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Exploitation Prevents Extinction: Case Study of Endangered Himalayan Sheep and Goats

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Introduction

When leaders at Torghar (black mountains or hills in Pushtoo), in the Toba Kakar mountain range of Balochistan Province, Pakistan, decided to act to conserve the rapidly dwindling populations of Suleiman markhor *Capra falconeri jerdoni* and Afghan urial *Ovis orientalis cycloceros* on their Jazalai tribal lands, they had to overcome a number of obstacles (Figure 9.1). Among them were funding and gaining acceptance by the local rural community who own and have occupied the area for centuries. Adequate funding and acceptance by local people are common problems confronting conservation in developing countries (Lewis *et al.*, 1990; Bodmer *et al.*, 1997). Local acceptance is especially important when people depend on natural resources for subsistence, as at Torghar.

Torghar' managers pursued an innovative approach new to the region, the implementation of a program by which funds raised by limited trophy



Figure 9.1 The Torghar Conservation Project was initiated to conserve populations of Suleiman markhor *Capra falconeri jerdoni*, left and Afghan urial *Ovis orientalis cycloceros*, right.

hunting of markhor and urial would be used to fund conservation of these species while simultaneously benefiting the local community (Khan, 2002). They initiated the programme by informally designating most of the Torghar area as the Torghar Conservation Project (TCP). The purpose was to conserve the area's biodiversity while enhancing community stability. The TCP can be considered a success in that there is clear evidence that it has achieved its objectives of conserving biodiversity while improving the lives of local families (Johnson, 1997a). Here we draw upon our first hand knowledge of the project and the written record to describe how the TCP, initiated in 1985, progressed over the subsequent 21 years, emphasising aspects that are potentially applicable to solving similar problems in other areas. The first author has made four trips to Pakistan since 1997 to work closely with project managers in population monitoring and habitat management aspects of the program. The second author is a Pushtoon tribal leader.

Study area

Geographic setting

The approximately 1000 km² Torghar Conservation Project lies within the Torghar hills, Toba Kakar range, of Balochistan Province in west central

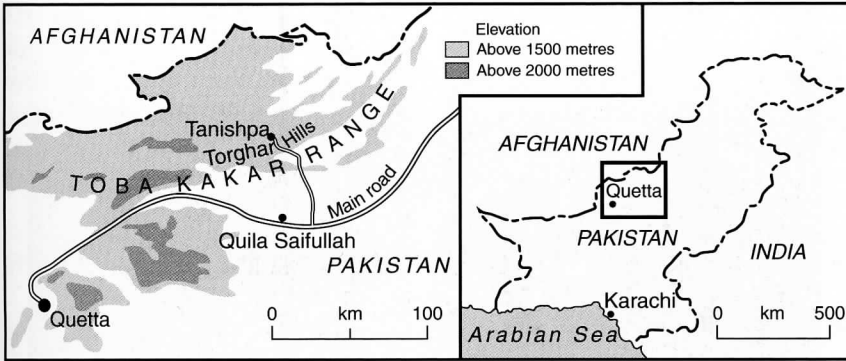


Figure 9.2 Location of the Torghar area within Pakistan.

Pakistan near the north central border with Afghanistan (Figure 9.2). The Torghar area is a series of rugged upturned sandstone ridges. The ridges are approximately 90 km long and vary from about 15 to 30 km in width. Johnson (1997b) described the TCP as predominantly a series of three parallel ridges separated by two north-east-running stream drainages. The southernmost ridge has a north-facing slope that gradually rises to an elevation of about 2800 m, and is dissected by several deeply incised drainages. The south-facing slopes drop precipitously from the crest forming a series of step-like cliffs to the Khaisore valley; the northern ridges consist of steeply upturned rock layers resembling a series of parallel, jagged-toothed combs (Figure 9.3).

The climate is dry, with cold winters and warm summers. Violent dust-storms and thunderstorms occur during summer months (SGPC, 1991). During July and August, the mean temperature is about 26°C; strong winds are common. Total annual precipitation within the region varies from 18 to 27 cm. Most precipitation occurs between December and March. Periodic droughts are common and may last for several years at a time. According to local tribesmen, the years 1997 to 2001 constituted an unusually harsh drought cycle (Woodford *et al.*, 2004), with drought conditions continuing through 2004, but moderating somewhat in 2005.

