

**SUSTAINABILITY OF MARKHOR TROPHY HUNTING PROGRAMME IN
DISTRICT KOHISTAN PAKISTAN**

By

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Dedication.....

My research is dedicated to my parents and especially to my late mother

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LIST OF ABBREVIATION & SYMBOLS

ANOVA	=	Analysis of variance
VCC	=	Village Conservation Committee
VCF	=	Village Conservation Fund
CTHP	=	Community trophy hunting programme
PRA	=	Participatory Rural Appraisal
SSI	=	Sexually selected infanticide
USD	=	United States Dollars
PRs	=	Pakistani Rupees
IUCN	=	International Union for the conservation of nature and natural resources
WWF	=	World Wide Fund for Nature
MACP	=	Mountain Areas Conservation Project
NWFP	=	North West Frontier Province
SPSS	=	Statistical Packages for Social Sciences
CGNP	=	Chitral Gol National Park

KELESTARIAN PROGRAM PEMBURUAN TROFI MARKHOR DI DAERAH KOHISTAN PAKISTAN

ABSTRAK

Pemburuan trofi merupakan suatu bentuk sukan pemburuan yang diamalkan sejak berzaman lamanya. Biasanya, haiwan yang diburu sebagai trofi mempunyai tanduk atau gading, dan kebanyakannya adalah jantan. Pada tahun 1983, Jabatan Hidupan Liar Khyber, Wilayah Pakhtunkhwa, Pakistan memulakan Chitral Conservation Hunting Programme, iaitu suatu program pemburuan trofi bagi markhor (*Capra falconeri cashmiriensis*). Ini tidak semestinya program pemuliharaan komuniti berasaskan kerana semua pendapatan yang dijana daripada memburu telah disimpan di akaun kerajaan. Program ini berterusan sehingga 1991. Mujurlah, dalam pertemuan CITES Kesepuluh pada tahun 1998, pemburuan trofi markhor dibenarkan dan terbuka kepada para pemburu di seluruh dunia. Justeru, program ini dimulakan semula dengan penyertaan komuniti di wilayah Chitral. Pada tahun 2000, program ini diluaskan ke lembah Kaigah, yang terletak di wilayah Kohistan. Bagi tujuan ini, suatu pelan pemuliharaan yang berasingan disediakan. Mulai tahun 2005, pemburuan trofi Markhor di lembah ini menjadi suatu fenomena yang regular. Kajian ini bertujuan untuk menyelidik trend populasi, beberapa saiz trofi markhor dan mendokumenkan sumbangan memburu trofi kepada pemuliharaan dan pembangunan di Kaigah lembah. Kajian ini telah dijalankan 2005-2012 selama lapan tahun. Musim sejuk musim lubang kajian mengenai mata tetap telah digunakan untuk mengumpul data lapangan. Selain itu penilaian penyertaan luar bandar telah digunakan untuk mengumpul maklumat daripada masyarakat mengenai pendapatan dari memburu trofi dan perbelanjaan daripada Vcf itu. Data yang terkumpul dianalisis

menggunakan SPSS versi 19 dan MS Excel. Trend penduduk markhor dalam Kaigah lembah telah dibandingkan mengikut masa dengan menggunakan parameter populasi daripada jumlah populasi, populasi jantan, populasi betina, populasi anak, populasi pemuda, nisbah jantan/batina, nisbah pemuda/batina dan nisbah bayi/wanita. Parameter ini juga menunjukkan trend peningkatan sepanjang lapan tahun kajian. Pekali atau koefisien penentuan bagi setiap parameter juga menunjukkan perkaitan yang kuat dengan masa. Ia juga merumuskan bahawa bilangan trofi bertambah daripada 20 kepada 31, iaitu pertambahan 5.12% dalam tempoh lapan tahun kajian. Kajian ini juga mendapati bahawa perolehan daripada pendapatan yang terkumpul, 50% digunakan untuk usaha-usaha pemuliharaan spesies di lembah Kaigah, dan yang selebihnya, secara tidak langsung digunakan untuk program kesedaran pemuliharaan markhor. Keadaan ini menunjukkan bahawa program pemburuan trofi berasaskan komuniti merupakan suatu program yang berjaya dari segi pemuliharaan dan pengurusan markhor. Aktiviti ini juga turut menyumbang terhadap insentif ekonomi komuniti dalam bentuk yuran pemburuan, yang mengubah sikap dan persepsi komuniti tempatan terhadap kehidupan liar. Sokongan serta penglibatan komuniti dalam aktiviti pemuliharaan dan perlindungan markhor serta spesies hidupan liar yang lain di kawasan mereka, secara tidak langsung menunjukkan bahawa program ini adalah lestari.

