Musk deer in study area is 3300- 3700m.

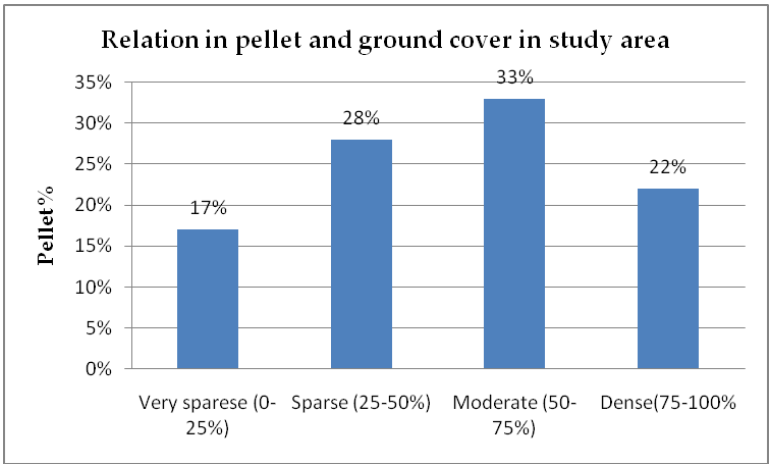
The highest rate of encounter with Musk deer pellet was 36○ to 45○ Angle of slope in both study areas Aryal, 2005, also recorded that musk deer pellet was encounter as highest rate from 36○ to 45○. There was increasing encounter rate of pellet 10○ to 45○ of angle of slope in study area then gradually decreasing.





Highest numbers of pellets were found in NW aspect.
Cover such as dense forest, rock, cave streambed and gully was recorded within 50m radius from laid plot. Twenty nine percent of dense forest was recorded within the 50m radius from the plot in the study area and followed by gully (21%), cliff, rock, cave, and streambed. Nine percent of plot area, there was not found any such cover within 50m radius from the plot. Generally musk deer preferred to rest near the dense cover if they feel unsafe they can move to save place i.e. dense forest.

Moderate crown cover (50-70%) was highest in study area and pellet group were found in moderate crown cover, it may due to in moderated crown cover area sunlight inter to ground level and musk deer Take opportunity rest in this site. About 51% of pellets were found in moderate cover and followed by sparse, very spares, and dense forest. There was less area as a dense forest also.



Ground cover was also observed And pellets were observed in moderate ground cover where 33% of pellet were found and followed by spares, dense and very spare area.

Important value Index (IVI) of tree species in Musk deer Habitat

Total 5 species of tree, 4 species of shrub and 7 species of herb were recorded. *Abies sp.* (IVI=108.35) was most prominent followed by *Betula utilis* (IVI=91.95), *Juniperus sp.* (IVI=36.1), *Cupressus torulosa* (IVI=31.49), *Pinus wallichiana* (IVI=32.11).

Table: Important Value Index (IVI) of tree species recorded in Musk deer habitat.

Trees: Scientific name	Relative density	Relative Dominance	Relative frequency	M
Abies sp.	33	41.2	34.15	108.35
Betula utilis	31.61	28.44	31.9	91.95
Juniperus sp.	13.37	10.46	12.27	36.1
Cupressus torulosa	9.87	9.69	11.93	31.49
Pinus wallichiana	12.15	10.21	9.75	32.11

Past and present poaching activities:

There are no different techniques to kill musk deer as in Manang district (Aryal,2005). Hunters use a variety of techniques to kill Musk deer, which include snaring and shooting, the latter sometimes aided by dogs. In the past hunters usually used guns and dogs but now due to security situation in the country shooting is replaces by snaring.

Present Hunting technique:

There are a few well established methods of hunting and killing Musk deer by poachers. The most commonly practice method is snaring and trapping. Musk deer usually follow a fixed trail (e.g., defecating place or grazing ground). Such trail is always well marked in the mountain spur. The poachers are aware of this habit and construct fence lines usually along a mountain spur, encircling a large habitat of Musk deer, leaving gaps in frequently used paths. Occasionally, the snare line runs from the top of the mountain to the river valley with more than 50 individual traps. For setting the snare, a small hole measuring about 20 to 25cm and 10cm deep is dug and two small pencil-like pegs with inner side made flat are fixed about 15cm apart inside the hole. After this, a stick of about one inch is bent and strongly fixed with both ends making an arch over it for fixing a trigger. The trigger is pulled further by the pressure of a bent over pole. A small horizontal stick with one side is fixed in the pegs. Just above it a wooden platform is built and a wire snare is set with one end attached to the bent over pole. When Musk deer treads on the hidden platform, the horizontal stick falls down by the weight of the Musk deer, the trigger is released with force and as a result the pole straightens, the noose is pulled tight around the animal's leg and the creature is jerked in the air. This is a most wasteful method of killing the deer for musk, as this often kills young and females which do not yield musk.

Past techniques:

In past, poachers were used to baying by hunting dogs. These dogs are trained to track the Musk deer by its scent. When the dogs locate the Musk deer, they start chasing without overtaking it till the animal becomes totally exhausted. The dog barks aloud to announce baying of the victim to its master. The poacher arrives at the spot quickly to kill the deer. Another method is killing the animal using poison. Musk deer is very fond of the leaves of alpine area. Musk hunters apply the local poison (*Skimmia laureola*) on the leaves of this shrub and bait in areas frequented by Musk deer. Another technique uses a pointed bamboo arrow or splinter dipped in poison fixed downhill across a regularly used path in a mountain ridge at the level of belly height. When the Musk deer is disturbed on one side of the ridge, it flees towards the other side by leaps and bounds. At the same time, the poison splinters may inflict a wound in the abdominal region and kill the animal.

Photos: Snare using for musk deer poaching. *Photo By: Aryal, A*

Another technique was to shoot Musk deer. In the past this was the main method of killing Musk deer but now due to the security situation in the country, all private guns have been impounded in the District Administration Office, Mustang. So shooting was replaced by snaring.

