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Natur und Landnutzung im Pamir

**Wie sind Erhalt der Biodiversität,
Naturschutz und nachhaltige Landnutzung im
Pamirgebirge in Einklang zu bringen?"**

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Yak-keeping in the Pamirs: Strategies under changing frame conditions

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Abstract

The Pamir mountains are a classical region where combined mountain agriculture and nomadism are the primary pastoral strategies for the utilization of natural resources. Similar ecological frame conditions at the upper level of vegetation cover can be observed. In contrast to the rather homogeneous appearance of this aspect of ecology survival conditions and pastoral strategies significantly differ when time scale and political systems are concerned. The aim of this paper is to set present-day pastoral strategies in perspective over time and space. The latter addresses developments across the borders where countries such as Afghanistan, Pakistan, Tajikistan, the PR of China offer a varied spectrum of legislation, infrastructure development and regional planning. Yak-keeping is the focus of comparison and the special features of this sector will illustrate the range of variation.

1 Introduction

The borderlands of Tajikistan, Afghanistan, Pakistan, and Xinjiang (PR of China) belong to a contiguous region dominated by high mountain ranges. The Eastern Pamir mountains, Eastern Hindukush, Karakoram, West Kun Lun Shan mountains and the Western Himalayas meet in this region and provide at high elevations substantial grazing grounds. The ecology and orography of Western High Asia are characterized by enormous levels of glaciation at high altitudes in contrast to extreme arid valley systems. Wherever groundwater is close and/or fountains/springs available extensive pasture areas are found in flat bottomed upper valleys. While artemisia steppe reaches up to levels of 3800 m, the fertile pastures of Western High Asia are to be found at higher elevations. Already in the thirteenth century, Marco Polo mentioned in his report the fertile pastures and the top quality meat produced there. He highlighted the special feature of "pamir" which resembles a wide valley covered by grass and valuable fodder plants (cf. Kreutzmann 2000a). These pastures were desired by nomads and combined mountain farmers who competed for the seasonal use during summers (Tab. 1).

Tab. 1: Comparison of nomadic strategies with combined mountain agriculture

Nomadism incorporates the advantage of mobility. Traditionally nomadic groups were able to exploit natural resources at dispersed locations. Great distances in the order of several hundreds of kilometres separated economically valuable mountain pastures from winter camp sites with areas of less economic interest lying in between. Projected on the studied region it is reflected functional migration cycles including longer stays in high-altitude pastures during summer and winter grazing in low-lying basins in the northern foothills or plains of the Inner Asian mountain arc. In both areas the nomads are dependent on being tolerated as a mobile group, being able to pay the grazing fees if applicable and/or permitted access by higher authorities.

Combined mountain agriculture has the advantage of fodder production in the permanent homesteads for herds which are grazed in the high-lying pastures during the summers. The limiting factor here is the provision of nine months-feed which has to be produced on private or common property village lands. Their permanent habitations are located at the upper levels of single-crop farming. The access to the Pamir pastures involves shorter migrations and some mobility within the summer habitations. Fodder here is comparatively plentiful but only available for a short period, feed storage and transport to the homesteads are of limited importance.

Source: based on Ehlers & Kreutzmann 2000

Kirghiz nomads and Wakhi mountain farmers are the prominent groups who grazed their flocks on the high pastures of Afghanistan, Tajikistan, Xinjiang. Wakhi farmers are found in the Eastern Hindukush and Karakoram of Pakistan while in the Eastern Karakoram and Western Himalaya Balti people and Astori are involved. In Chitral are found, in addition, Kho mountain farmers and Gujur pastoralists. The type of yak kept in this area resembles closely the yak of neighbouring China. The colour patterns range from black to white with grey shades in between. The frugal conditions - especially during winter - result in heavy weight losses as winter feeding is a rare exception. The summer season in rich and fertile pastures enables the yak to gain substantial weight. This cycle of storing energy for the harsh winter conditions during summer applied to all animals in the herds of pastoralists and farmers, and is thus similar to the situation in the main yak-rearing areas of China.