SUSTAINABILITY OF MARKHOR TROPHY HUNTING PROGRAMME IN DISTRICT KOHISTAN PAKISTAN

ABSTRACT

Trophy hunting is a form of sport hunting that has been practiced since hunting gatherer period. Usually, animals hunted as trophies have large weapons such as horns, antlers or tusks. Therefore, trophy animals are mostly males, and the animals most frequently considered as trophy species are ungulates. In 1983 the Wildlife Department of the Khyber Pakhtunkhwa province in Pakistan began the Chitral Conservation Hunting Programme, a trophy hunting programme for markhor (*Capra falconeri cashmiriensis*). This was not strictly a community based conservation programme because all income generated from hunting was deposited in the government accounts. The programme continued until 1991. Fortunately, in 1998 at CITES 10th meeting, markhor hunting for the trophies was allowed and opened to international hunters. Thus the programme was restarted with true community participation in district Chitral and in 2000, Kaigah valley in Kohistan district was also included in the programme and a separate conservation plan was prepared for the purpose and since 2005 trophy hunting of Markhor in the valley is a regular phenomenon. This study was aimed to investigate the population trend, number of trophy size markhor and document the contribution of trophy hunting to the conservation and development in Kaigah valley. The study was carried out from 2005 to 2012 for eight years. Winter rut season survey on fixed points was used to collect field data. Moreover participatory rural appraisal was used to collect information from the communities about earning from the trophy hunting and expenditure from the VCF. Analysis of the data was carried out using SPSS version 19 and MS Excel. The trend of markhor population in Kaigah valley was compared

over time using population parameters of total population, male population, female population, kid population, yearling population, male/female ratio, yearling/female ratio and kid/female ratio. These parameters showed an increasing trend over time during the eight years of the study. The coefficient of determination for each parameter also showed a strong association with time. It is also concluded that number of trophy sized animals increased over time from 20 to 31 and the growth remained 5.13 % over eight years of the study. This study also revealed that the revenue collected by the community was spent 50 % directly for conservation of the species in the valley and rest of the expenditure also contributed indirectly to the conservation of markhor in the form of awareness raising. This indicates that community based trophy hunting programme was a successful programme in terms of conservation and management of markhor. This activity provided economic incentives to the communities in the form of hunting fees which changed the attitude and perceptions of the local communities towards wildlife. The communities supported and became involved in conservation and protection of markhor and other wildlife species in their own area, which indicated that the programme was sustainable one.

CHAPTER 1

INTRODUCTION

1.1 Introduction to Markhor (*Capra falconeri cashmiriensis*)

Seven species of wild sheep and goats are found in Pakistan. These seven species are divided into 12 subspecies (Hess et al., 1997; Roberts, 1977). Out of these, markhor belong to the family Bovidae and sub family Caprinae (Roberts, 1977; Schaller, 1977). The word ‘markhor’ has interesting meanings and it is believed to be a Pashto language word “Mar Akhkar”. The word actually consists of two words: the meaning of mar is snake and that of akhar is horn, because shape of horns of the species is curved and this seems to be of the shape of snake. Thus the species was named as “Mar Akhkar”. As time passed, the word changed to markhor (Roberts, 1977).

Two sub species of markhor have been reported in Pakistan by Schaller and Khan (1975). Basis of their classification was shape of the horns and characteristics of their body. These two sub species are: 1) flare-horned markhor, whose horns are twisted but moving away from each other and 2) Straight-horned markhor, whose horns shape is cock screw. Flare horned markhor has two types i.e. Astor markhor (*Capra falconeri falconeri*) and Kashmir markhor (*Capra falconeri cashmiriensis*). Whereas straight horned markhor also has two types including Suleiman markhor (*Capra falconeri jerdoni*) and Kabul markhor (*Capra falconeri megaceros*).

Roberts (1969) has stated that flare horned markhor has more body weight than straight horned markhor and length of the horns of straight horned markhor is also short. Horn size of females of both the sub species is much smaller as compared to males (Roberts, 1977). A fifth sub species of markhor was described by Ellerman

and Morrison-Scott (1951) as Chiltan markhor (*Capra falconeri chialtanensis*) besides the above four i.e. Astor markhor (*Capra falconeri falconeri*), Kashmir markhor (*Capra falconeri cashmiriensis*), Suleiman markhor (*Capra falconeri jerdoni*) and Kabul markhor (*Capra falconeri megaceros*). Shackleton (2001) stated that taxonomic position of Chiltan markhor was not clear due to its morphological characteristics which are midway between markhor and wild goat. Shackleton (2001) further asserted that IUCN Red List and IUCN Caprinae Specialist follow the classification of the species as described by Schaller and Khan.



