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### Review Article

## Conservation, Management and Threats to Markhor Population in Pakistan: An Overview

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### ABSTRACT

Markhor is a national animal of Pakistan. It is present in different regions of KPK, and Balochistan, with the majority of the population in KPK particularly in Swat and Chitral district. Markhor has two sub-species that are further divided into five types Astor Markhor (*Capra falconeri falconeri*), Kashmir or Pir Panjal Markhor (*Capra falconeri cashmiriensis*), Kabul Markhor (*Capra falconeri megaceros*), Suleiman Markhor (*Capra falconeri jerdoni*), and Chiltan Markhor (*Capra falconeri chialtanensis*). The fifth one Chiltan Markhor is not a true Markhor and considered a crossbreed of Markhor and wild goat. These Markhor species are present in different areas of Pakistan and they differ from each other on the basis of their location and their horns. Its IUCN status is near threatened in Pakistan. The major reasons for its decline are habitat loss, illegal hunting and poaching. Although, a number of conservation programs and various national and international agencies are working for the protection of this animal such as TCP, KPK wildlife department etc. The present review highlights the importance of Markhor along with its distribution, major threats and conservation strategies adopted to protect Markhor.

### INTRODUCTION

Pakistan has a wide variety of wild goats and sheep belonging to subfamily Caprinae and family bovidae [1]. There are seven Caprinae species which are found in Pakistan, and further partitioned into 12 subspecies [2, 3]. Markhor is one of the members of family Bovidae and subfamily Caprinae [1, 2], which was firstly portrayed by Wagner in 1839 [4]. The word Markhor is imitative of Persian linguistic means snake eater. However, it is mostly considered as Pashto driven word "MAR Akhkar". "MAR" represents snake and "Akhkar" to horns [2]. Later on passage of time, the word became Markhor.

On the basis of horns Markhor has two sub-species such as straight horned and flare horned Markhor. The straight horned Markhor further divided into Kabul and Suleiman Markhor while, flare horned Markhor into Astor and Kashmir

Markhor [5]. The markhor is also divided into five types that are found in Pakistan and recognized as Astor Markhor (*Capra falconeri falconeri*), Kashmir or Pir Panjal Markhor (*Capra falconeri cashmiriensis*), Kabul Markhor (*Capra falconeri megaceros*), Suleiman Markhor (*Capra falconeri jerdoni*), and Chiltan markhor (*Capra falconeri chialtanensis*). The first four are known as subspecies of markhor while the Chiltan markhor is a type of wild goat, with its own unique characteristics and habitat in the Chiltan Mountains of Pakistan [6-8].

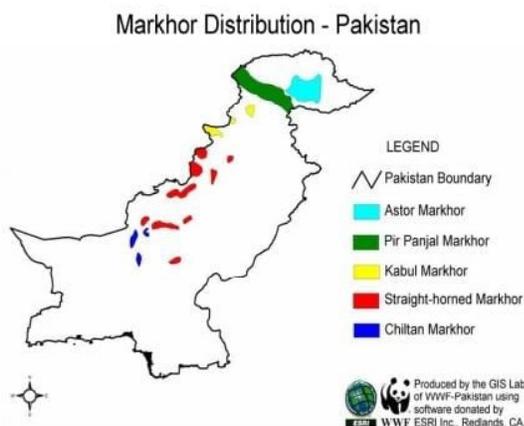
#### Description of Markhor

Markhor have solid and nearly short legs with expansive hooves [1]. Its fur color is varied with regions and it is from reddish brown to grayish brown or dim. Adult male sizes are between 99-104 cm at the shoulder and total body length is

132- 185 cm. Females are much smaller than males [9]. These animals are diurnal in feeding habits and found very active at early morning and late evening during the summer, however in winter they feed discontinuously during the day. When the ground is covered in snow, Markhor graze mostly on the leaves of oak trees, whereas throughout the summer they consume more forbs and grasses [1-2]. This showed feeding habits and food priorities are changed with the season and accessibility. The mating season begins in late October and continues till early December. The development gestation period is approximately 160 to 170 days [2].

### Habitat and Distribution

In comparison to other *Capra* members, Markhor is a goat with low heights, existing between 700 and 1000 m along the Suleiman range's lower slopes. However, in winter they reached up to 2700 m and in summer upto 4000 m in Chitral valley. It leans toward regions with abrupt slants and bluffs getting little precipitation [1, 4, 8]. A provisional distribution of Markhor species has shown in Figure 1.



