



Review of the literature on Pastoral Economics and Marketing:

Afghanistan, India, Iran, Iraq, Israel, Jordan, Pakistan, Palestine, Syria, and Turkey

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Summary

The present report is part of a global study on the Economics of Pastoralism commissioned by The World Conservation Union (IUCN), contributing to the three year UNDP-GEF project World Initiative on Sustainable Pastoralism (WISP). The IUCN global study aims at supporting and advancing a current change in attitude towards pastoralism, so that appropriate policies, legal mechanisms and support systems are established to allow for the self-evolution of pastoralists towards sustainable livelihoods.

The objective of the present regional study is to collate and document information on economic valuation of pastoralism in Afghanistan, India, Iran, Iraq, Israel, Jordan, Pakistan, Palestine, Syria, and Turkey. It also identifies gaps where primary research on markets and economic valuation needs to be conducted. The study is aimed at demonstrating the usefulness and effectiveness of economic valuation as a tool for decision making and producing economic arguments for use in advocating better policies.

In the countries under review, except for India and Turkey, drylands occupy half or more of

land area, according to a USAID study. Similarly, India classifies much of its surface as wasteland, which indeed is used for grazing. Alternative uses of the wastelands may put pastoralism under more pressure.

Most drylands have, with exception of pastoralism, limited economic use. However there are some competing industries which need to be taken into consideration. In Iran, for example, in addition to forage production, mining, fuel wood, industrial use of rangeland products e.g. medicinal plants and recreation are other benefits of the rangelands (FAO).

Development of irrigated crop production has often proven to be unsustainable. Soils became degraded by salinization. Fossil water resources were exhausted. Pastoralism has been sustainable for many centuries, even though it might have changed previous vegetation. Problems of overgrazing have occurred since a few decades that need to be well understood and solved.

Drought is a normal feature of drylands. For example, thirteen drought years during the past two decades, occurred in Iran. Drought has many negative effects on the environment and the rangeland is no exception. Based on a report by the UN, the total losses of crop and livestock due to drought in year 2001 in the agriculture and livestock sector is estimated at 2.6 billion US\$. It was estimated that 75 million heads of livestock were being affected and 900 million US\$ of damage was being inflicted. The striking drought of 1999-2000 caused a 41% reduction in the total forage of the rangelands, equal to 4.4 million tons (FAO Iran).

The Kuchi nomads and other semi-nomadic pastoralists in the provinces of Ghazni, Zabul, Kabul and Kandahar have been particularly hit by the drought of the first years of this Millennium, and about 60 percent of Kuchi households had completely lost their livestock. (FAO Afghanistan).

Severe droughts, however, are exceptions. The “common” drought can be tackled. While crops may not grow or wilt away easily, the breeds developed in arid and semi-arid regions survive droughts for a longer time.

Main pastoralists’ livelihood patterns

In the face of variable rainfall, mobility is an ecological and economic necessity. Pastoralists make use of the scarce dryland vegetation and follow seasonal forage availability, which mainly depends on precipitation and temperature. Both nomadic and transhumant systems are practised in order to locate the best pastures and grasslands resources.

Transhumance is defined as “a type of pastoralism in which pastoralists regularly graze their herds in two or more geographically separated grazing orbits within a year” (FAO 1992). This animal husbandry system takes advantage of the temporal and spatial variability associated with typically altering rainy and dry seasons.

Typically, flocks move out of the hotter lowland areas in spring to reach the better grazing areas and cooler weather of the highlands, e.g. in the Himalayan mountains of India, Pakistan and Afghanistan. Similarly, herds are shifted between mountains and lowlands in Iraq, Iran, and Turkey. In autumn, they move back to the lowland villages to avoid the cold winter of the highlands. During winter, the herds are fed on stubbles from harvest

and mountain grazing are available. Trucks are nowadays used to provide water and feed to the herds, or to move whole herds to pastures, resulting in overexploitation of pastures where formerly the scarcity of water limited the grazing and allowed the vegetation to recover.

Generally, nomadic pastoralism has declined. Camels that were mostly associated with nomads, have sharply declined in numbers. Semi-sedentary systems are widespread. Irrigated crop production has often limited grazing lands, like in Rajasthan, India, or in Syria's and Jordan's Badia desert. Among the Bedouin of the Near East, economic diversification has become so extreme that, in many cases, dependence on sheep production is more symbolic than actual. Lancaster (1981) and Abu-Rabia (1994) describe how the Jordanian and Negev Bedouin have increasingly taken up a variety of seasonal and permanent employment outside the pastoral sector and are investing in permanent housing, thereby maintaining and perhaps even cementing their social structure while effectively discarding herding (cited after FAO (2001) Pastoralism in the New Millennium). In Afghanistan, income derived from livestock production is often supplemented by other income sources, like harvesting, casual labour but also through the purchase of agricultural land. In recent years, an increased diversification of household income and a move towards a more semi-migratory lifestyle has taken place (de Weijer).