Potential Poaching area:
Marpha VDC's forest is one of the potential poaching areas of Mustang district. Past experience of local people, most post potential sites of poaching area are:
Kuplithang forest,
Lumbuniyo forest,
and Chicheghang forest.

Large numbers of snare were collected by CAMC member during the patrolling of forest. In 1996 patrolling team of CAMC found 3 dead musk deer (ACAP, 1996). 1 juvenile musk deer found in trap in 1999, (ACAP,1999). In 1993 the local villagers of Marpha had caught three poacher with trophies of musk deer and several snares in forest and handover to ACAP office for legal action and the legal unit of ACAP pokhara finalize the case and penalize the victims sending to prison seven year for one and five years for two others(ACAP,1999).

Every year large number of snare was recorded by Patrolling team of CAMC, Marpha. 400 number of snare recorded in 2001, 287 number in 2002, 87 number in 2003 (per.com with Chariman of Marpha CAMC,2005)

Pattern of Trades and Use:
The musk secreted by the musk gland of the males has been used in the perfumery industries for a long time for its intensity, persistence and fixative properties. In Asia, including China, it has also long been used in traditional medicine as a sedative and as a stimulant to treat a variety of ailments (Green, 1985, Sheng, 1998, Homes, 1999). In China, Musk deer have been hunted for musk, and musk purchasing has been conducted in rural markets or via local medicine companies and the perfume industry perfume is produced based on natural musk, but production is not high at present (Zhang, 1983). The use of musk in the perfume industry in China has decreased because of the high price, and because of animal welfare and species conservation concerns. The effects of musk have been known in Traditional Chinese Medicine (TCM) for several thousand years, musk being used in about 300 pharmaceutical preparations (Sheng, 1992). China has a high domestic demand for musk (Homes, 1999), and this originates from both legal and illegal sources within the country. The total demand for musk is between 500 to 1,000 kg per year in China (Sheng, 1998).

Global Trade:
China, India, Kyrgyzstan, Mongolia, **Nepal,** Russia, Soviet Union, Cambodia, France, Germany, Japan, Macao, Senegal, Singapore, Switzerland, Uzbekistan are the exporters of raw musk and **42 countries** (Belgium, Australia, Bulgaria, Canada, China, Denmark, East Germany, Finland, France, Gabon, Germany, Ghana, Honduras, Hong Kong, India, Indonesia, Italy, Japan, Macao, Malaysia, Mauritius, Netherlands, New Zealand, North

Korea, Norway, Philippines, Poland, Portugal, South Korea, Romania, Senegal, Yugoslavia, Soviet Union, Switzerland, Spain, Taiwan, Thailand, Togo, UAE, UK, USA, Singapore) import Musk deer products, including raw musk (Homes, 1999).

China, it is one of the major exporters of Musk deer derivatives. Very little is known about the trade and consumption of musk inside China. According to Wang *et al*. (1993) the quantity of musk that was annually traded in China in the early 1980s ranged from 2,000 to 2,500kg. According to Sheng and Ohtaishi (1993), some 500,000 Musk deer were killed every year in China in the 1960s. This over-exploitation of Chinese Musk deer populations led to declines from approximately 3,000,000 Musk deer in the 1950s to about 1,000,000 animals in the 1970s. Much of this musk is used in the production of medicinal derivatives and then traded worldwide.

Trade pattern in Mustang:

It was a very difficult task to identify the trade pattern of Musk deer in study area. During the study periods many snares and signs of poaching of Musk deer were found in the study area which shows that there is also trade in Musk deer. The trade is impossible without involvement of local people (who provide information about patrolling and do not necessarily set snares / kill Musk deer directly, only provide information to poachers so as to remain safe from the CAMCs and other authorities), and it is very difficult to discover who is involved. Generally poachers come from Gorkha, Dhading, Lamjung and Tanahaun districts same as manang. According to local people and former hunters one male Musk deer produces about 3 tola (1 tola = 11.64gm) of Musk. At local level one tola of Musk is priced at NRs 5,000. Poachers supply to local middle-men who supply onwards to Tibet. Poachers also supply to middle-men in Kathmandu hiding the musk pods in ghee (clarified butter) bottles (Aryal, 2005).

Potentiality of Musk deer Farming:

Musk deer farming is a good income source which can be seen from experience in China. It is also possible in Nepal as in Marpha. There are some legal constraints in this regard and the need for knowledgeable manpower, funding, etc. In order to develop this concept, good coordination with relevant government ministries and departments and with ACAP will be essential. For this, A feasibility study is essential before the programme implementation. ACAP should take the lead in this.

Need of Musk deer Harvesting programme and Community benefit: The benefits to be accrued from the management, that includes a harvesting scheme of Musk deer, are manifold. ACAP is protecting a highly vulnerable species together with its habitat from further degeneration. Local people would profit immensely from the harvesting scheme. It would be an alternative means of income and an opportunity to manage their natural resources. It must be remembered that the Mustange people are migrating in large numbers to Kathmandu and other urban areas, due to the harshness of the mountainous terrain they inhabit. The landscape is incredibly beautiful but the poor quality of soil does allow much scope for agriculture. Such migration could very well lead to degradation of the Mustang culture. A sound means of income through the Musk deer pod harvesting scheme would be instrumental in encouraging the local people to stay. A well designed "special project" for managing /harvesting the species in its natural habitat is needed.

Threats

Habitat loss:
Excessive degradation and fragmentation eventually leads to habitat loss. Potential habitat of Musk deer has already been lost due to high deforestation in Miprakiu forest and Napang Danda area of Marpha VDC. Local people of the Marpha are highly dependent on Musk deer habitat for fuel wood, timber. Fuel wood and timber collection is causing loss of good habitat for sensitive Musk deer.