**Figure 1:** Distribution of Markhor in Pakistan [10]

### Number of Markhor in Pakistan

In the Chitral Division, there are over 800-1000 Markhor. Review reports indicated that the Swat, Chitral, and Dir Kohistan Divisions included 1400 Markhor [11]. The IUCN declared all Markhor subspecies to be endangered in 1996. People are the essential hunters of the Markhor. Since Markhor occupies exceptionally steep and difficult to reach hilly territory, a few fortresses of Markhor species often approached by humans, Eurasian lynx, Snow leopards, Wolves, Black bear are predators of Markhor [12].

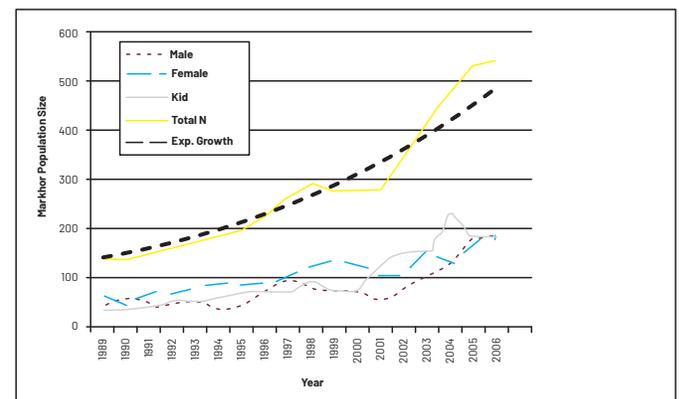
### Importance of Markhor

Markhor as national animal have cultural, social and economic value in Pakistan [13]. It has distinguishing features which caught the attention of many hunters and illegal trophy hunting because of its skin coat, hair and horns [14].

### Change in Population Growth

The data in two years (2015-2017) have been collected for

Astor Markhor from five different districts of Gilgit Baltistan. An enumeration of 1087 animal species in 15 community controlled hunting areas have been found. It includes 24%, 36% 21% and 19% males, females, youngsters and toddlers respectively. Generally, provinces contain a total population growth of about 0.13 animals per kilometer. The population growth and density of Markhor species in several areas was recorded, firstly kargah became at the peak point having 211 species, then Bunji having 187 number of species. There are 119 species in doyan, 75 range in sakwar-jutial-barmas and 74 in tangir area etc [15]. In Pakistan, there are a total five subspecies of Markhor. One subspecies is so-called as chiltan Markhor commonly known as wild goat. Remaining four subspecies are straight horned Markhor (SHM) such as Kabul and Suleiman Marhor and two flare horned Markhor (FHM) as Astor and Kashmir Markhor [16]. A total number of FHM was approximately counted as 1500, while SHM was lower than 2000 species [17]. Markhor species have versatile habitats that have the ability to live in temperature ranges from 40 plus [16-18]. Due to community based hunting programs, Markhor conservative status became endangered in 2015, and changed to near threatened species in 2018. In Chitral Gol national park, the population growth of Markhor is increasing annually. In 1990, only 154 species was found but number of species increase in 2006 survey up to 612 species (Figure 2) [18, 19].



**Figure 2:** Markhor population trend in Chitral Gol National Park, Chitral, KPK Pakistan [3]

### Threats to Markhor

All five sub-species of Markhor are at the forefront of threats which include the habitat loss, low reproductive rates, lack of incentives, poaching, lack of operational funds, lack of public awareness and deforestation etc. [20-22]. One of the major problems is habitat loss which plays a vital role in the extinction of Markhor and other wild animals [23]. The factors which affect the habitat of Markhor are overpopulation of humans, more usage of wood, logs,

planks, pasturing, foraging and conquering of alien species [7, 24]. In 1975 Wildlife Act a cash reward is announced but no reward for the staff and insufficient investment demoted the workers. Lack of education is a hindrance in conservation [25]. Regional community in KPK are ignorant of the social and economic welfare for renewable conservation of wildlife. So, it is noticed a lack of knowledge about wise use of wild species, lack of concentration, inadequate budget, and topographical isolation are some reasons for the extinction of hoofed species [25]. In many villages, cities and countryside the hunting of Markhor for meat, trophy as a means of livelihood is a major problem in declination of its number [24]. Other than protected areas hunting, poaching of Markhor species takes place which can be controlled by involving local communities or Government [23, 25-26].