Balochistan is characterised by a diverse flora, typically Persian in character (Burkill, 1969). The TCP lies within the Balochistan juniper and pistachio scrub forest and dry subtropical semi-evergreen scrub forest zones described by Roberts (1997). Shrub-steppe plant communities dominate the semidesert landscape of the Torghar area.

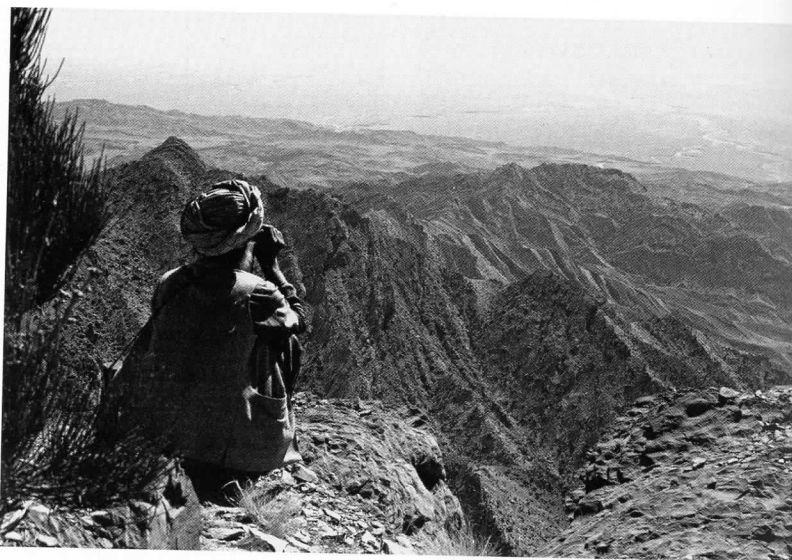


Figure 9.3 Much of the Torghar landscape consists of steeply upturned rock layers resembling a series of parallel jagged-tooth combs.

Human setting

The human population numbers about 4000 tribal people, predominantly Jazalais, a Pathan tribe. The Pathans still practice an ancient code of honour based on tribal rules (Caroe, 1958; Spain, 1962; Quddus, 1987). The people of Torghar are further divided into clans, each occupying its own specific area of the mountain or valley. Individual residents are dispersed throughout the mountains with some centred in five villages: Kundar, Tanishpa, Khaisore, Torghberg and Tubli. Tanishpa is the largest village with about 25 households. The Jazalais are a semi-nomadic people, tending large flocks of sheep and goats. In early spring some families move north out of the mountains to the plains of Kakar Kahorasan taking their families and flocks with them, and returning to the Torghar area in early autumn. Other tribes in surrounding areas live similarly. The TCP lies across one of the traditional migration routes followed by these tribes. Nearly 20 tribal groups, said to number in the thousands, with large numbers of sheep and goats, pass through the area twice a year (Woodford *et al.*, 2004). In early spring these tribes travel to

Khorsan and beyond the Durand Line (political boundary between Pakistan and Afghanistan) (Hayat Khan, 2000) into Afghanistan to summer in their tribal territories there. Although cultivable land and perennial water are limited, some families have developed fruit and nut tree orchards in valley bottoms near human settlements. Extreme poverty is a characteristic of human society at Torghar.

Wildlife

Suleiman markhor and Afghan urial are the only large wild ungulates inhabiting the TCP. Suleiman markhor occur in low numbers and have a limited distribution in Pakistan, including the rugged mountains of western Pakistan. Afghan urial are more widespread and common than Suleiman markhor, but are not abundant (Roberts, 1997). Mitchell (1989) and Johnson (1997a, 1997b) concluded that by the early 1980s Suleiman markhor and Afghan urial populations at Torghar were at very low levels. Both species are listed in the Third Schedule of the Balochistan Wildlife Protection Act of 1974 as animals which can only be hunted under specific circumstances (Johnson, 1997b). Suleiman markhor are listed as 'Endangered' under the US Endangered Species Act (FWS, 1997) and are listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) which effectively halts legal trophy hunting by foreign hunters (CITES, 2006). However, markhor are legally hunted at Torghar through a special CITES exemption for Pakistan that was approved at the tenth CITES meeting of the Conference of Parties in 1997 (Shackleton, 2001). The Afghan urial is not listed under the US Endangered Species Act, but is listed in Appendix II of CITES.