The yak provides their owners mainly with products for home consumption. Milk is used for household needs if insufficient sheep milk is available for the preparation of the saltish milk tea accompanying each meal. Surplus milk is converted into yoghurt from which a small quantity is consumed by the household. The top layer of cream (*merik*) is removed for direct consumption or, in cases of huge quantities the cream, is converted into butter as is traditionally done by Kirghiz nomads. The remainder of the yoghurt can be converted into fresh butter as well. Some people de-hydrate the fresh butter (*maska*) through heating and create by this process durable butter fat (*ghee, rughun*). The surplus butter milk is partly consumed by the household, the bulk is boiled down in a huge pot and a viscous substance emerges after more than a day of boiling which is formed into little cakes and finally dried in the sun on a special platform out of reach of any animal. After some days hard blocks of this protein cake (*qurut*) reach the required state of dehydration so that they can easily be stored for consumption in winter (cf. for milk-processing Kreutzmann 2000b, p. 99). The *qurut* is known from Iran to the Tibetan Plateau as a sour substance which is used in food preparation especially for soups. Thus, nothing from the sometimes large quantities of milk is wasted.

All the tasks - beginning from milking to processing it into a variety of consumable products - fall into the female domain. In some societies, as in the Wakhi communities, this is related to the traditional obligation of women to spend the summers in the high pastures. Men support the women during the movement of herds from the homestead to the pasture, from stage to stage, and on the way back to the winter settlement. While herding the flocks and milk processing falls to the women folk, men are responsible for cutting and processing the yak hair, as well as for slaughtering. Some family members and especially children accompany the women to the pastures. Exceptions to this general rule are manifold. Where the household configuration is unfavourable elder household members take up responsibilities, or relatives are involved in a system of share-herding or taking turns.

The utilization of yak dung is different in nomadic and farming societies. Combined mountain farming, i.e. the combination of crop-raising and livestock-keeping, resembles an interrelated production system in which the livestock provides animal manure for the fertilization of fields. Where yak dung is accessible within a reasonable distance to cultivated land the practice of fertilization is common. Nowadays the transport of dung from remote high pastures to the fields in the permanent settlements is rare. In nomadic communities yak dung is predominantly collected as fuel for fires, both for cooking and for heat, and stored near the houses or the yurt encampments.

Yak meat is mainly consumed within the households while in recent years communities with market access have started to sell it to local butchers (e.g. in Hunza, Gorno-Badakhshan, Sarikol). At the end of the summer grazing season, when the animals are at their peak weight and cold conditions prevail, yak are traditionally slaughtered to fulfill the meat requirements for the winter. The meat is cut into thin pieces and dried. Yak hair is utilized for different purposes. Ropes are made from it for all needs in a pastoral environment. The majority of hair is made into threads of which coarse rugs (*sherma*) are fabricated covering the sleeping spaces in the yurt or the house. Yak tails are used as dusters. These products rarely reach the markets. Overall it can be said that yak products are traditionally household-related and that other animals such as sheep and goat are kept for marketing and trading. In recent years this pattern has been abridged and yak and its products play a role in trans-border exchange of goods and for bartering.

In Western High Asia yak-keeping (Tab. 2) forms one prominent section of animal husbandry, besides keeping herds of sheep and goats in a much wider area. The regions in which yak-keeping is practised are briefly introduced in the sections which follow and the socio-economic context and recent changes are discussed. Tab. 2 gives the numbers of yak and yak hybrids in the various regions.

Tab. 2: Yak populations and their distribution in Western High Asia

<i>Region</i>	<i>Yak numbers</i>	<i>Yak hybrids</i>	<i>Area of distribution</i>
Tajikistan: Eastern Pamir	14 000		Gorno-Badakhshan: Murghab
Tajikistan: Western Pamir	300		Gorno-Badakhshan: Ishkashim
Afghanistan: Hindukush	app. 1 000		Wakhan
Afghanistan: Pamir	1 500		Little and Big Pamir
Xinjiang: Taghdumbash Pamir	app. 10 000		Taxkorgan County
Pakistan: Eastern Hindukush	1 000	1 220	Chitral
Pakistan: Eastern Hindukush/Karakoram	4 000		Ghizer: Gupis, Ishkoman, Yasin
Pakistan: Karakoram	>1 500		Hunza
Pakistan: Himalaya	4 000	<20 000	Baltistan
Pakistan: Himalaya	200	5 500	Astor

Sources: EHLERS & KREUTZMANN 2000, KREUTZMANN 1986, 1996, 2000, LONGY & GELY 2000, NAZIR AHMAD 2000, NÜSSER 1998, 2000, SCHMIDT 2000, STÖBER 2001 and personal communication by Clemens, Nüsser, Schmidt and Stöber.