Forest fire:
A main threat of musk deer habitat in Marpha VDC is Forest fire, almost every year forest fire was occurred in musk deer habitat, and it is serious threat of musk deer habitat. Forest fire in last year occurred in 2 sq.km area of musk deer habitat of Marpha forest.

Grazing:
Owing to high seasonality and low primary productivity, the Himalayan region supports relatively low ungulate / herbivore biomass (Aryal, 2005). It is therefore obvious that with the increase in the biomass of domestic livestock in many areas, wild ungulates such as Musk deer have suffered competitive exclusion. Sathyakumar *et. al.* (1993) have reported that increased livestock grazing and associated impacts have led to low Musk deer densities in many areas in Kedarnath Wildlife Sanctuary, India. In 68% of Musk deer habitat was seen livestock dung that means there is high grazing pressure in musk deer habitat.

Poaching:
Poaching is another main threat for the population of Musk deer in the study area.
In 1993 the local villagers of Marpha had caught three poacher with trophies of musk deer and several snares in forest and handover to ACAP office for legal action and the legal unit of ACAP pokhara finalize the case and penalize the victims sending to prison seven year for one and five years for two others(ACAP,1999). Every year large number of snare was recorded by Patrolling team of CAMC, Marpha. 400 number of snare recorded in 2001, 287 number in 2002, 87 number in 2003 (per.com with Chariman of Marpha CAMC, 2005).

Chapter: Two

Participatory Action Plan for Musk deer Conservation in Marpha Village of Mustang District, Nepal

Introduction of Area:

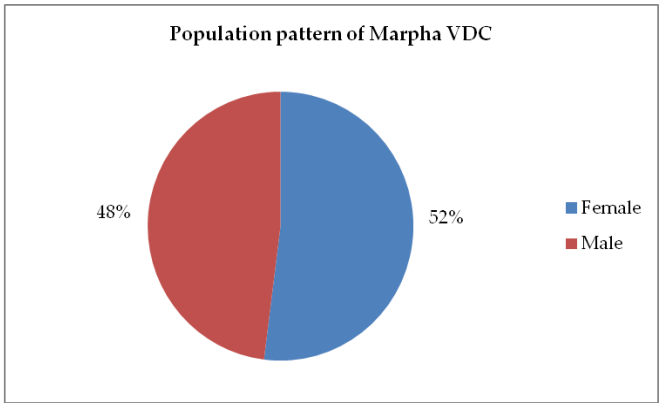
Marpha is located in the southern part of district and adjoining with the district head quarter. It is surrounded by Jomsom, Kangbeni and Kowang VDCs.

Marpha VDC Land Cover	
Land cover	**Area sq. meters**
Cutting/Cliff	823841.80
Agriculture	3049368.56
Forest/ potential musk deer habitat	59055512.42
Orchard	239248.98
Grass land	142661636.22
Shrub land	11877872.64
Sand/Gravel	6913742.69
Bare land	514890452.80
River	3638420.00
Glacier	2375790.00
Total area of Marpha VDC	***745525886.10***

Source: ACAP, 2005

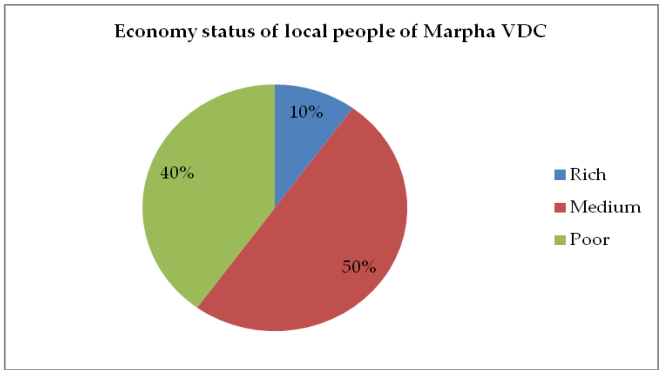
Human Population:

Total population of Marpha VDC is 986, (Male: 510 and Female: 476) and there are total 216 house hold, about 98% of house hold are depended on fire wood for cooking and heating. Remaining 2% percent house hold are using gas, kerosene stove for coking, heating purpose, this is specially in hotels



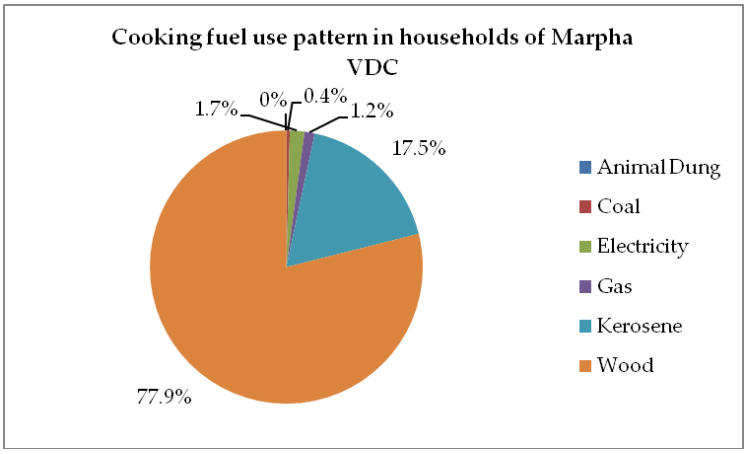
Present situation of local people (economy):

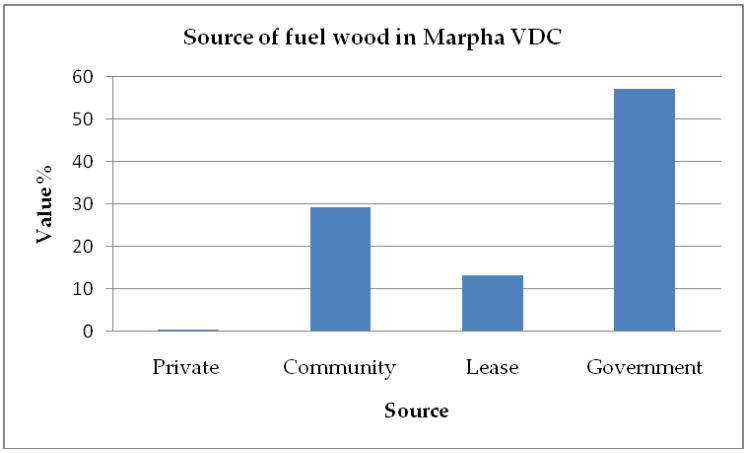
Main occupations of the local people are agriculture and tourism. 40% of people of VDC are poor, they have less than 1 ha, land, they have to do agricultural work, or labour work for their subsistence. 50% of people area medium, they have 5-7 ha land. 10% people are in rich and them main occupation is tourism, hotel business.