Conservation hunting programme

In the early 1980s tribal leaders Nawab Taimur Shah Jomezai and Sardar Naseer Tareen were alarmed at what appeared to be a dramatic decline in Suleiman markhor and Afghan urial in the Torghar area (Johnson, 1997b; Khan, 2002; Mitchell & Frisina, 2007). The decline in markhor and urial was probably due to increased poaching as the result of the influx of weapons, ammunition, and millions of refugees into the area during the Soviet–Afghanistan war (Johnson, 1997b; Khan, 2002; Mitchell & Frisina, 2007). The war began in 1979, ending in 1992.

Tribal leaders sought assistance from the United States Fish and Wildlife Service (USFWS) in early 1984, and from this association the TCP developed. They agreed that a game guard programme with limited trophy hunting was essential to save Torghar's urial and markhor populations from extinction. Trophy hunting could provide funding to maintain the conservation programme.

The people of Torghar and surrounding areas have a centuries-long tradition of hunting in their own areas. Hunting was an established right and norm for the tribesmen. Banning of hunting by local tribesmen was a major hurdle for tribal leaders to overcome before the conservation programme could begin in earnest. After careful consideration, the tribesmen agreed to accept a ban on hunting in exchange for the potential employment opportunities and economic benefits associated with a conservation programme. In 1985, the TCP began by purchasing equipment and paying the salaries of seven game guards to protect markhor and urial, utilising a US\$10,000 loan from the Chisholm Foundation. The loan was repaid using trophy hunting income.

The employment of game guards was a complex issue. Important social considerations included access to resources, opportunities for development, and right of representation in the decision-making process among the various tribal affiliations. Discussions and negotiations were centred on perceptions by some that employment was a 'right' rather than a position based on merit or need (T. Rasheed, personal communication, 2006). The decision was to distribute the employment of game guards among tribal clans. The distribution of benefits based on need and skills versus 'rights' is an ongoing issue; the challenge has been to find ways to accommodate both viewpoints (Bellon, 2005). Game guards were responsible for protection of wildlife within areas belonging to their clan. Initially game guards were placed at points of entry into the area protected and were faced with the task of informing approaching migrating tribesmen that hunting was banned. To avoid jeopardising safe passage through Jazalai territory, people dependent on seasonal migration through Torghar agreed to respect the hunting ban. This was a major accomplishment for the conservation effort because the culture is strictly tribal and it would be difficult, if not impossible, to enforce Government writ without tribal acceptance. Local people feel themselves bound only by tribal law.

In 1986 the first foreign hunters harvested one markhor and four urial for a fee of US\$6500 per urial and a US\$20,000 fee for markhor, making the TCP self-sufficient. Local leaders maintained the TCP on an informal basis up to 1993. Each year additional game guards were employed. In 1994 the TCP

evolved into the Society for Torghar Environmental Protection (STEP), an officially registered nongovernmental organisation under Pakistani law. The primary goal of STEP is the conservation of urial and markhor; however, since all wildlife species in the area are protected, a diversity of species, including many non-hunted species, benefits. Trophy hunting is not a goal of STEP, rather a means to fund the programme (Khan, 2002). During the 2005–2006 hunting season five markhor and five urial were harvested. The fees are now US\$35,000 per markhor and US\$11,000 per urial. Until 2000, 25 per cent of the hunting fees went to the government and 75 per cent to the community-based hunting programme where the hunt occurred. In 2000 this ratio was changed to a 20/80 (Shackleton, 2001).

Each year a limited number of urial and markhor hunters visit the area to pursue trophies. Their hunting fees employ local tribesmen, who refrain from hunting in exchange for employment as game guards in charge of preventing poaching in the TCP. STEP currently employs 82 game guards (T. Rasheed, personal communication, 2006). The TCP hunting program is the oldest community-controlled program in Pakistan (Shackleton, 2001).

All hunting within the TCP is administered by STEP following Pakistani law and rules formulated by the local Torghar community. Trophy hunting of markhor and urial is open to anyone willing to pay the associated fee. STEP locates hunters through a booking agent and they are guided by STEP personnel.