2 Case studies from the Pamirs and Western High Asia

2.1 Tajikistan

In the Eastern Pamir, part of Tajikistan's Gorno-Badakhshan district, Kirghiz herders, and a few Wakhi, keep yak herds nowadays around traditional supply stations like Murghab (formerly Pamirski Post) and Langar in Rajon Ishkashim. From there they undertake seasonal migrations to the summer pastures at higher elevations.

Under Soviet rule Tajikistan's economy was completely integrated into the union system, with significant effects even on the remote mountain areas - as the case of Gorno-Badakhshan reveals. The Wakhi members of *sowchos roi kommunizm* in Rajon Ishkashim kept yak (in Tajik language: *khashgau*) in the upper parts of the Amu Darya valley and in Khargushi Pamir. The whole agricultural system was devoted to animal husbandry, because all other food supplies were imported from outside. Even high-protein fodder (50 tons) was brought in to sustain a herd of 450 yak all-year-long in the Pamirs. This was the sole case of extra-feed in the area and strongly linked to Soviet breeding strategies developed for the Pamirs. Here, only male animal herders were employed in the high pastures. Basically, nomadism became regarded as mobile animal husbandry under the conditions of collective resource management and in the context of the prevalent socio-economic set-up.

With the independence of Tajikistan and the related transformation of socio-economic structures, individual ownership of land (1996-1999) and cattle were re-introduced. Yak-herding is organized through the farmers' association, the herders keep 70 % of the production while the rest belongs to the association. The Wakhi of Ishkashim are the only non-Kirghiz yak herders of the Western Pamir and still control a herd of 300 yak.

The Soviet state-run economy had selected the Eastern Pamir (Tab. 3) as the prime yak-producing region and mainly Kirghiz pastoralists have been involved. Even today nearly 14,000 yak are kept in Rajon Murghab. Until today, the majority of yak herds is controlled by state-run enterprises or farmers' associations which are the successor organisations of the *kolchos* and *gozchos*. The adverse economic conditions of the transformation period have impoverished the Kirghiz herdsmen because herds are small, food supplies meagre and additional food from the market is expensive. Basically, the vast majority of agriculturists in GBAO are dependent on humanitarian aid at present. The situation was aggravated by substantial losses of livestock in February-March 1999 when in Rajon Ishkashim alone 5,000 head of livestock including 300 yak were lost to unexpectedly high snowfall. The socio-economic transformation process has forced the majority of people to follow a subsistence strategy based on agricultural and livestock resources. The present income levels are far below previous ones and it remains to be seen if this resource-based strategy will succeed.

Tab. 3: The system of Pamirs

Eastern Pamir	Gorno Badakhshanskaja Avtonomnaja Oblast (GBAO) Republic of Tajikistan
	<ul style="list-style-type: none"> · Khargushi Pamir (Pamir of the hare): the basin of lake Kara K�l (black lake) · Rang K�l Pamir (Pamir of the coloured lake): the basin of the lake with the same toponym · Sariz Pamir (Pamir of the yellow trail): part of the Murghab valley up to the settlement of Murghab (previously named Pamirski Post) · Alichur Pamir: the valley of the river with the same toponym
Wakhan	Wakhan Woluswali, Badakhshan Republic of Afghanistan
	<ul style="list-style-type: none"> · Chong Pamir: Great Pamir or Pamir-e Kalan: the headwaters of the Pamir Darya and the basin of Zor K�l (big lake) · Kichik Pamir: Little Pamir or Pamir-e Khurd: the headwaters of Aksu river including the lakes Chakmaktin K�l and Besh �t�k K�l
Sarikol	Taxkorgan Tajik Autonomous County Uigur Autonomous Region Xinjiang, Peoples Republic of China
	<ul style="list-style-type: none"> · Taghdumbash Pamir: headwaters of river with same name and Karachukur River