Plate 1.1: Markhor browsing on foliage of oak tree.



Plate 1.2: *Capra falconeri cashmiriensis* (Adult male – January 2012)

1.2 Distribution of markhor

Schaller (1977) investigated that markhor occurs from Pakistan, India, and Afghanistan in the South Asia to Turkmenistan, Tajikistan, and Uzbekistan in the Central Asia. Shackleton (2001) stated that markhor is found from the hills of southern Baluchistan to Hindu Kush and Himalaya's mountain ranges in the northern parts of Pakistan. Populations of markhor are mostly fragmented. Astor markhor is only found in the Nanga Parbat mountains in the Gilgit Baltistan province. Pir Panjal or Kashmir markhor has a wide range of distribution. It is found in Chitral, Dir Kohistan, Swat Kohistan and Indus Kohistan of Khyber Pakhtunkhwa province. The species could also be found in Azad Kashmir. Kabul markhor is also present along the southern border of district Chitral. Its presence is reported in Murghazar hills of district Swat. Remnants of Kabul markhor also occur in Khanori areas of Malakand Agency and Sakra hill range in Mardan and Buner districts of Khyber Pakhtunkhwa province in Pakistan. Suleiman markhor is widely distributed in the mountains around Quetta in Baluchistan province. (Roberts, 1977; Schaller and Khan, 1975).

1.3 Habitat of Markhor

Markhor are present in arid and open forest lands, joining with *Artemisia* bushes (Huffman, 2004; Roberts, 1969). Temperatures in the habitat range from below 0 C⁰ to 30 C⁰ in various seasons. In winter the habitat receives heavy precipitation in the form of snow fall (Plate 1.3) and the temperature is mostly below 0 C⁰ and in summer it reaches up to 30 C⁰. This habitat consists of scattered plants of *Juniperus macropoda* and *Juniperus excelsa* on the northern aspect but the southern aspect is mostly treeless. Preferred habitat of markhor consists of precipitous slopes and crags receiving low rainfall (Roberts, 1969). Plants species in the habitat of

markhor are oak (*Quercus baloot*, *Quercus dilatata* and *Quercus semicarpifolia*), Sagebrush (*Artemisia tridentata*), *Indigofera heterantha*, *Ephedra gerardiana*, wild Almond (*Amygdalus* sp.), Pistachio (*Pistacio* sp.), Spruce (*Picea smithiana*), Chilghoza pine (*Pinus gerardiana*), Deodar (*Cedrus deodara*) and Fir (*Abies pindrow*) (Malik 1981, Schaller 1977). Suleiman markhor can be found along the lower slopes of the Suleiman range from 700 m to 1000 m from the mean sea level but Kashmir markhor is found from 2700 m to 4000 m in Chitral, Kohistan and Swat districts (Schaller, 1977).



Plate 1.3: Typical Markhor Habitat in Kaigah valley Kohistan during winter

1.4 Introduction to Trophy Hunting Programmes

Trophy hunting is one kind of sport hunting, which is an established habit since human's existence. The animal hunted for trophy is usually male due its durable parts like horns, antlers and tusks, which can be used for display. Animals most commonly hunted for trophies are the ungulates. In trophy hunting, a hunter usually looks for an animal in a taxon or a special geographic area (Frisina *et al.*, 2000).

Ungulates which are hunted as trophy animals can easily be distinguished as males and females due their external morphological appearance and that they are polygamous. Due to the characteristic of polygamy, if some males are hunted every year, it will have negligible effect on the growth rate of the population. It means that even if small populations of wild ungulates are offered for trophy hunting, there will be no threats to the population. But in the process, it should be ensured to leave sufficient mature males irrespective of the population size. Leaving of sufficient number of mature males will lead to normal reproduction rates and that the long-term survival of the population will not be threatened (Shackleton, 2001).

Shackleton (2001) investigated that trophy hunting is advocated by the conservationists by the assumption that trophy animals are mostly older males. They have lived most of their life time and who are at the last stage of their life and will die soon. This assumption is not totally true. Trophy males are always in their major reproduction years. It is sometimes difficult to find older males in ungulates populations because once a male reaches the end of his active life, his health condition weakens quickly and the individual gave up to natural predators or starvation or could not stand severe weather conditions.