Cooking fuel wood used Pattern and dependency in forest for fuel wood:

Fuel wood collection and cooking Pattern directly affects to habitat of Musk deer as well as other wildlife of the area. There are high pressure of fire wood in the forest of the Marpha VDC, about 77.9% houses hold depend on the fuel wood for the cooking which 90% fuel wood come from forest area which provide potential habitat for Musk deer and other wildlife of area. This data show that there is high pressure in Musk deer habitat for the fuel wood collection.





Forest degradation and Habitat loss in Marpha :

Excessive degradation and fragmentation eventually leads to habitat loss. Potential habitat of Musk deer has already been lost due to high deforestation in Miprakiu forest and Napang Danda area of Marpha VDC. Local people of the Marpha are highly dependent on Musk deer habitat for habitat for sensitive Musk deer.

Forest fire Marph:

A main threat of musk deer habitat in Marpha VDC is Forest fire, almost every year forest fire was occurred in musk deer habitat, and it is serious threat of musk deer habitat. Forest fire in last year occurred in 2 sq.km area of musk deer habitat of Marpha forest.

Grazing pattern in Marpha village:

Owing to high seasonality and low primary productivity, the Himalayan region supports relatively low ungulate / herbivore biomass (Aryal, 2005). It is therefore obvious that with the increase in the biomass of domestic livestock in many areas, wild ungulates such as Musk deer have suffered competitive exclusion. Sathyakumar *et. al.* (1993) have reported that increased livestock grazing and associated impacts have led to low Musk deer densities in many areas in Kedarnath Wildlife Sanctuary, India. In 68% of Musk deer habitat was seen livestock dung that mean there is high grazing pressure in musk deer habitat. In Marpha VDCs total 600 sheep/goat were domesticated by local people and they use the grass land of pasture area of the village, that directly reduce the feeding material of the musk deer and other wild grazing species like Goral, Blue sheep etc.

Poachng:

Poaching is another main threat for the population of Musk deer in the study area. In 1993 the local villagers of Marpha had caught three poacher with trophies of musk deer and several snares in forest and handover to ACAP office for legal action and the legal unit of ACAP pokhara finalize the case and penalize the victims sending to prison seven year for one and five years for two others(ACAP,1999). Every year large number of snare was recorded by Patrolling team of

CAMC, Marpha. 400 number of snare recorded in 2001, 287 number in 2002, 87 number in 2003 (per.com with Chairman of Marpha CAMC, 2006).

Current activities carried out for the conservation of Musk deer:

Presently, there was no any specific Musk deer conservation programme in the Marpha VDC or whole Annapurna conservation area, but indirect some livelihood and natural resource focus conservation activities were carried out in the area.

Proposed Conservation Strategy:

1. Objectives:

- Conservation of Musk deer surrounding the Marpha VDC
- Regular monitoring of Musk deer habitat and patrolling
- Maintain ecological process
- Restoration of degradation area
- Promote tourism through wildlife
- Involve local people in wildlife tourism
- Support to local people for their livelihoods.

2. Problem in achieving objective:

- Poaching,
- Overgrazing,
- Lack of awareness for the Conservation of wildlife
- Poor economic condition
- Lack of sufficient fuel wood/ timber

3. The Strategies:

3.1 Zonation and Zone plan :

Core zone should be demarcated for the free movement of musk deer in it natural habitat without the disturbance of human activities, this zone is totally protected for the musk deer above 3600m altitude area. Below that area will be use by local people for their day need such as fuel wood collection, grazing. Domestic grazing is totally restricted in core area. Restricted activities within core zone are:

- To collect fuel wood, NTFPs, and other forest product.
- Forest fire
- Domestic livestock grazing
- Poaching/hunting of wildlife with in core area and other parts of CAMC area.

3.2 Theme plan:

3.2.1 Activities:

Without the local people participation, it is difficult to conserve musk deer in their surrounding area, so local people basic need and alternative source of income should be provided for the conservation of musk deer. This action plan is prepared on the basis of this theory. Local people were highly interested to involve in the conservation of Musk deer so that they can attract tourist in their area and that directly benefited to local economy. Through the series of the workshop and local people interaction, different activities were design which directly and indirectly related to musk deer and other wildlife conservation. Local people need alternative sources for the conservation of musk deer and its habitat. If we are prohibited to collected forest products from the musk deer habitat, we should provide alternative source of that products.

Following activities are suggested to implement for the conservation of musk deer and other wildlife species of the area as well as up liftment of local people living standard.

3.2.1 Institutional Coordination/Local body:

In ACAP area there are existing responsible body whose responsibilities are to conserve natural resource in their area through the local participation, that body is called Conservation Area Management Committee (CAMC). We tried to make different subcommittee for the musk deer conservation like in manage district but CAMC disagree to make new committee and CAMC itself is working for musk deer conservation through the people participation. CAMC will regularly monitor the musk deer habitat, regular patrolling in musk deer habitat, and conducts different programme and activities for the musk deer conservation in their area. If the CAMC get financial supports then it is interested to conduct following activities.