Source: KREUTZMANN 1996

2.2. Afghanistan

Yak-keeping in Afghanistan is restricted to the Badakhshan province, i.e. Zebak and Wakhan (including the Little and Big Pamir). No data are available for the Zebak region at present. The Pamir region of Wakhan is better known (cf. Dor 1976, Shahrani 1979) and has a long record of yak-keeping. Pauperized Wakhi farmers utilizing the Pamirs for summer grazing have competed with rich Kirghiz nomads controlling most of these Pamirs. Impoverished Wakhi did take up jobs as animal herders for Kirghiz herd owners and turned eventually to nomadic strategies (Kreutzmann 1996). The proportion of yak (Kirghiz: *kotoz*) was about one tenth of the total livestock numbers within the community's herds of about 40,000 animals. The introduction of animal herding as a service – rich herd owners gave their animals to poor community members on a contract basis – had led to an increase in the number of animals in the Pamirs. The peak number of livestock was reached prior to the exodus in the aftermath of the Afghan Saur Revolution. In 1978 a group of 1,300 Kirghiz fled to Pakistan. They comprised all 280 yurts, or household units, in the Afghan Pamirs. Not all members of the Kirghiz group of Rahman Kul joined him in Eastern Anatolia after four years of exile in Pakistan.. Rahman Kul alone had to leave behind 16,000 sheep and goats, more than 700 yak, 15 horses and 18 Bactrian camels - while the whole community of the Afghan Pamirs possessed more than 40,000 animals of which only a small herd of 6,000 had been taken to exile in Pakistan. Rahman Kul migrated with his group of 1,132 Kirghiz in August 1982 to Turkey. Not a single livestock was taken there by them.

A small group of 200 Kirghiz had returned to the Little Pamir from Pakistan by October 1979 (Shahrani 1984). The community under the leadership of Abdurrashid Khan had grown to 102 yurts in Pamir-e Kalan (Great Pamir) and 135 yurts in Pamir-e Khurd (Little Pamir) by 1999. The number of yak varied around 1,400 head compared to nearly 9,000 sheep and goats, 160 horses and 90 Bactrian camels. All forms of animal husbandry have been limited to subsistent survival strategies in recent years, as traditional exchange lines have been interrupted due to adverse political conditions. Presently, the Kirghiz are engaged in yak breeding and in limited barter trade with entrepreneurs from neighbouring Hunza in Pakistan. The itinerant traders supply basic necessities in exchange for yak and yak products. Yak are not crossed with other types of cattle by the Kirghiz and Wakhi.

2.3 Southern Xinjiang

2.3.1 Taghdumbash Pamir

The Taxkorgan or Sarikol (name of the former principality) area comprises three different ethnic groups: Sariqoli, Wakhi and Kirghiz (here less than 5 % of the population). The former two groups (82 % of the inhabitants) follow a combined mountain agriculture composed of crop raising and animal husbandry with seasonal utilization of Pamir pastures, while the Kirghiz specialize solely on livestock. All three groups traditionally move their flocks within the Taghdumbash Pamir and paid tribute to the Mir of Hunza who exercised control on these pastures until 1937 (Kreutzmann 2000b). While Kirghiz lived at the higher elevations Sariqoli approached from the northern low-lying villages. Only the Wakhi founded their settlement of Dafdar (3,400 m) in the heart of the Taghdumbash Pamir, about a century ago, with the consent of the Chinese authorities. All three groups compete for the fodder resources there.

Since the Chinese revolution in 1949, and the formation of the Tajik Taxkorgan Autonomous County in 1954, collectivisation took place and rural communes were established in the villages. The basic infrastructural assets such as school, police, mail, health post and barefoot doctor, commune administration and shop, mosque etc. have been provided to all communities of the Taghdumbash Pamir.

In post-revolutionary times the number of livestock increased by a factor of 4.75 to 128,800 heads in 1984. During the following decade the growth slowed down, and in 1994 the number of livestock was returned in the census at 147,586. This figure covers all stocks of Bactrian camels, horses, donkeys, yak, other cattle, sheep and goats. Natural grazing provides the overall most important local resource utilized through animal husbandry: The area covered by grasslands extends to 6.09 million *mu* of which 97.6 % belong to natural grazing while 0.13 million *mu* are irrigated meadows (1 *mu* equals 0.067 ha; Tab. 4). More than two thirds of the economic turnover of Taxkorgan County derives from animal husbandry: in 1984: 2.75 million Yuan, compared to 1.18 million Yuan from crop raising (Kashgar Prefecture Chronicle 1985). The situation has not changed much recently and underlines the economic importance of livestock husbandry in the Pamirs.