Sheep and goats are the basis of most pastoralist systems, although the Gujars in Pakistan and India migrate with buffalo and cattle. In India, other pastoralists like the Todas graze them e.g. in forest areas. Camels are important in the deserts of Rajasthan (India), Balochistan (Pakistan) and Afghanistan as well as the Badia desert of Syria and Jordan. Yak occur in a few very high places in Afghanistan, Pakistan and Ladakh in India, but are not as important as they are in the Eastern Himalaya.

Total livestock numbers have, however, increased in most regions –both arid and semi-arid– over the past several decades, especially sheep and goats. Many areas are overgrazed on the one hand. On the other hand, feed sources like crop residues, sown pastures or feed concentrates were developed, and natural grazing in some areas is reduced to one fourth of the total feed requirements, like FAO shows in the table below.

Contribution of different sources of fodder production in Iran, in 1999 (FAO)

Source of fodder	Production (1,000 tons TDN)	Contribution %
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In general, it seems to be easier to access livestock numbers than numbers of their keepers. Two facts may lead to the conclusion that the total number of pastoralists must have increased significantly:

- Nomads usually keep much larger herds than sedentary or transhumant livestock keepers. With more sedentary systems, the average number of animals per household has decreased. If the total number of livestock were constant, the number of livestock keeping households should have multiplied.
- As total livestock numbers have increased significantly in most areas over the past decades, the total number of livestock keeping households may have increased accordingly.

Of course, statistics of livestock and people need to be analysed more carefully, and e.g. non-pastoral livestock production systems like peri-urban dairy systems subtracted from calculations.

For example in the Kaghan Valley in Pakistan, in 1901, the total population of the then Tahsil Mansehra was 18 396, of which Gujars were 9 200. By 1981, the population had increased to 154 602 (Muhammad Rafique Sardar (2003) :Agro-Pastoral Production Systems Of High Altitude Pastures, Upper Kaghan Valley, NWFP, Pakistan, in: FAO Transhumant Grazing Systems in Temperate Asia).

Some studies are available that shed a light on the economic status of pastoralists. This is especially true of the pastoralists of the Badia steppe in Jordan and Syria. IFAD and FAO carried out project baseline surveys around a decade ago.

In the Syrian steppe, al Badia, there are between 900,000 and 1,5 million people. The number of nomadic herders is estimated to have decreased to 10,000 persons, while the rest being transhumant herders, who take the sheep for grazing for 7-8 months a year (FAO (2003): Syrian Agriculture at the crossroads). Jordan statistics indicate that the population of the Badia is around 185 000 who live in 170 communities. There are 25,594 households, 12,242 (or 48 percent) of which own livestock. The prevailing grazing system in the Badia is semi-nomadic grazing. Only 2 percent of livestock raisers are full-time nomads, the rest are semi-nomadic and live in houses, although their stocks move according to the availability of forage.

A survey by IFAD (1995) in the Jordanian steppe revealed that 54.5 percent of the holdings employ shepherds, 97.7 percent of whom are paid in cash; the other 2.3 percent are paid in kind (partnerships or grants). Jordanians represented 23.7 percent of the shepherds and employees. Similarly, an FAO survey conducted near Palmyra, Syria, in 1998 found that 61 % used tents; 15 % houses; and 24 % both. 80 % owned a truck, tractor or car.

FAO in its 2003 publication on "Transhumant Grazing Systems in Temperate Asia" presents detailed studies including socioeconomics of pastoralists of the Kaghan Valley and the Malakand Division in Pakistan, and the Gaddis in Himachal Pradesh, India. Nomadic graziers drive all the livestock to higher altitude. Same is the case with the household members. Since they do not have permanent hutments in winter grazing areas so all the members had to move with livestock. On the contrary the sedentary graziers have their houses in lower parts of Kaghan valley. 1-2 dairy animals are kept at home to meet the milk needs of the remaining household members. Similarly, sick and elderly pe

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Similar facts are reported in detail from the Raika in India by Ellen Geerlings (Geerlings, Ellen. 2001. Sheep husbandry and ethnoveterinary knowledge of Raika sheep pastoralists in Rajasthan, India. MSc thesis, Wageningen University, Netherlands).