1.5 Trophy Hunting Programmes with community participation in Pakistan

The Wildlife Department of Khyber Pakhtunkhwa province started the Chitral Conservation Hunting Programme in 1983. This was a trophy hunting programme for the conservation of Kashmir Markhor. This conservation programme was not a community based programme because all the income generated from trophy hunting was deposited in government account as provincial government revenue. This programme was developed by North West Frontier (now Khyber Pakhtunkhwa) Province Wildlife Department. The programme was collaboratively implemented by Khyber Pakhtunkhwa Wildlife Department and a hunting organization, Shikar Safari Club. The programme continued for eight years from 1983 to 1991 until the Government of Pakistan imposed a ban on the export of trophies along with all big game hunting throughout Pakistan due to shifting of markhor from Appendix-II to Appendix - I. During these eight years of the programme, two markhor were hunted each year in and around Chitral Gol National Park (Khyber Pakhtunkhwa Wildlife Department record 1983 to 1992).

In 1998 the programme was resumed with true community participation in district Chitral. Two conservancies i.e. Tushi Shasha and Gehrait were formed for the purpose and in 2000, Kaigah valley in Kohistan district was also included in the programme and a separate Conservation Plan was prepared for the purpose. Under that Conservation Plan, trophy hunting of Markhor took place in 2004-05 and since then trophy hunting of Kashmir Markhor in the valley is carried out each year.

Khyber Pakhtunkhwa Wildlife Department each year in September/October provides an advertisement in the national and international media and invites bids for hunting from the interested parties. The parties send their sealed bids to the

department within stipulated time period, which are opened in the presence of the bidders or their representatives. The highest bidder is then selected for the hunt and he is given a permit to shoot the animal within 14 days in the field. The permit is valid for three months only and the hunt usually takes place from January to March each year. The revenue generated from trophy hunting is divided in the ratio of 80:20 between the communities and the government. The community deposits their share in the Village Conservation Fund (VCF) in a bank account. The bank account is operated jointly by three signatories under an agreement signed between the government and the Village Conservation Committee (VCC).

1.6 The Problem

In Kaigah Valley, District Kohistan, lack of accurate data on the status of Kashmir Markhor and community incentives hampers the long term sustainability of Markhor Trophy Hunting Programme. So this study is aimed to document the accurate data on the status of Kashmir markhor and use of the revenue generated from trophy hunting on the conservation of the species.

1.7 Objectives of the study

Objectives of the study in Kaigah valley District Kohistan are:

- To collect population data through full enumeration for determining the population trend.
- To ascertain the number of trophy size markhor.
- To document the contribution of trophy hunting to the conservation and development in the valley.

CHAPTER 2

LITERATURE REVIEW

2.1 Markhor and its distribution

In 1973 it was decided to place markhor in Appendix–II of CITES. Markhor was shifted from Appendix-II to Appendix-I in 1992. This decision imposed a complete ban on all kinds of hunting in the member countries of CITES. However in 1997, Pakistan was allowed to export upto six markhor per year. The decision was made at the 10th CITES meeting of the conference of the parties (Shackleton, 2001). This decision was made on the request of Pakistan to help Pakistan to develop a community based trophy hunting programme with the support and active role of communities for the conservation and management of markhor and its habitat (Shackleton, 2001).

Pakistan is a unique country in the world which has rich diversity of Caprinae and is famous for conservation of wild sheep and goats. Out of the twelve sub species of wild goats and sheep, only markhor is of importance to the sports hunters (Hess *et at.*, 1997). These animals mostly live in small isolated and fragmented populations and are distributed from the south in hills of Baluchistan and Sind to the foothills and high mountains in the north in Khyber Pakhtunkhwa and Gilgit Baltistan provinces of Pakistan (Roberts, 1997).

Wild goats are found in the dry and inaccessible mountain ranges of southern Baluchistan and south-western Sind. There are two subspecies of wild goats in Pakistan. These are: the Sind wild goat which is also called Sind ibex and the Chiltan goat. Chiltan goat is only found in the south west of Quetta in Baluchistan province in the Chiltan hills. Markhor has two sub species; straight horned markhor

(*Capra falconeri megaceros*) and flare horned markhor (*Capra falconeri falconeri*). Astor and Kashmir forms is flare-horned markhor and Kabul and Suleiman forms is straight-horned markhor (Schaller and Khan, 1975). The Caprinae Specialist Group and the IUCN Red List recognizes this classification of markhor. The world's largest population of markhor is present in Pakistan from the dry and arid mountain of Baluchistan in the south to Khyber Pakhtunkhwa and Gilgit Baltistan in the north (Hess *et al.*, 1997; Roberts, 1997).