Tab. 4: Potential fodder availability of pastures in the Pamir regions

Region	total area in ha	Grazing area		available grazing potential				
		In ha	total %	to be utilized in tons	%	not to be utilized in tons	%	total in tons
Western Pamir	2,468,700	1,113,390	45.1	40,990	22.4	141,260	77.6	181,250
- Wakhan	249,200	146,030	58.6	2,630	17.8	12,120	82.2	14,750
Eastern Pamir	2,839,700	1,099,900	38.7	61,400	45.3	74,400	54.7	135,800
Pamir (total area)	5,308,400	2,213,290	41.7	102,390	31.9	215,660	68.1	317,050
Sarikol (Taxkorgan)	5,038,250	374,313	7.4					555,370

Source: Walter and Breckle (1986) and data provided by the county administration Taxkorgan 1991, 1998.

In the heart of the Taghdumbash Pamir a veterinary station specializing in yak-breeding was established in Mazar (south of Dafdar along the Pak-China Friendship Highway) by utilizing the local knowledge of Tajik and Kirghiz animal herders who found employment there. About 400 persons reside at Mazar breeding farm which has about 5,000 sheep and 500 yak (Schaller et al 1987). Much larger herds of yak are kept by the Wakhi and Kirghiz of the Karachukur Valley which drains the westernmost part of the Taghdumbash Pamir. This side valley has become the only Kirghiz-dominated pasture region of the Taxkorgan county. The number of yak grew from 5,909 in 1981 to 8,147 in 1990, the highest figure since 1976. The trading and export value of yak has been limited. Only rarely were small consignments of yak exported to the neighbouring Hunza valley in Pakistan. In recent years this trans-border trade has ceased to exist. The products, milk, butter, *qurut*, hair and meat, are mainly utilized for local purposes: Additionally, the transport capabilities and frugality of yak are regarded as major assets of the animals in the Chinese Pamirs. No hybridisation is practiced here.

2.3.2 Western Kun Lun Shan: Muztagh Ata and Kongur region

The Kirghiz of Kizil Su followed traditionally a long-distance nomadic migration cycle between the summer grazing grounds in the Pamirs and the irrigated oases of the mountain forelands. They spent the winter occupied with herding and various other businesses in the towns of Kashgar and Yarkand. This pattern has been abridged within the last 50 years. Nowadays the Kirghiz nomads are confined with their herds to the Pamir regions all-year-round. Only for marketing purposes do they leave their mountain abodes and travel on foot with their flocks, or on the back of trucks, down to the Sunday markets of Kashgar and/or Yarkand. Thus, the sheep and goats cover the distance of 280 km easily and without great loss of weight. Only rarely are some yak also marketed.

The pasture system has been adjusted to changed frame conditions. On average, the herds of the Kara K l Kirghiz consist of between 1 and 2 horses and a similar number of donkeys and between 2 and 3 Bactrian camels. These animals are preferred for transportation and travelling purposes. The additional livestock amount to about 12 yak, 98 sheep and 40 goats (Kreutzmann 1995). These numbers represent more than a trebling of the large livestock and a doubling of sheep and goats over the past 20 years. In 1976, the peoples' commune of Subashi (Karakul) owned a total number of livestock of about 10,300 animals (Myrdal 1979). Besides state ownership of flocks, private property rights for a limited number of animals had been assured for the nomads. The carrying capacity of accessible pastures was estimated at 40,000 animals, by 1991 the number exceeded 30,000. By comparison with the overall livestock development in Aqto division, where livestock numbers grew by a factor of 1.3 from 1976-91 and cattle numbers (including yak) by 1.65 respectively, the growth in Kara K l is out of proportion (Aqto T zkirisi 1994). In the remote, high-altitude yak and sheep-breeding area the livestock numbers grew three times faster. In this area, relaxed attitudes of the Chinese authorities towards agricultural and livestock production have led to an increased market orientation - especially since the reforms of 1978. The quality of pastures was improved by irrigation and fencing of meadows. Grass is cut by scythe and winter fodder is stored to cover the long period of meagre natural grazing in the winter settlement (*kishlok*) of Subashi at an altitude of 3,600 m.

Administratively, the Kara K l grazing zone forms part of the Aqto division, which is one of the four sub-units of the Kizil Su Autonomous Oblast where the majority of China's 119,300 Kirghiz reside (data of 1994). The majority of the Kirghiz of Kizil Su has become sedentary agriculturists while the inhabitants of the higher Pamirs continue to follow mobile livestock husbandry exclusively. The *kishlok* of Subashi is equipped, like other communes, with infrastructure institutions as mentioned above and with a veterinary post controlling the quality and health status of animals. The "survival" conditions of the harsh environment disguise the fact that the animals raised in these productive pastures compete very well in the profitable markets of the urban oases along the Southern silk route (Tarim basin).