Biodiversity influences

The population status of markhor and urial were monitored from 1994 to 2005 through four surveys following field protocols described by Johnson (1997b) and Frisina *et al.* (1998). During each autumn survey, observations were made from the ground by experienced observers within the same predefined observation areas. The number of markhor and urial observed, and the size of each survey area, were the basis for calculating an observed density for each species. The core portion of Torghar (Johnson, 1997b) was divided into observation areas and each area was classified as high or low quality habitat for markhor and urial. Observed densities were then applied to the entire TCP to formulate an estimated population. The results of the first three surveys were reported by Johnson (1997b), Frisina *et al.* (1998) and Frisina (2000). During a fourth survey (using the same field protocols and calculations for population

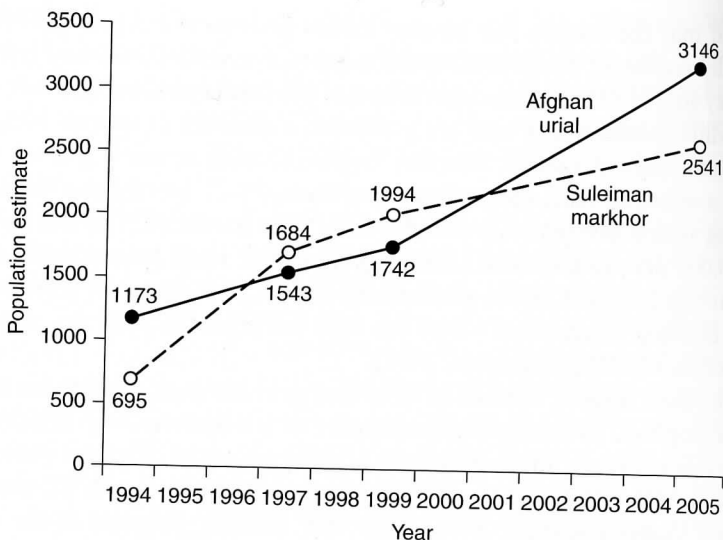


Figure 9.4 Population trend of Suleiman markhor and Afghan urial in the Torghar Conservation Project. Data from Johnson (1997a), Frisina *et al.* (1998), Frisina (2000), and Shafique (2006).

estimation) conducted in November 2005, the population was estimated to be 2541 markhor and 3146 urial (Shafique, 2006).

The trend for both markhor and urial within the TCP has been up for several years (Figure 9.4). While the survey protocols formulated by Johnson (1997b) do not lend themselves to robust statistical interpretation, they do provide conservative and comparable population estimates. The estimates are conservative because the protocol assumes that all markhor or urial within the observation areas were observed, which is unlikely to be the case. Even aerial surveys underestimate population density (Pollock & Kendall, 1987). When conducting autumn surveys utilising a helicopter to count sheep, one can only expect to observe 20–50 per cent of the population (Remington & Walsh, 1993). Because of visibility limitations in the TCP due to extremely rugged topography (Figure 9.3), observers saw a smaller proportion of the population from the ground than would be expected using a helicopter. Johnson (1997a) concluded that the increases in markhor and urial populations were real and attributable to the effectiveness of the game guard programme in curtailing poaching.

The population estimates serve as a basis for estimating potential trophy quotas for the TCP. After examining the literature for similar polygynous species and populations, Harris (1993) concluded that annual harvests of trophy males in numbers equivalent to 1 or 2 per cent of the total population size can be maintained without negative consequences. Since markhor and urial have polygynous mating systems, the population's overall reproductive rate would be little influenced by loss of a small number of males (Caughley, 1977). Using this as a guide, potential maximum quotas have ranged from six to 17 for markhor and 11 to 13 for urial (Johnson, 1997a; Frisina *et al.*, 1998; Frisina, 2000). However, actual quotas for markhor and urial have been more conservative than this. Since the trophy hunting programme began in 1986, hunters have taken 45 urial and 35 markhor. The harvest has averaged two markhor and urial per year with annual harvests ranging from zero to five for each taxon. Hunters from 13 countries have hunted at Torghar; the majority of markhor hunters are Europeans while most of the urial hunters are North Americans (Table 9.1). Harvest levels have actually been within the range of one to two per cent of the total number of animals observed during population surveys (Frisina, 2000; Shafique, 2006). Thus, STEP has practised the precautionary principle (Cooney, 2004; Rosser *et al.*, 2005) through very conservative harvest quotas. It is critical to maintain sufficient mature males in the population for normal reproduction to be achieved and to not jeopardise long-term survival of the population (Shackleton, 2001). The success of this approach is self evident by the increasing populations of markhor and urial in the face trophy of hunting (Figure 9.4). The application of the precautionary principle is further substantiated by the high proportion of trophy and adult males observed in the population during the years of trophy hunting (Table 9.2).