3.2.2. Institutional Coordination / Capacity Building:

CAMC should coordinate with different stakeholders for the conservation of Musk deer with help of ACAP. Formal or informal training such as Nature guide training, cooking-baking training, handicraft training, and other wildlife Conservation training should be given to local people and committee member who express interest. Especially institutional capacity building training should be provided for committee members and strengthening the committee by training etc. ACAP should provide capacity development training for local people especially for those who have poor economic condition. These activities help to strength the capacity of local people and thus reduce the pressure on Musk deer habitat.

3.2.2. Alternative Energy Development:

Local people have highly demand in alternative source of energy. Local people are depended on forest for Fuel wood/Timber collection which directly affects the musk deer habitat. So that alternative source of fuel wood such as, improve fuel wood stove (Sudhariyako Chulo), Solar cooking stove, gas stove should be promoted in the area. ACAP and other donor agency should support to such activities.

Target group: Marpha VDC people.
Number of benefit house hold:
By whom: ACAP and other donor agency
Means of alternative energy
Cooking Gas Support: local people are demanding one gas depot in center of village, local people especially hotels owners are interested to use cooking gas so that the pressure of firewood in musk deer habitat will be reduced.
Solar Cooking Stove support
Solar light support
Estimate cost for support: $ 10,000

3.2.3. Restoration of Degrade land by apple plantation (Alternative source of income):

There is large open area in above the village and in also in forest area. So ACAP/CAMC should planted indigenous plant i.e. Apple in that area, total approximately area is near about 90 hector which will be one of the alternative source of income for the local people. Apple plantation is most suitable in 40 hector area so that it become one of the potential sources of income. Local people are so interested for community apple farming which is one of the main existing income sources of local people; the committee will handle the programme. For this
Preliminary step: Apple nursery and irrigation canal should be
extended in the apple farming area or proposed site.
By whom: CAMC/ACAP/MDCC.
Place or site: Tenjelo Blaa, Lechch, Tanlas, Tengla site of Marpha VDC
Cost: $15,000

3.2.4. Conservation Education:

Lack of awareness, Villagers does not know the importance of wildlife. Therefore, Awareness programme should be carried out for the school students, youth club, and local people for the conservation of Blue bull and wildlife tourism.
Target group: Marpha village people.
Number of benefit house hold: all house hold of Marpha VDC
What activities: schools quiz/Art competition, Street drama,
Awareness Camps,
Cost: $3,000

3.2.5. Institutional Capacity Building:

Formal or informal training such as wildlife Conservation, Wildlife management training should be given to local people, committee member, and CAMC members.
Target group: committee members (50 persons)
By whom: ACAP/ other donor agency
Cost: $5,000

3.2.6. Income Generation Activities:

Source of incomes of local people of Marpha area agriculture, tourism, business. The local people surrounding the Marpha VDCs are mostly involve in hotel

business, most of the farmer change their income source from agricultural to hotel business. Other sources of income of the area are sheep/Chauri rising in forest area, apple farming medicinal plants collection/sell. Sheep/Chauri/yak raising in the forest area are directly effect in musk deer habitat they are sharing food with musk deer, these activities are also disturbing the musk deer habitat, so that we should develop musk deer zone and should restricted to sheep/chauri and other human activities. Local people are directly depended in forest for the fuel wood also. Therefore we should launch Income Generation Activities (IGAs) as the incentive programme. Hunger and poor economic status enforce people to involve in illegal activities such as musk deer poaching, So employment opportunity should create for those people who have poor economic condition so that they can motivate to the conservation. Following IGAs are design to local people surrounded Marpha VDC (forest and private land).

NTFPs Farming:

Non-Timber Forest Product (NTFPs) i.e. medicinal plant cultivation in farm land or forest land or community land is one the most potential income generation activities, because the area hold unique ecological character and favour for the high valuable medicinal plant, Such as Kutki, Padamchhal, Akarkara, Chichi,

ACAP should start this works by providing initial support such as seeds of NTFPs, cultivation technique.

Model for the NTFPs farming:

For the NTFPs farming following steps should take:

- Awareness: First of all we should make aware local people about NTFPs and their market value, therefore, we should encourage them to cultivate NTFPs in community of private land of the area.
- Group/person selection: Interested group formation and should be given priorities to poor/local people who directly involve in forest destruction, poaching.
- NTFPs cultivation and management training: Before the activities carried out, training should be given to those selected persons and training should cover identification, cultivation, propagation, processing grading, storage, nursery practice, market, NTFP related organization.
- Seed and seedling distribution: Seed and seeding should provide by

Donor/ ACAP and farmer should agree to invest labour works.

- Protection and management: Protection of the NTFPs cultivation areas should be by farmer themselves and required technical supports should be provided by ACAP.
- Market: Siddhartha Seed Store is ready to collect that product by paying appropriate cost to farmers.

Target group: local people surround the Marpha area.

Training Name: NTFPs farming and management (5 days).

Cost: $7,000

Sheep/Chauri (Yak) Farming:
Next priorities of local people of Marpha are to farming sheep/Chauri. Sheep/Chauri keeping was found very popular in the area due to cheap and easy to rise and traditional practice and these are main source of meat and milk of the area. Poor and less land people were even attempted for increase in number of goat by using community/forest land. There is traditional farming practice of Sheep/chauri in the area. This farming is more feasible in those areas where forage was easily available.
Target group: Local of people of the area.
Support by whom: Donor agency.
Training Name: First training should be provided to local who raise sheep/chauri specially focus to header.
Training cost: $1,500

Natural Zoo or breeding center establishment:
Marpha is one of the most potential sites for the establishment of a Musk deer Breeding Centre. In future it could be expanded as a Musk deer Farming Centre.

Ecotourism:
Developing opportunities for ecotourism – so that tourists can pay for guided trips to see musk deer –thereby contributing to the local economy.

Musk deer Farming:
The Government of Nepal has funded a musk deer research facility at Godavari, outside Kathmandu since 1996. Although several male and female musk deer were transported to the facility, the male deer have since died so that no breeding program has been possible. The main reason was climatic and physical factor. They are different the original musk deer habitat and lack of musk deer feeding species.