2.4 Northern Pakistan

Yak-breeding in Pakistan can be found in the upper valleys of mountain ranges from the Hindukush to the Himalayas (Tab. 2). Only mountain farmers dwelling at the upper limit of settlements are engaged in yak breeding. They have augmented their flocks by keeping yak in addition to other livestock. One major distinction has to be made between the different yak-breeding areas in Northern Pakistan: the western part is dominated by herds where hybridisation is not done while in the East and particularly in Baltistan and the Nanga Parbat region hybridisation is practised. Some exceptions occur in the Eastern Hindukush as well. As long ago as 1926, a table of hybridisation practices in the Gilgit District was compiled after a survey by the colonial administration. Even at that time the bureaucracy was curious about the variety of domestic animals in the area. It suggested (as referred to by Kreutzmann, 1986, p. 103) that the F1 females (*zumo*) from mating yak bulls to cattle cows were regarded as the best milkers and the F1 males (*zoi*) the best bullocks for ploughing. (The reciprocal F1 was not known to occur). Females of the first backcrosses (in both directions) were still regarded as good milkers but inferior to *zumo*. Later generations of backcrosses with cattle males were regarded as useless and those with yak bulls eventually approaching the yak type. The efforts and inputs from veterinary departments into yak-breeding were rather limited, a situation which has not changed much since. Development projects have concentrated on improving cattle, sheep and goats by introducing outside stock (Farman Ali & Tetlay 1991). Yak breeding and interbreeding remains the farmer's responsibility and changes depend on his activities in the first place. Nevertheless, in recent years more research on yak-keeping in Northern Pakistan has taken place.

2.4.1 Baltistan

The Tibetan speaking Muslim population in Baltistan is well-known for its hybridisation practices. Schmidt (2000: 124-126) has collected data about the practices in the Shigar Valley. The Balti term *hyag* for yak is basically restricted to male yak while the females are termed *hyaqmo*. Hybridisation with common bulls (*xlang*) and common cows (*ba*) is a regular feature of Balti animal husbandry. The female offspring of the hybrids are distinguished from the male by the suffix *-mo*. In Baltistan the most common F1 hybrids are *zo* and *zomo* which are regarded as well adapted and suited animals for the agricultural tasks: *zo* are frequently employed for ploughing the fields and threshing purposes. The *zomo* is esteemed for its milk-producing qualities which exceeds the average yield from a *hyaqmo*, the female yak.

In the villages of the Shigar Valley the average male bovines kept by Balti households ranged between 1.2 and 5.6, while the range for females was 3.0 to 10.6 which is rather high when compared with the number of goats that fluctuates between 6.1 and 15.2 and that of sheep between 2.8 and 16.1 (survey in 1997-1998 by Schmidt 2000, p. 128). Schmidt (personal communication) estimated about 1200 yak and 5500 to 6000 hybrids for the whole of the Shigar Valley. A concentration of the yak-keeping in Shigar is in the upper parts of the valley, namely in Basha and Braldu where substantial yak herds are to be found, while the low-lying villages keep many fewer yak. They replenish their herds with stock from the high-lying valleys of Basha, Braldo and Thale. The yak purchased there are intended for hybridisation as people esteem the hybrids in the low-lying areas for milk production and as work animals for ploughing and threshing. Yak here are rarely used as pack animals. Generally speaking we find a similar pattern of yak-keeping in Baltistan as in the adjacent districts. To the east, hybrids form the majority while to the west, the proportion of hybrids decreases.

The Eastern part of Baltistan is characterized by higher animal population density and smaller pastures. Thus it would be reasonable to estimate 4000 yak and less than 20 000 hybrids for the Baltistan District. Some uncertainty remains as the size of yak herds on the Deosai Plateau which borders the disputed Kashmir area (personal communication by Schmidt).