Markhor are social animals and live in small herds. The herds consist of females, their kids, yearlings and young males. Mature males live alone outside the herds and only join the herds during the winter rut season in late December (Roberts, 1977). Markhor are diurnal feeders and graze/browse mostly early in the morning and late in the evening. They can be seen feeding irregularly during winter throughout the day (Roberts, 1977). It can seldom be seen climbing into oak trees (Plate 1.2) for eating of its leaves especially during winter, when the ground is either covered with snow or herbaceous flora is dried due to severe cold (Schaller, 1977). Food preferences are dependent on season and its availability (Aleem, 1976).

The age of maturity for reproduction for female in straight-horned markhor is about three years (Roberts, 1977) while for the female of flare-horned markhor, it is two years (Aleem and Malik, 1977). December is the rut season and it continues for one month up to January. According to Roberts (1977), gestation period is approximately six months. The litter size is one to two. (Aleem and Malik, 1977).

2.2 Trophy hunting and population ecology

In ungulates, in many cases, hunting is the main cause of adult mortality (Lavangtan and Loison, 1999; Ballard *et al.*, 2000; Bender *et al.*, 2004). Hunters usually select the animals on the basis of age, sex and/or morphological character for hunting. This is due to either social liking or hunting regulations (Martinez *et al.*, 2005). Keeping in view this selectivity, it is essential for the wildlife managers to study the effects of trophy hunting on the growth of the population (Harris *et al.*, 2002; Festa-Bianchet, 2003). The wildlife managers are usually concerned with the dynamics of the population and characteristics of the habitat, which may have an effect on the population growth of wild ungulates and ultimately on the sustainability of the hunting (Festa-Bianchet, 2007). In most of the hunted populations very few old animals and almost no adult males and high proportion of young females are left (Gaillard *et al.*, 2000).

In the hunted population, the survivors of the hunting season and that of harsh winter will be comparatively in better condition in the spring and there will be high chances of success of reproduction than survivors from the un hunted population, who were in high competition during winter (Boyce *et al.*, 1999). If in a population, harvest levels are higher for males as compared to females, the surviving population would mostly consist of juveniles, yearlings, sub adult males and females (Coulson *et al.*, 2004).

Wildlife managers should always try to reduce the impacts of human beings including hunters on biodiversity. It is necessary that trophy hunting should be sustainable but sustainable only does not mean to leave enough adult males for next

year hunting. Sustainability should also mean a system of management that will change the pressures on wild ungulates. Trophy hunting must be a part and parcel of conservation initiative because it not only produces interest and education in biodiversity but also income which can be used for conservation of the species (Festa-Bianchet, 2007).

2.3 Trophy hunting

Trophy hunting is a good tool for conservation because hunters are ready to pay huge amount of money for availing the opportunity of hunting trophy animals. Trophy hunting programme might be a sustainable programme, if income generated from trophy hunting is spent for the conservation of the species and its habitat. This will ensure restoration of population and habitat (Shackleton, 2001).

Trophy hunting makes an integral part of many conservation programmes and projects and is used as a conservation tool for sustainability of wildlife resources. Trophy hunting also plays a pivotal role in improving the socio-economic conditions of the custodian communities (Logan & Moseley, 2002; Hofer *et al.*, 2002). Trophy hunting programme outside of protected areas can be implemented for the conservation of wildlife, where there are fewer chances of other uses of wildlife like wildlife viewing and ecotourism (Lindsey *et al.*, 2007).

In some parts of Africa, trophy hunting is required for the benefit of both people and wildlife. Harmful effects from trophy hunting can be reduced by adapting an aged based system while conserving large areas of lion habitat. Otherwise these areas will be encroached by communities for agriculture or livestock rearing (Packer *et al.*, 2006). In a sustainable hunting programme only those animals

are hunted which will eventually die. It is exactly not known that which animal will die from starvation, predation, diseases or other natural calamities. However some animals will die each year more slowly and painfully (Gunn, 2001). Packer *et al.*, (2010) investigated that unwarranted trophy hunting has caused population decline in African lions (*Panthera leo*), American Cougars (*Felis concolor*), and possibly African Leopards (*Panthera pardus*). A well managed trophy hunting programme has the following characteristics:

- 1) Transparency,
- 2) External monitoring system,
- 3) A mix of top down and bottom up authority that has local support, and
- 4) A good management that uses funds generated from trophy hunting for conservation (Amgalanbaatar, *et al.*, 2002).