Musk deer farming is a good income source which can be seen from experience in China. It is also possible in Nepal. There are some legal constraints in this regard and the need for knowledgeable manpower, funding, etc. In order to develop this concept, good coordination with relevant government ministries and departments and with ACAP will be essential. For this, a feasibility study is essential before the programme implementation.

Need of Musk deer Harvesting programme and Community benefit: The benefits to be accrued from the management, that includes a harvesting scheme of Musk deer, are manifold. ACAP is protecting a highly vulnerable species together with its habitat from further degeneration. Local people would profit immensely from the harvesting scheme. It would be an alternative means of income and an opportunity to manage their natural resources. It must be remembered that the Mustang people are migrating in large numbers to Kathmandu and other urban areas, due to the harshness of the mountainous terrain they inhabit. The landscape is incredibly beautiful but the poor quality of soil does allow much scope for agriculture. Such migration could very well lead to degradation of the Mustang culture. A sound means of income through the Musk deer pod harvesting scheme would be instrumental in encouraging the local people to stay. A well designed "special project" for managing /harvesting the species in its natural habitat is needed.

Total cost for Musk deer breeding farm established: $40,000

3.2.7. Musk deer habitat conservation:
For the conservation of Musk deer, there should be fixed a core region for the conservation of Musk deer their habitat. The area should be protected with prohibition on collection of forest product, domestic livestock grazing, forest firing, and other human activities which directly disturb Musk deer and their habitat.

3.2.8. Nature Guide/Eco-trekking Training:
Select local people who are interested and capable for Natural guide training.
Target group: youth and educated
Support by whom: Donor agency
Training Name: Natural Guide training.
Cost: $ 1000

3.2.9. Research and regular monitoring of Musk deer population:
Regular research should be done regarding its population, ecology, habitat structure etc. Population should be regularly monitored through silent drive count method or pellet group count methods, Action research should be carryout by ACAP through the participation of Local people and CAMC.
Cost of activities: $ 4000

3.2.10. Patrolling:
Regular patrolling will be done in Musk deer habitat. Patrolling will be done once a week by committee.
Cost for patrolling/year: $1000

3.2.11. Musk deer habitat conservation measurement:
Core area will be fully protected for musk deer habitat, there is strictly prohibited to do any work like collection of forest product, grazing, forest firing, and other human activities which directly disturbance to musk deer and their habitat. Require action will be taken for the musk deer habitat conservation through coordination with ACAP.

4. Role and Responsibility of Conservation Area Management Committee:
- Regular patrolling Musk deer habitat every week.
- Raise conservation awareness for conservation of wildlife surrounding Marpha Forest.
- Support to ACAP during the research and monitoring of wildlife.
- Punish those who work against the rule and regulation of
Committee and who work against the welfare of wildlife.
- Mobilized fund for the conservation of wildlife and community development.

5. Fine/Penalties:

Conservation area management communities set special rules and regulation for fine and penalties for those people who involve in the illegal activities regarding musk deer. Rules were followed:

I. Who collect any forest products in core area they will fine Nrs 100 first time, Nrs 200 in second time, and Nrs 5000 for third time, if anybody do more than third time, legal action will be started and forward to ACAP.

II. Who killing musk deer they should be paid as fine Nrs 10,000 first time 20,000 time and 30,000 third time after that if they will forward to ACAP for legal action.

III. Who support poacher or musk deer and other wildlife hunting activities he/she should fine Nrs 2000.

IV. If anyone involve in putting snare in musk deer habitat, they should be paid Nrs 5000 first time and increasing as double after that.

V. Who do illegal forest fire in musk deer habitat they have to pay more than Nrs 5000 according to fire site situation if the fire burnt area is more than 1hactore, they have to pay Nrs 5000, and if burnt area is 2 hectare they have to 10,000 so no.

6. Price/award:

- The person who helps to curb poacher, CAMC will give price/awards Nrs 5000 to those person.
- The person who provide information about illegal activities in musk deer habitat, CAMC will give him Awards according to activities and their impact in musk deer and its habitat.

7. Source of income for CAMC :

Donor agency, fine/penalty, donation.

8. Total cost for implementation of action plan:

It is estimated that total $ 82,500.00 require for the implementation of this action plan.

Chapter: Third

Conservation Education Part

Poster and Brochure Publication:
Under this project I have published poster on Musk deer with title of **Save the Himalayan Musk deer**. I have published poster as 2000 copies, having size of 20''X 18'' (appendix-1). I have distributed 200 copies in schools of study area and 900 copies have provide to Annapurna Conservation Area Project and Pokhara Natural Museum for the distribution in other potential Musk deer distribution area (for schools, schools students, local youths, local stakeholders, etcs). 500 copies are providing to IUCN Nepal for the further distribution in concern organization and Musk deer distribution area of
Nepal.

Similarly I have published Brochure on Musk deer, which included overall musk deer introduction, status, threats, important, musk pod, legal status and its related law in **Nepali Language**. 1000 copies of brochure were publication and distributed in study area, and concern organization

Please find attached different file name as Musk deer poster and Musk deer Boucher as a separate PDF documents:

Conservation awareness Activities in Marpha Schools:
Two days conservation awareness class was carried out in 15-16, August, 2006. Training participants were 8, 9, 10 class student and school teacher. Training was covered, introduction on musk deer, distribution range, status of Musk deer in Nepal, and ACA, threats on it habitat, our role and responsibility in Musk deer conservation. Before the training Art and Essay competition was carried out among the students. Four session training/class has taken general information on Musk deer and it threats.