2.4.2 Astor: Nanga Parbat region

Yak hybrids are distributed in the Astor region of the Northern Areas in a similar manner as in Baltistan. Yak keeping is found here, except in the Northern declivity of the Nanga Parbat and in the neighbouring villages of the Indus Valley (Clemens & Nüsser 2000: 162-163, Nüsser 1998: 110). The Shina-speaking population values hybrids such as *zoi* (male) and *zomo* (female). Yak bulls (Shina: *bépo*) are shared among a group of farmers and can be hired for hybridisation for a fee (*yakluk*). The main yak-breeding area around the Nanga Parbat is the Rupal Gah. In Tarishing 3 yak and 100 hybrids were recorded (Clemens and Nüsser, personal communication). In a recent livestock census three out of four households were interviewed. The number of yak recorded was rather low at 189 against 2642 *zoi* and 2580 *zomo* (Nazir Ahmad 2000). Yak and hybrids represent one fifth of the bovids in the cattle category.

2.4.3 Hunza and Nager

In Hunza a few Burusho keep yak, but the majority of yak are with the Wakhi high mountain farmers of Gojal in the Upper Hunza Valley. The Burushaski language knows the terms *bépay* for female and male yak, and *yabá* for a male yak which survives the whole year-round in the high pastures. Although *argun bepay* is listed for a hybrid, hybridisation is very uncommon, especially in the upper valley. The Wakhi language knows the terms *zugh* for male yak and *zughhev* for the female. A number of villages in Gojal keep yak (Kreutzmann 1986), mainly those with access to extensive and remote pastures such as Pasu and the Batura region, the upper Chupursan valley and the Abgerchi people as well as the Shimshali. A total of approximately 1000 to 1500 yak are kept in small numbers as part of the household herds. Non-lactating yak are kept in remote locations such as the Khunjerab Pass region and the Shimshal Pamir. The hub of yak-breeding in Hunza is the Shimshal Valley where animal husbandry plays a bigger role than in other parts of Gojal in which agricultural activities are being replaced by non-agrarian jobs. Shimshal still is quite remote and controls extensive and fertile pastures - which made the former ruler to establish the settlement in the first place. The system of staging, i.e. utilization of pastures at different altitudes, is rather complex (Tab. 3) because a number of fertile, but remote, high pastures are included in the system. According to the degree of herder's control required, lactating and non-lactating animals are separated and are led to different pastures. The altitude range of yak pastures varies between 3100m in the lower Shimshal and 5300m in the uppermost areas. The bulk of yak is pastured during the summer in Shuijerab and Shuwart where more than 400 yak are gathered (cf. Tab. 3). About 100 yak are led on a difficult path

into Ghujerab valley which is accessible only from Shimshal and to other side valleys. All recent surveys estimated the number of yak in Shimshal alone as between 500 and 1000 (cf. Butz 1989, p. 5). The fluctuation relates to animal losses due to bad weather conditions. The high value corresponds to increases in livestock numbers from purchasing stock from outside.

In recent years, some farmers from Hunza have been engaged in some yak trade with their Kirghiz neighbours in Afghanistan to supply the civil and military meat market of the Northern Areas. In the same manner yak have been imported from the Chinese Pamirs. This strategy has led to the improvement of local herds as good breeding animals were kept by the farmers or specially purchased.

Yak meat is now available in butcher shops in the business centres of Hunza and Gilgit on a regular basis, a feature unknown a decade ago.

In the Nager area some hybrids were reported from Minapin at the foot of Rakaposhi mountain and from Hispar at the mouth of the Hispar glacier.

2.4.4 Chitral, Yasin and Ishkoman

In Chitral, North-West Frontier Province, there are three areas where yak (Khowar language: *zogh*) are kept: first, between Shandur Pass and Buni Zom about 700 yak - with hybrids only in the upper valleys such as Laspur Gol (a valley on the western foot of Shandur Pass, 3700m), about 50 yak in Phagram Gol (on the northern side of the Buni Zom mountain), the second area is located on the northeastern face of Tirich Mir, about 70 yak and hybrids in Shagrom, Tirich Gol, and about 400 in Khot, a side valley of Turkho (Nüsser 1999 and personal communication). The third area with yak is the Wakhi region of Upper Chitral where extensive pastures are utilized and individual households keep up to 60 yak (no hybridisation) with an average of 9.6 among the 116 households (Kreutzmann 1996: 67, 133). These figures are derived from empirical studies in the 1990s; the agricultural census data are either not available or not reliable as samples are not regularly taken in the remote locations where mountain farmers keep yak and census data more often restricted to the more easily accessible regions and.