Women's work is crucial to a Kuchi family's survival. There is a clear gender division of labor, with men being responsible for livestock and sales away from the tent, women being responsible for household work and sales around the tent, and children being responsible for young stock. However, there is not a clear division of assets, or rights of access to profits from sales (Christine Jost (2004): Men, Women, Children And Livestock. A Livelihoods Analysis of the Afghan Registan Kuchi Focused on Gender and Animal Health, Cordaid, The Netherlands).

Dairy products are important in the local diet, especially curd and buttermilk and are mainly produced at home. Ghee (clarified butter oil), qurut (dried curd) and some cheese are generally prepared and marketed by women (FAO Iran).

In Iran, according to FAO, more than 86% of the milking, 42% of the feeding watering and health care is done by women (FAO National Sectoral Report on Women, 1994).

In the northern areas of Pakistan and in the Chitral alpine pastures, women commonly look after the herds and spend the summer in alpine areas. Men maintain additional supplies by travelling back and forth. The winter season is spent around permanent settlements in lowlands (FAO Pakistan).

Exports from pastoralism: Globalization challenges

The largest share of pastoral products

on to the national economy¹

Share of livestock in agricultural exports	Dryland area	Share of Drylands/ total area	Number of pastoralists	Share of pastora-lists
	29 M ha	45%	2.5 million kuchi	7% to 10%
	12.4 M ha pasture/ grassland; 64 M ha wastelands	3.9% pasture/ grassland; 20% wastelands		
	90 M ha	90%	0,8-1,5 m ⁴	2%
	43 M ha	63%	3m families, among which 180,000 nomadic	

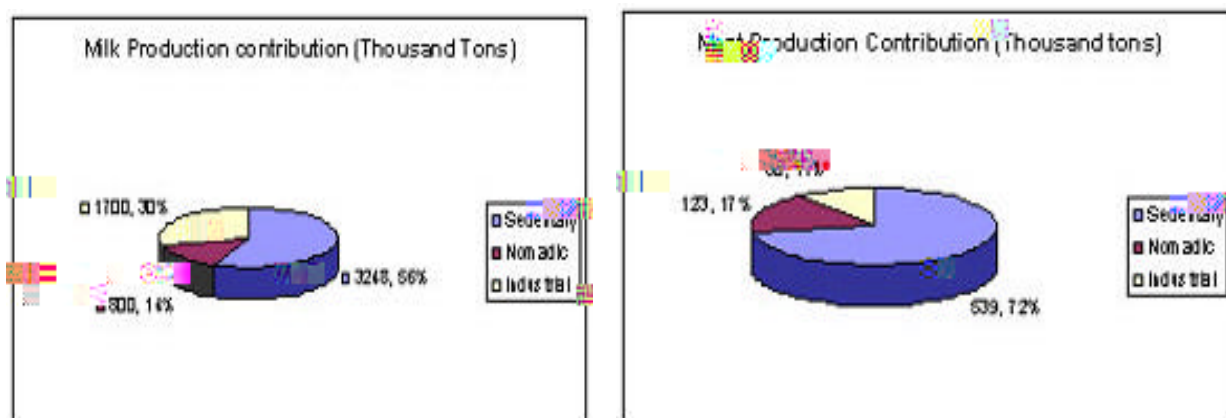
Effects of globalization may be thorough, where pastoralists produce for markets, whether domestic or export. In Mexico, sheep breeds disappeared with the conclusion of the NAFTA, by which cheap Australian wool entered the Mexican market. Subsistence sheep breeders, however, were not affected (Raul Perezgrovas in Livestock diversity. Keepers' rights, shared benefits and pro-poor policies. Documentation of a workshop with NGOs, herders, scientists,

Goats: The cattle of the poor

In Iran, although migrating pastoralists number only about 2% of the entire population (1.3 million pastoralists) according to government figures, they satisfy about one quarter of the country's livestock needs (CENESTA).

FAO provides data on the contribution of the different livestock production systems in Iran, according to which nomadic pastoralists contribute 14 % of milk and 17% of meat production. This includes transhumant systems. Sedentary systems which account for 56% of milk and 72% of meat production are typically mixed cropping and livestock systems, that usually hire a herdsman to look after livestock grazing in vicinity of the villages during summer.

Figure 1 – Production of milk and meat by the different systems in Iran (FAO)



Marketing and infrastructure

Marketing is on the one hand considered as a major problem that pastoralists, both transhumant and mobile, face. On the other hand, there is much evidence that local markets are well provided with pastoral products (see preceding chapter). The marketing issues have not systematically been studied and represent a key knowledge gap.