Benefits to the local community

Since 1986 the trophy harvest has brought in a total income of US\$1,332,000, less US\$191,000 paid to the Government of Balochistan. A portion of the funds earned through the hunting program is used to provide health care for the local people. STEP has also undertaken measures to increase the number of jobs and improve education, roads, communications and agriculture in the TCP.

In addition to health care, the conservation effort is not only benefiting a few people by employing them as game guards, but is bringing prosperity

Table 9.1 A summary of markhor and urial harvest at Torghar by hunter country of origin 1986–2006. (Figures are percentages of total harvest.)

Country	Markhor	Urial
Austria	2.9	4.4
Belgium	5.7	4.4
Canada	2.9	4.4
Denmark	14.3	11.1
France	14.3	6.7
Germany	8.6	2.2
Hungary	2.9	0
Italy	11.4	0
Mexico	8.6	11.1
Spain	14.3	2.2
Switzerland	2.9	0
UK	2.9	2.2
USA	8.6	51.1
Unknown	0	4.4
North America (total)	20.1	62.2
Europe (total)	79.9	37.8

Table 9.2 Proportion of trophy and adult males observed in the population during the years of trophy hunting.^a

Species	Trophy males			Adult males			N ^b
	≥6 years	Range	SD	≥2.5 years	Range	SD	
Markhor	14%	10–17	2.9	24%	13–29	7.2	4
Urial	16%	10–25	6.5	32%	24–49	11.8	4

^aData from Johnson (1997a), Frisina *et al.* (1998), Frisina (2000), and Shafique (2006).

^bN = the number of annual autumn (fall) census surveys.

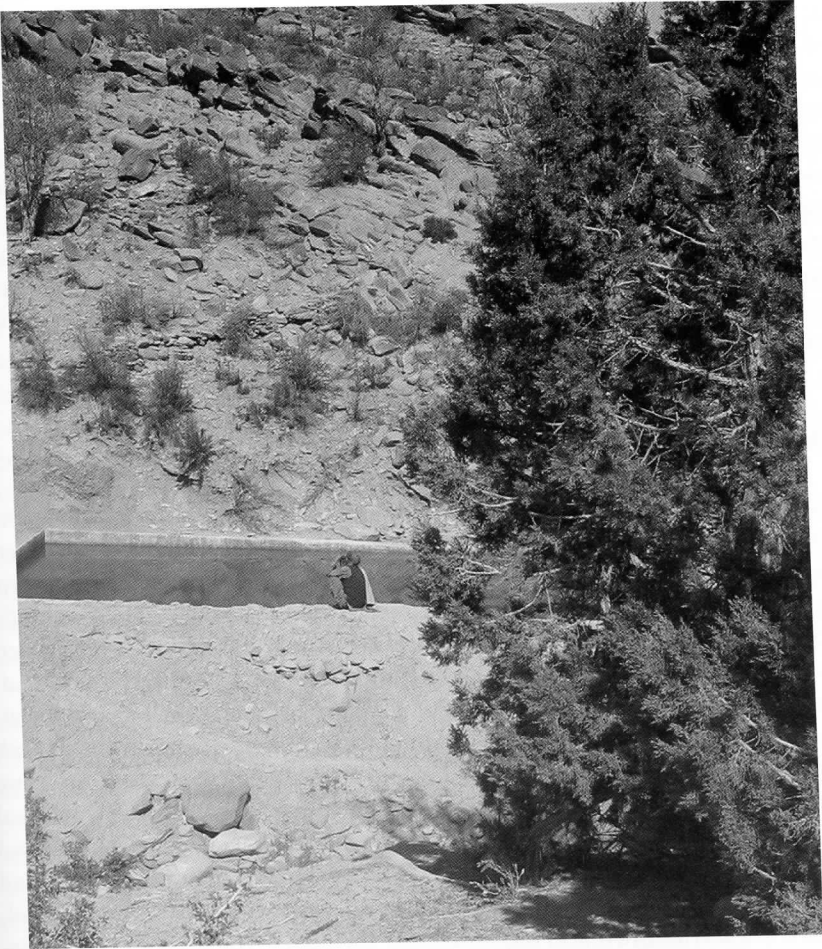


Figure 9.5 The Society for Torghar Environmental Protection, with support from the United Nations Development Program, has constructed water storage structures that benefit the human community and wildlife.