A similar situation applies for the Yasin and Ishkoman valleys, Ghizer District. In Yasin, yak are kept in the Thui valley (approx. 150), in Barkulti (approx. 50), and in Darkot and the Nazbar Valleys. It was reported that no hybrids are kept and that the maximum number is well below a total of 500 yak in Yasin (Stöber 2001 and personal communication). In Ishkoman Wakhi and Gujur (former nomads) keep yak in the Karambar Valley (<500). The Wakhi settled here as refugees since the late 19th century and introduced yak-keeping in Ishkoman. The Gujur arrived later and first offered their services as animal herders in the region before becoming independent animal husbandry people. They adopted yak-keeping from their neighbours in suitable locations.

The major yak herds are found in the Gupis area, which resembles the upper parts of the Ghizer District close to the Shandur Pass (3700m) region and the neighbouring Chitral District. A recent survey (personal communication Juergen Clemens) showed 3095 yak for Gupis alone. Overall the proportion of yak in the Ghizer District is approximately 5% of all bovids, cattle, sheep and goats are kept in roughly similar proportions

In all cases yak augment the livestock of mountain farmers in a complex system of irrigated crop-farming and animal husbandry. Non-lactating yak are regularly kept outside the homesteads for almost the whole year, calves and their mothers spend some short periods in the permanent settlements prior to their migration to the high pastures.

3 Conclusions

In all four cases presented yak-keeping has played a major role as yaks are well-adapted to this high-altitude environment. The observation is that wherever animal husbandry is a persistent economic feature yaks remain an important component of the herds. The data available basically show steady figures for yaks while the remaining stock varies much more.

An important exception has been observed in Northern Pakistan where in the Hunza region yak numbers have risen in recent years (cf. Kreutzmann 1986, 2000). Within the last decade stocks of yaks have been expanded through the import of female yaks from the Taghdumbash Pamir in Xinjiang (China) across the

Khunjerab Pass and the Karakoram Highway into the Northern Areas and mainly Ghujal subdivision of Hunza (Tab. 2). Alone in 1989/90 more than 500 yaks have been imported of which one third has been retained for breeding purposes while the rest replenished the always deficient meat markets of Gilgit. This deficit has challenged local entrepreneurs to rear yak herds in order to market them in the meat bazaars of the Northern Areas. The quality of locally raised yaks is by far higher than the appalling low-quality meat of water buffaloes imported from down country Pakistan. Since a few years yak have been bartered with the Kirghiz of the Afghan Pamirs. The supply of fresh meat has resulted in the opening of butcher shops in villages such as Gulmit where never before such a business existed. This exceptional feature puts yaks into the picture as a marketable resource. In most of the cases the role of yaks is quite different. Only the extreme deficit in meat supplies has affected the dominant pattern.

It seems to be that yaks are primarily kept for subsistence purposes and as an investment in securities. With a comparatively low labour input substantial life meat stores are available in the appearance of yak herds. Besides that there are further spin-off effects in milk and hair processing etc. Thus yak-keeping complements the function which is mainly attributed to crop-farming, i.e., to safeguard survival under high altitude conditions. The higher the settlement regions the more importance people place on the combination of crop cultivation and livestock breeding. The share of the subsistence sector in this form of a feasible combined mountain agriculture is characterized by the cultivation of well-adapted bread crops and an interrelated livestock component providing dung, fuel and traction power besides the consumable goods mentioned above. Yaks play a prominent role in this respect when the search for security is in focus.

Other bovids and especially sheep and goats are predominantly kept for marketing purposes. Consequently their numbers have varied much more under changing socio-economic frame conditions. In the context of planned economies a shift to fat-tailed sheep and goats could be observed, a trend which has gained in momentum after the relaxation of rules and regulations. Those animal herds are basically responsible for dramatic changes in vegetation cover and for land degradation. In the Kara Kōl Pamir their numbers have tripled since the reforms of the late 1970s and fat-tailed sheep are in great demand in the urban markets at the rim of the mountain arc.

Yak-keeping seems to be a less important indicator for socio-economic change in Western High Asia. Nevertheless, yaks play a vital role in the domestic economy and substantiate any attempt to create sustainability in the animal husbandry sector. Livestock-keeping has always been a risky undertaking in high mountain regions. The safety factor is served best in the animal herds if enduring yaks utilize marginal pastures in remote locations.

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