Activities:
Essay and Art competition

1 0 th August,2006
Essay competition:
Essay writing Competition was organized in 10th of August; 2006.The essay with its topic "Himalayan Musk deer" was conducted in Janagal higher secondary schools, Marpha. In this competition altogether 21 students participated. Although the time was of only one hour and there was no word limit, the participants came up with some really good essays and judge by the team member of the project. The language of written was Nepali for their essay.
The result of the Essay Competition and prizes they won are as follows:

1st – Winner- Depek Lalchan- Class 10 Prize – Rs 3,000
2nd - Winner- Asha Maya Pariyar- Class 9 Prize- Rs 2,000
3rd – Winner- Prakhas Subedi- Class 10 *Prize-* Rs 1,000
See appendix-1 for tops 3 Essays: conversion from Nepali language to English.

Illustration 1: School students (participants) in drawing competition

1 1 th August, 2006:

Art competition

On 11th August, 2006, The Project was organized an art competition where the students with their exceptional artistic talent competed for an attractive first prize of Rs 3000 on the theme "Conservation of Himalayan Musk deer". Altogether we had 23 students participating from school.

The result of the Art Competition and prizes they won are as follows:

1st – Bisnu Pariyar Class 7, Janawal H.S. School prize Rs 3,000
2nd - Krishna Gurung, Class 7, Janawal H.S. School prize Rs 2,000
3rd -Nanda Pun Class 7, Janawal H.S. School prize Rs 1,000
See some selective tops three arts in appendix-2

Illustration 2: Participant of students in ART competition

August 13th 2006

Awareness class:

On the Third Day, August 13th 2006 the project was organized an Awareness class with its message for the conservation of Musk deer and its biodiversity. The class included more than 40 participants. The Class was taken by BRTF members. The class was focus lecture and participatory discussion methods.
The class focus following parts
1. Introduction about Musk deer
2. Must deer Status in Nepal
3. Threats on Musk deer population in musk deer and its importance
4. Our role in Musk deer

August 14th 2006.
On the fourth days of the project, was organized the group discussion with the local people as all together it was carried out in the three time in different people and interact and discussed about Musk deer, it distribution area and its threats. And discussed about the musk deer participatory conservation action plan.

Financial statement:

S.N.	Activities	£
1	*Travel* a) Air fare (2 persons for two time * two person Pokhara to Mustang	100.00
2	*Field allowance* a) Investigator 60 days field visit @ £10 including accommodation, foods. b) Local assistant (1 per, @£6 for 30days) (including porters + Knowledgeable persons for study area travel) c)People hire for the population count through SILENT DRIVE COUNT METHOD (10 person for 4 days @ £ 6) d). Technical assistance 1 per, @£6 for 30days	600.00 180.00 240.00 180.00
3	*Conservation awareness class materials poster publication and brochures publication*	200.00 500.00
4	*Stationary & supplies, report, Communication*	200.00
5	*Equipment (Compass, measuring Tapes, slide film, photo film and) hiring/buying, GIS maps etc*	250.00
6	*For series of workshop to prepare participatory conservation action plan of Musk deer*	400.00
	Total	**2850.00**
	Fund Provided by RSG	**2610.00**

Chapter: Four

Overall Conclusion and Recommendations

Conclusion:

- In Mustang district Musk deer is found in Tukuchhe, Marpha, Muktinath, Kobang, and Kagbeni VDCs and suspected in Jomsom, Ghasa, Kunjo and Lete VDC. Musk deer also found in Parche and Namarjung VDC of Kaski district with in an ACAP region.
- Musk deer is distributed in different forest of Marpha VDC namely: Phong, Thalche, Chicheghang, Lumbuniyo, Napang Danda, Miprakiu, and Kuplithang.
- 15 musk deer (5 male, 9 Female, 1 were unclassified) were counted in Lumbubiyo forest area through silent drive count.
- Pellet group density in Chichugan forest was 7.26/ha therefore by using regression model developed by Aryal, 2005, it was estimated that there was 2.4 musk deer/sq. km.
- Thanche and Phong forest which less human-livestock pressure area and frequency of pellet observation was high in this area.
- Local people strongly believed that population of musk deer is declining from the forest of Marpha VDC. About 86 % of local people said that the population of musk deer is decline. All the schools students were not known its legal status and only 2% of respondents know its legal status.
- Forest land is most preferred habitat types by musk deer.
- The preferable altitude of the Musk deer in study area is 3300-3700m.
- There was increasing encounter rate of pellet 10○ to 45○ of angle of slope in study area then gradually decreasing.
- Generally musk deer preferred to rest near the dense cover.
- Moderate crown cover (50-70%) was highest in study area and pellet group were found in moderate crown cover.
- Total 5 species of tree, 4 species of shrub and 7 species of herb were recorded. *Abies sp.* (IVI=108.35) was most prominent followed by *Betula utilis* (IVI=91.95), *Juniperus sp.* (IVI=36.1), *Cupressus torulosa* (IVI=31.49), *Pinus wallichiana* (IVI=32.11).
- Snare/trap is currently the preferred method of poaching. In the past poachers used guns, poison and dogs for killing Musk deer.
- There are high threats to Musk deer habitat due to overgrazing by domestic livestock, forest fire, timber and other forest product collection, etc.
- Local people are dependent in musk deer habitat for fire wood, pastoral land for their livestock and NTFPs collection for their subsistence
- With the participation of local people specially CAMC, participatory musk deer conservation action plan has prepared, which proposed budget is near about $ 82,500.00

- Conservation education activities were carried out in the Marpha VDC of mustang districts.
- Musk deer posters and brochures were published and distributed

Recommendation:

- Proposed participatory conservation plan must be implemented with the coordination with the funding organization.
- Detail presence and absence survey should be carried out in suspected VDCs and detail population study should be carried out in other Musk deer distribution VDC of Mustang district.
- Correlation between pellet group density and musk deer population density should be identified.
- Conservation education activities are most important to raise awareness among local people. Such as Awareness camp, conservation quiz, Art competition for schools student should be launched.
- Musk deer farming should be started so that local people can benefit and developing opportunities for ecotourism – so that tourists can pay for guided trips to see musk deer –thereby contributing to the local economy.
- A core area should be demarcated in prime habitat of musk deer and prohibited to graze domestic livestock and collect forest products or to carry out any activities which may disturb Musk deer.
- CAMC should be done regular patrolling in all Musk deer habitat.