to the entire populace through projects designed to improve water supply (Figure 9.5). For example, with joint support from the United Nations Development Program, STEP has developed water tanks, wells, channels and storage dams at suitable locations. Among these was a water storage dam

in the Khaisor Valley to reduce livestock grazing pressure within portions of the TCP. Water tanks were also developed at Tanishpa. STEP has assisted local people to develop agricultural fields and has supplied them with fruit and firewood sapling trees for their orchards. Ten technicians were trained to provide basic veterinary services to local herdsmen. Funds have been used to repair roads and trails to improve transportation for people living the Torghar area. The newly available water has allowed local people to increase production of their orchards and may reduce the sole dependence on raising livestock. STEP is being careful to place any new water sources at locations that will not increase competition between domestic and wild animals.

Future

STEP began a new phase in its development in 2000 by adding habitat maintenance and protection to its programme. Following several years of severe drought local tribesmen came to the realisation that the conservation programme was more important to their future than the long-established traditions of raising domestic livestock. Local tribesmen have asked STEP leaders for assistance in developing a habitat protection programme (Frisina *et al.*, 2002, 2006). STEP is in the process of developing a rotational grazing strategy for managing domestic sheep and goats in a manner harmonious with the habitat requirements of markhor and urial. The new strategy for range management will include the reintroduction of *pargor* a local and traditional form of rotational grazing that was abandoned several years ago (Woodford *et al.*, 2004). This traditional system will be adapted to maintain the soil and vegetation in harmony with the wild and domestic ungulates (Frisina *et al.*, 2002). Local tribesmen also requested that the plan include measures for protecting urial and markhor from diseases associated with domestic livestock. During the 1997–2001 drought years local tribesmen lost about 16,000 sheep and goats (Frisina *et al.*, 2002). By 2005, when the drought began to moderate, total sheep and goat numbers were reduced to about 20,000. Local tribesmen intend on maintaining sheep and goat numbers at a maximum of 25,000 in future years (Frisina *et al.*, 2002). They believe revenue from urial and markhor populations will provide a more stable economic source than the more traditional livestock. The needs of people living within the TCP are great and STEP will continue to develop wells and to train people in improved livestock

management and agricultural practices. Providing community health care is an ongoing effort.

Conclusions

The success of biodiversity conservation in the TCP has more to do with effectively managing for unique social characteristics and needs of the tribal society than the application of modern wildlife science. Over time, local people, in increasing numbers, have gained ownership of the conservation effort and have made it their own by sharing in the decision-making processes and the benefits of the programme. During years of severe drought salaries received through the program were an important source of income for some of the residents. Thus the community has come to realise that their survival and the successful conservation of biological resources are interdependent.

The increase of Suleiman markhor to an estimated 2541 in November 2005 (Shafique, 2006) is particularly noteworthy when one considers that Schaller (1977) estimated a total world wide range population of 2000 for this taxon in the early 1970s. The TCP population is now obviously the largest in existence and the only one with an apparently secure future.

Trophy hunting is a critical part of the conservation effort, generating revenue necessary to support the game guard programme and impressing upon the local people that their economic well-being is directly tied to the abundance of markhor and urial. STEP emphasises to the local community that the primary purpose of the hunting programme is not the generation of maximum funds, but instead the conservation of wildlife and wildlife habitats. The TCP developed using a limited dependence on external donor funds. Revenues obtained through hunting have made the programme financially self sustainable, and have served to encourage a sense of community ownership. Reliance on internally generated funds from trophy hunting can make the programme vulnerable to natural disasters, social unrest, and geopolitical instability typical of the region. On several occasions, geopolitical tensions have discouraged foreign hunters from participating. However, prior to funds derived from the hunting programme, the community had little in the way of reserve resources to use during difficult times. The current annual harvest quota level of four markhor and five urial meets the financial needs of conservation and provides funding for community needs. STEP considers the current harvest quotas adequate for maintaining the programme.

Most of the wildlife habitat in Balochistan Province occurs in tribal areas. It is well known that the Balochistan wildlife authorities cannot enforce the laws in these areas; wildlife is at the mercy of local tribesmen. STEP has proven that with the support and involvement of local people, wildlife conservation and management plans can succeed. Lessons learned from the TCP serve as an important practical example for conserving biodiversity under difficult circumstances that are not unusual to Central Asia. The value of the programme is verified by the fact that, the IUCN Central Asian Sustainable Use Group recently began applying the TCP approach to several other areas in Balochistan.

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