#### **Working on the Conservation of Markhor**

It is reported that different species of Markhor are present in mountainous regions of Balochistan and KPK [27-28] and threats to biodiversity are noticed [29]. The developing countries are more on the verge of these threats as they need support to build policies for conservation [30]. There must be some conservation programs for the conservation of Markhor. Local inhabitants, non-governmental associations (NGOs) and the public authority have taken steps for biodiversity protection in the northern zones of Pakistan. There is a private preservation program named as Torghar Conservation project (TCP) established in 1986 after discussion with Pathan ancestral pioneers and qualified natural life scientists from the USA [31]. TCP has its fundamental target the reclamation and preservation of the Suleiman Markhor (*Capra falconeri megaceros*), and the Afghan urial (*Ovis orientalis cycloceros* in the Torghar that lies in district Killa Saifullah, Balochistan, Pakistan [31, 32]. Some other aims of this project are social and monetary government assistance programs for individuals of the TCP region which assumes an imperative part in making the motivations for the tribesmen's families [31]. In the past few years (1997-2001) of extreme dry spell, which greatly lessened the quantities of their livestock, the nearby individuals inside the TCP region have chosen to create and introduce a supportable administration plan for their domesticated animals and other natural life found in that region. Moreover, they decided to prevent their animals from grazing in the region so the flora can be conserved for the wild animals like Markhor [28, 31]. These plans and progress of the TCP improved by a NGO, called the Society for Torghar Environmental Protection (STEP), made to deal with the TCP as a community-based, government-perceived, and non-benefit preservation organization.

#### **Role of National and International Agencies in Conservation of Markhor**

With special approval of CITES, the KPK WD launched the community based markhor trophy hunting program in the Province in 1997. This program was launched to encourage nearby communities and their role in the protection of Markhor and other wild species. For this 80% of the permit fee has to be placed into a Village Conservation Fund (VCF). This program worked effectively to change the point of view of locals. The KPK ought to get acknowledgement for this accomplishment since nearby occupants effectively participated in the security of markhors [11, 33]. In 1992, CITES moved all *Capra falconeri* subspecies and populations from Appendix II to Appendix I. In 1997, the Conference of Parties to the Convention on International Trade in Endangered Species (CITES) issued a resolution permitting an annual export limit of six Markhor trophies from Pakistan's community-based hunt market sectors to CITES-accredited countries [34].

#### **Wildlife Conservation Society**

The WCS community-based conservation programme has been a huge success in saving Markhor and restoring them to a place of pride (as well as ecological and economic value) in Gilgit-Baltistan [35]. Since 1997, WCS has been working in the heart of the flare-horned Markhor distribution. Illegal hunting and harvesting have ceased in most of the valleys where WCS trained community rangers are working as a result of this programme. The rangers' wildlife tracking has also revealed that the Markhor population is increasing: the initial survey gave roughly an estimate of 1700 Markhor in the programme landscape, representing a 70 percent rise in the population from year 2000 to next 2 years [36]. The WCS Pakistan Program now touches 65 villages in Gilgit-Baltistan, influencing over 400,000 inhabitants, and covering approximately 80% of the Markhor territory. In several of these valleys, Wildlife Conservation Society is the sole animal protection NGO working full-time [37].

#### **Conservancy by the Parks and Wildlife Department Gilgit-Baltistan**

Markhor are also tracked and safeguarded by a new programme called "Markhor conservancy". The agencies shared the benefits of conservation with the locals [29, 38]. In 2014, a study was conducted in Jutial Conservancy, District Gilgit, and Gilgit-Baltistan, to determine the rank of the flare-horned Markhor (*Capra falconeri falconeri*). The findings of the survey revealed the existence of 162 adult Markhor, with a number of kids. The study's findings further support the preservation interventions, particularly the trophy hunting programme launched in the Conservancy by the Parks and Wildlife Department Gilgit-Baltistan and the Wildlife Conservation Society, as a successful example of community-based Markhor preservation in the region that can be replicated in other parts of the species' range for

joint management of Markhor and other natural resources, as well as to improve local populations' livelihoods [35].

#### Funding for Conservation of Markhor

In 1997 Markhor prize hunting program was initiated by the special permission of CITES. The purpose of this program was to advance nearby networks in the protection of Markhor and other significant creature species. The 80% of the permit fee was to deposit into Village Conservation Funds (VCF). The viewpoint of the program was achieved by involvement of locals that produced significant impact to save the lives of wild animals along with others. A prompt expansion in the quantity of Markhor in local areas was noticed in the protection regions. Later, the VCF was used to improve the infrastructure such as repairing of roads, introduction of small water supply channels etc. This was only accomplished by locals as they partook effectively in the security of these assets [3, 39]. TCP, and Community based conservation and management of mountain ungulates in Tajikistan are some more projects that are working for the conservation of Markhor.

#### CONCLUSIONS

In conclusion, the conservation and management of Markhor populations in Pakistan are vital endeavors. These iconic animals hold cultural, ecological, and economic significance, making their protection a shared responsibility. While ongoing conservation efforts and regulated hunting have shown promise, challenges such as habitat loss and illegal poaching persist as significant threats. To secure a brighter future for Markhor, continued commitment to habitat preservation, law enforcement, and community engagement is essential. By working together, Pakistan can safeguard this majestic species for generations to come.

#### Conflicts of Interest

The authors declare no conflict of interest

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