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Appendix-1

Tops three winners of Art competition / (English translation from Nepali)

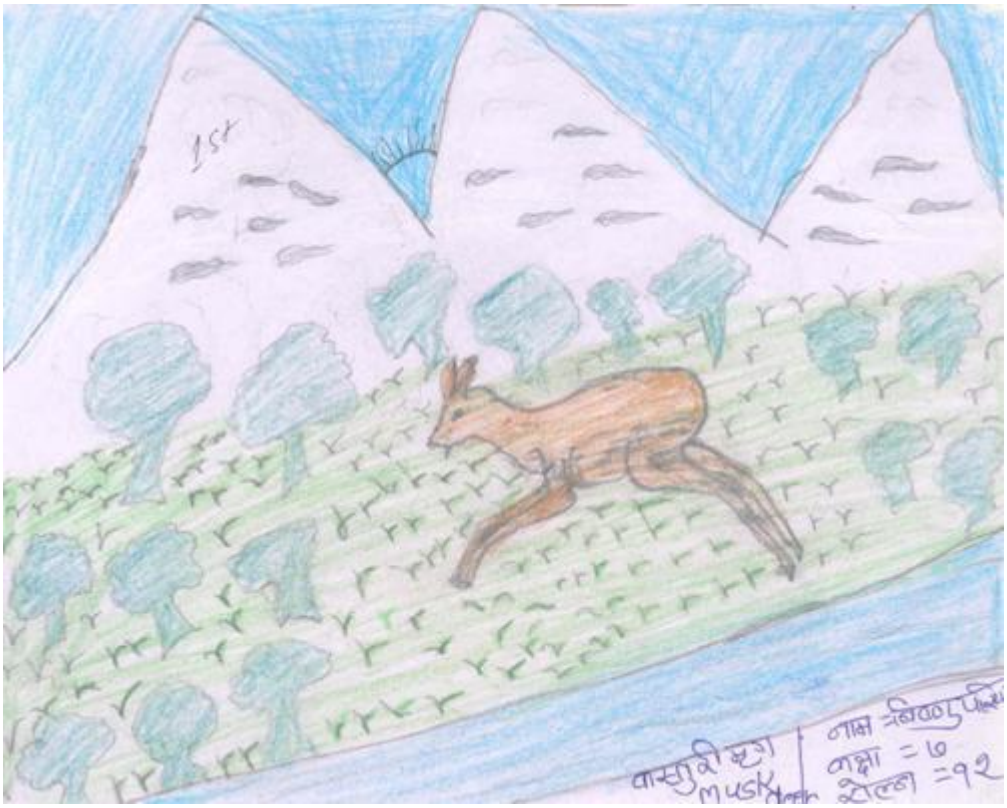
Dibek Lalchan class: 10
Shree Janabal Secondary School, Marpha
Musk Deer is an important animal. The animal is found in less quantity in our country Nepal. It is four limbed animal and is clearly figure out in one rupee note of country. Its value is because of presence of musk pod. People use this musk for perfumes, scents and medicines because of this valuable pod, people are attracted towards the animal resulting extinction of it. Though many organizations are established for the conservation of this animal, it is not conserved equally. For its conservation people should be awarded for the conservation. So awareness raising programme should be done for the conservation of the deer. By conserve ring importance also, its production should be increased. Increased population of the deer may increased tourists resulting economic benefit in the country so people should be awarded about conservation of the animal. If people convict illegal activities there should be different punishment like jail, penalties, and others. So Resulting in decreasing rate of musk deer's extinction.

Second/ Aash maya Pariyar Class: 9
Shree Janabal Secondary School, Marpha
Musk deer found in the forest of Marpha village and chero village of mustang districts. It four limbed animal, and body is covered brown hairs. For the conservation of this animal, different activities should be carried out like; stop poaching animal by villagers, Awareness raising program about animals among the people, Legal punishment for killing the animal. Musk is an important animal so it should be conserved and if we conserve, our new generation will be able to see it.
Musk deer is such animal such animal which can't be seen and else can be seen in difficult places. In other places, it is getting extinct. But we marpha people are lucky to get opportunities to see and conserve it. We, villagers, are glad for this reason. We should not kill musk deer but if we find death musk deer also, we can get some benefit from it. For example, if a hair of musk is kept in the pillow of baby, snake will not attack. If Musk deer is live by conservation we will be benefited. And if it is dead also we can get benefits. So it is necessary to conserve musk deer and should be conserved in following days also. This will increase tourist for the observation and travelling from the different countries. tourist will increase economy. This will result in economic support for the country. So it should be conserved.

Thirds
Prakas subedi
Class: 9
Shree Janabal Secondary School, Marpha
Musk deer is one of the animal going to be extinct from Nepal. It is an herbivorous animal. This lies under the phylum chordata and mammalian group. In Nepal, musk deer population is depleting every days. It has a perfumes pod called musk pod in its body. So people unknown about its value becomes greedy and poach it illegally. May Gos and NGOs are working for the conservation of this animal. Many national parks, wildlife reserves and conservation have been established for it conservation. Poacher will be punished for illegal hunting of the musk deer. But still laws are not implemented properly. These laws are limited to acts and regulation's books only. Maximum protection is not enough for its conservation but there should be awareness programme for the conservation. People should be aware about benefits of conserving it. It can recognize different animals by their own smell.

Appendix-2

Selective Top 8 Arts drawing by Schools students of Janawal Higher secondary school, Marpha




कस्तुरी मृग
musk deer


कस्तुरी मृग
Musk deer
नाम ÷ नन्दा पुन
कक्षा ÷ 6
रोल न ÷ ४
विद्यालय ÷ श्री जनपाल आ.वि जार्फा
खुस्ताङ