For a hunting programme to be sustainable, population of the species must be monitored, managed and conserved on sound basis (Shackleton, 2001). Sustainability also requires the support and active participation of the custodian communities in and around the habitat of wild ungulates (Harris, 1995; Harris and Pletscher, 2002). The present low quota of less than one percent for trophy hunting of wild ungulates in Pakistan is causing less threat to the animals population, but could affect local populations, if not well managed. If all trophy sized males are removed from a population that may have very negative impact on the population of wild ungulates (Shackleton, 2001; Harris *et al.*, 2002). Trophy hunting discourages poaching and, if funds generated from trophy hunting were used for the activities related to conservation, the impact of well managed trophy hunting programme could be positive (Shackleton, 2001; Harris *et al.*, 2002). Many people support trophy hunting as a source of income generation for the management and conservation of

target species, especially in developing countries where there are fewer opportunities of funds for conservation (Shackleton, 2001; Harris *et al.*, 2002).

Trophy hunting will be a better tool for conservation if:

- 1) The income generated from trophy hunting is spent in the activities related to conservation and management of the species,
- 2) The hunting programme is based on sustainability, and
- 3) Local support is available (Harris, 1995; Johnson, 1997; Harris & Pletscher, 2002). Trophy hunting programme should have active participation of communities and it should also be associated to conservation management programmes for the species and its habitat. (Amgalanbaatar, *et al.*, 2002).

If prime age animals are allowed to breed for a few years before being shot may be adequate to maintain their superiority as breeders. However, long delays may often be undesirable due to the risk that the animal will expire due to predation or starvation or diseases before hunting. This risk often increases after prime age (Mysterud and Bischol, 2009).

Community members who reside close to the habitats of wild species can be taken on board for wildlife conservation by providing them several forms of incentives such as land ownership, empowerment, and livelihood improvement (Hulme and Murphree, 1999). If no incentives are provided to the community members that usually involve in poaching and exploitation of natural resources (Fischer *et al.*, 2005). Mayaka *et al.*, (2005) investigated that uses of wildlife may include; birds and animals watching, ecotourism, trade of animals, and hunting for some durable part or subsistence. But a tourism based industry called safari hunting

is primarily based on hunting for trophy. Trophy hunting is an incentive to the community and is considered as one source for income generation with little use of wildlife species and least disturbance to the habitat (Loveridge *et al.*, 2006; Eltringham, 1994).

Trophy hunting has both ecological and economical advantages. Less infrastructure is required for trophy hunting, involves less number of people and the habitat is least disturbed as compared to ecotourism. Moreover, low percentages of the total population, often old males, who possess some aesthetic value, are hunted. More income is generated from trophy hunting as compared to ecotourism with low numbers of hunters seeking a trophy animal (Loveridge *et al.*, 2006; Mayaka *et al.*, 2005). Baker (1997b) found that for hunting of a trophy animal, hunters are ready for payment of more money and willing to travel for longer distances to avail the opportunity. The income generated from trophy hunting fees can be used for conservation of biodiversity with the active participation of custodian communities (Loveridge *et al.*, 2006).

Trophy hunting plays an important and potential role in rehabilitation of wildlife habitats and making more income from hunting of wildlife with less negative impact on population of trophy species (Lindsey *et al.*, 2007). In many countries of South Africa, areas are set aside for wildlife conservation and management, and conservancies on community lands have been created using the income generated from trophy hunting (Balduş and Cauldwell, 2004; Weaver and Skyer, 2003) and this has provided incentives for protection, management, and reintroduction of animals into disturbed and fragmented wildlife areas (Lindsey *et al.*, 2007).

The benefits of properly managed and monitored trophy hunting programme are more than its disadvantages (Loveridge *et al.*, 2006). In mountain goat (*Oreamnos americanus*) population, only one percent of the total population was suggested for hunting. This low quota reduced the repercussions of trophy hunting (Voyer *et al.*, 2003). The recommendation of one percent quota is greater than the quota of markhor hunting in Pakistan (Shackleton, 2001).

Loveridge *et al.* (2006) stated that sports hunting can benefit conservation in a number of ways, but protection of habitat is the main advantage of trophy hunting. Trophy hunting can produce heavy income and in many cases the revenue is used for conservation of biodiversity (Shackleton, 2001).

2.4 Problems and controversy in Trophy Hunting

In Pakistan, there is a need of capacity building to develop scientific approaches to conduct research on population viability and landscape ecology. An intensive training programme is required for members of the communities and local staff of wildlife department to tackle issues related to trophy hunting programme (Ali, 2008).

Various diseases are transmitted to markhor through domestic goats and sheep (Frisina *et al.*, 2002). In Chitral Gol National Park from December 2 to December 22, 1999, as many as eleven markhor were found dead. When their dead bodies were sent to Veterinary Research Institute Peshawar for post mortem, they diagnosed as *Pleuropneumonia*, *Pnterotoxemis*, and due to other viral/bacterial diseases as cause of deaths (Ali, 2008). The Khyber Pakhtunkhwa Wildlife Department reported that thirty to fifty individuals of markhor were died of the

disease transmitted from livestock carried from Afghanistan (Malik, 2002b; Shackleton, 2001; Anonymous, 2000).

Land tenure system in and around markhor habitat is disputed among communities and this may result into possible threat to the species conservation through communities participation. Communities have intra village and inter village disputes and they have problems with the government too on the ownership and use rights of the natural resources. This vague system of land tenure often makes people less interested in wildlife conservation (Ali, 2008).

Success of a wildlife conservation programme cannot only be gauged from revenue generation but it can be measured from: uplift of livelihood of the communities, inculcating a sense of ownership in the custodian communities, a decision making process that could be long lasting, and a transparent and equitable distribution of income generated from trophy hunting (Lewis and Alpert, 1997). Butler (1995) stated that unjust sharing of income from wildlife resources may result in inter and intra community disputes.

It is sometimes controversial to propose big ungulates for trophy hunting as a conservation tool, even though the Convention on Biological Diversity promotes sustainable use as one of its three pillars. The African Rhino Specialist Group recommended four guiding principles to tackle this problem: 1) ensuring that hunts are biologically sustainable and based on sound monitoring system, 2) ensuring income generated from trophy hunting is equitably distributed between public and private sectors, 3) desiring good biological management on long term basis for black rhino conservation, and 4) ensuring the transparency (Leader-Williams *et al.*, 2007).

Harris & Pletscher (2002) investigated hunting programme of Argali *Ovis ammon* in Aksay County, Gansu province of China and they concluded that the income generated from hunting fees has contributed less for conservation of the species at the community level, thus the incentive system was not effectively utilized.

CHAPTER 3

MATERIAL AND METHODS

3.1 Introduction of the study area

Kohistan district (Plate 3.1) is one of the most remote and backward district in Pakistan and is situated in the extreme north of Khyber Pakhtunkhwa province. Literacy rate is less than 20 % as compared to the overall literacy rate of 45 % in Pakistan. Thirty percent of the people are living below the poverty line. Nature has bestowed on the area, as it is rich in forests from Alpine meadows to Alpine scrubs, moist temperate, dry temperate and scrub forests. These forests are abode to a number of wildlife species including markhor, snow leopard, black bear and pheasants. The world's largest surviving population of Western Horned Tragopan (*Tragopan melanocephalus*) is present in the district in Palas valley.

Kaigah valley (Plates 3.2 & 3.3) is situated on left bank of Indus River in district Kohistan. It is about 20 Kms from District head quarter Dasso and approximately 350 Kms from the provincial capital Peshawar and 400 Kms from the capital of the country Islamabad. Total area of the valley is 50 square kilometres, where about 400 persons are living in 40 households. The main tribes of the valley are Kharza khel and Jhalkan khel. Few households of Gujars are also residing in the valley as tenants.

Kaigah valley conservation committee was formed in May 2000 with technical assistance of Khyber Pakhtunkhwa Wildlife department. The valley was notified as community game reserve via Government of Khyber Pakhtunkhwa

Notification No. SO (FT-I) FFWD/VIII-10/92/7554-63 dated 15-07-2000. Trophy hunting is successfully being practiced in the valley since 2005.

The local communities of Kaigah valley depend on the natural resources to meet their requirements of timber, fuel wood, and fodder for livestock. All the flora and fauna have numerous benefits for the people, in the form of food, medicines etc. They collect non wood products including honey, mushrooms, chilghoza, walnuts, and medicinal plants from forests of the valley having great market values and are one of the major sources of income and support economy of the poor community of Kohistan.

Kaigah valley represents typical habitat of temperate forests and has the plants and wildlife species associated with dry temperate and alpine region with rich biodiversity. The typical wildlife species include Snow leopard (*Panthera uncia*), Himalayan lynx (*Felis lynx*), Indian fox (*Vulpes bengalensis*), Wolf (*canis lupus*), Kashmir Markhor (*Capra falconeri cashmiriensis*), Black bear (*Ursus thibetanus*), Monal pheasant (*Lophophorus impejanus*), Koklass pheasant (*Pucrasia macrolopha*), Himalayan snow cock (*Tetraogallus himalayensis*) and Chukar (*Alectoris chukar*).

The major plant species of the valley are Fir (*Abies pindrow*), Oak (*Quercus spp*), Blue pine (*Pinus wallichiana*), Chilghoza pine (*Pinus gerardiana*), Spruce (*Picea smithiana*), Willow (*Salix spp.*), Deodar (*Cedrus deodara*), Berch (*Betula utilis*), *Artemisia spp.*, *Ephedra gerardiana*, *Indigofera heterantha*, *Berberis lyceum* and *Viburnum nervosum*.

However, there is considerable concern for conservation of biodiversity since 1971, because many species of plants and animals are on the verge of extinction or endangered due to human activities, such as, excessive exploitation of forests, hunting, pollution, modernization of agriculture, damages due to forest fire, changing local culture and fragmentation of wildlife habitats. Such species include Ephedra (*Ephedra gerardiana*), Chilghoza pine (*Pinus gerardiana*), Himalayan Elm (*Elmus wallichiana*), Kuth (*Saussurea lappa*), Snow leopard (*Panthera uncia*) and Musk Deer (*Moschus chrysogaster*).

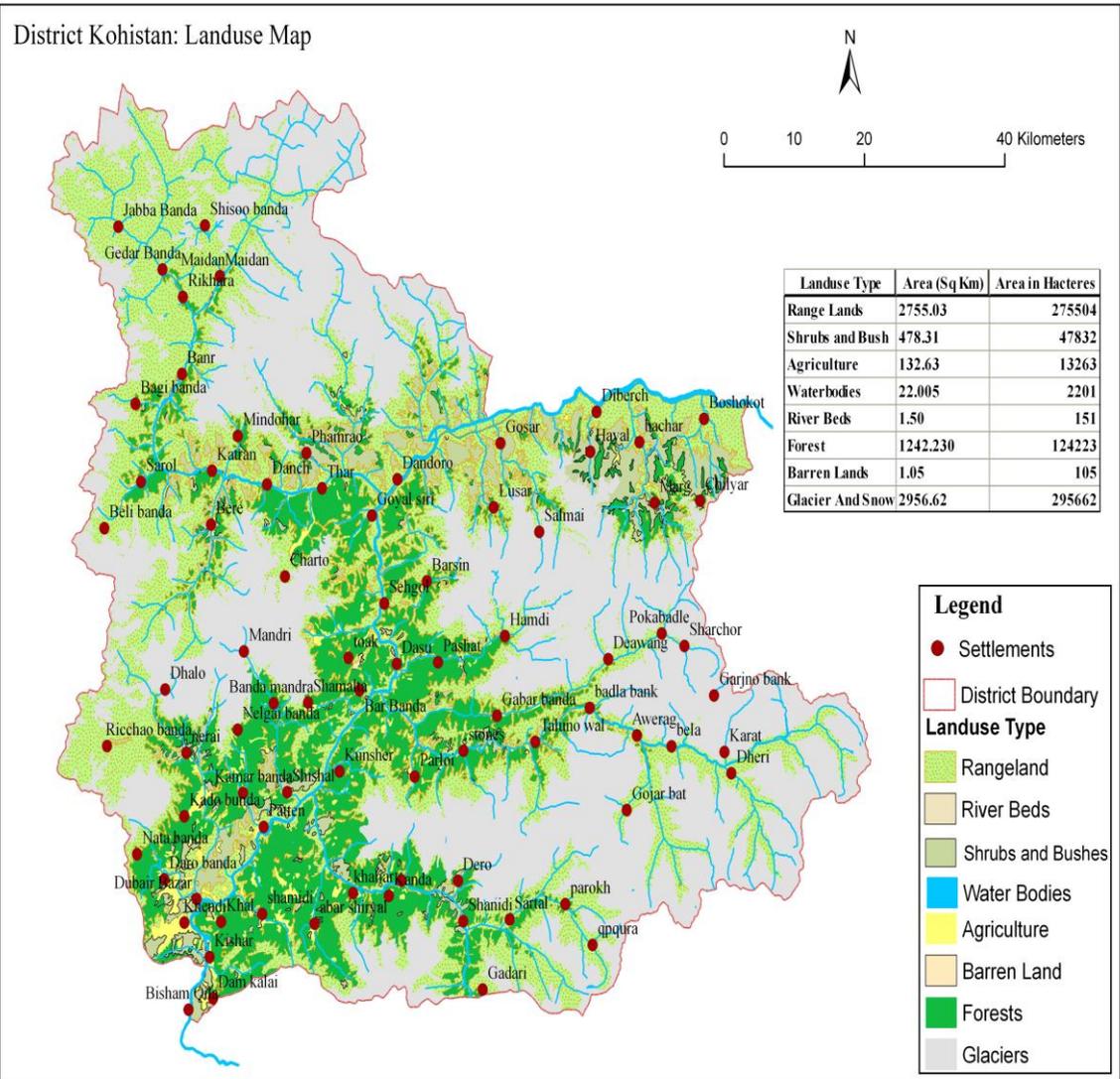


Plate 3.1: Map of District Kohistan Pakistan