From a Workshop on Rangeland Management and Pastoralism in Arid Lands in 2002 it is reported that in some countries, dumping of live animals or meat from Australia and New Zealand causes problems to local production (Mohammad Taghi Farvar (2002): Workshop on Rangeland Management and Pastoralism in Arid Lands, CENESTA/CEESP, Iran).

In West Asia and North Africa, demand for small ruminant products (WANA) is expected to grow due to increased affluence and population growth. The poor in marginal areas of the region whose livelihoods depend on livestock production, however, may lose their market share due to low productivity and poor marketing infrastructure (Aden Aw-Hassan, Farouk Shomo, and Luis Iñiguez (2003): Helping Small Enterprises Capture the Livestock Products Market in West Asia and North Africa. ICARDA, Caravan 22).

In Iran, in some places cooperatives and companies go to the pastoralists to collect their surplus production. Sedentary pastoralists have fewer problems in selling their products and buying their requirements where mobile pastoralists often have to go to towns to buy their needs during their seasonal migration (FAO).

In Afghanistan, farmers are mainly at the mercy of middlemen for selling their animals, hides and skins and poultry. In some cases, however, processing of milk at the farm into cheese, yogurt, curd, butter and ghee, allows value addition and through direct marketing farmers get around middlemen. The Pamir Reconstruction Bureau has initiated collection and its distribution in the Kabul area (World Bank).

A recent study on opportunities to rebuild Afghanistan concludes that there are sizeable domestic, regional and international markets for processed products from Afghanistan agriculture. Its results may apply to pastoralist systems in other countries as well:

- There is a need to determine opportunities and constraints in adding value to and marketing of meat and other livestock products, for instance wool, karakul, cashmere, handicrafts (rugs, carpets), hides and skins, and milk products.
- Opportunities for improving the traditional technologies for milk processing, wool spinning, and cashmere harvesting need to be determined, and mechanisms through which international quality standards can be met, and production can be increased.
- Potential markets (regional, national or international) need to be determined, as well as the mechanisms that need to be put in place to access these markets.
- An economic assessment of the economic profitability of lamb fattening is required, including the type and level of investment required to reach international hygiene and sanitation standards. Focus should initially be on import substitution, with a vision of potentially reaching the export market in the future.

(Eberhard Halbach and Wais Ahmad: Paper 9: Prioritizing Investments For Initiating Rural Development: The Case Of Rebuilding Afghanistan. Strategies for Development and Food Security in Mountainous Areas of Central Asia. International Workshop Dushanbe, Tajikistan June 6-10, 2005).

The Raika in Rajasthan, India, “depend on middlemen to market live animals and wool. Demand for slaughter animals is high, and Muslim agents regularly visit the Raika homesteads looking for animals to buy. In the wool market, the middlemen are also from the Raika community. While there is some grumbling about the high margins obtained by these people, it is difficult to operate without them, since the sheep breeders are generally much too occupied with herding to take these matters into their own hands. ...However the fact that India imports huge amounts of carpet wool from countries such as Australia and Canada (whose farmers actively lobby their governments for higher import quota to India), suggests that pressurizing the Indian government for changing its import policies might yield some positive results (Lokhit Pashu-Palak Sansthan (2005): Sheep pastoralism in Rajasthan. Still a viable option? Workshop report compiled by Chakrawarti Singh and Ilse Köhler-Rollefson).

Roads can have a development effect also on pastoralists. The opening of the Karakoram highway in Pakistan has had a noticeable effect on both the agriculture and the animal husbandry of the area. The road link permitted easy transport of cereals from the plains, sometimes subsidized; this has led to an increase in fodder cultivation for winter feed. Improved fodder technology has been taken up by the population. Introduction of improved lucerne (*Medicago sativa*) cultivars to replace old, winter-dormant landraces was especially successful. In recent years there have been many inputs to development in the area, as well as intensive improvements in education. Now many youths have received education, and are no longer interested in herding. The present situation has been studied in detail and is described by Ehlers and Kreutzman (2000); the local population is now making less use of high pastures although there is some anecdotal evidence that other groups may be taking an interest in them (FAO Transhumant Grazing Systems in Temperate Asia).

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Sale of goat milk is considered unethical by Gaddis; goat milk is never sold, it may be given to acquaintances. The only use of this milk is consumption by the graziers and making cheese for their own use.

Expenditure is only Rs 493 (US\$ 3.02) per sheep and Rs 137 (US\$ 0.92) per goat as grazing fee. Ten percent of animals are lost due to wildlife or accidents. Besides grazing, the only supplement provided to the animals is salt (at 3 kg/100 animals), which is fed once a week by spreading it over the rocks at stopovers (FAO: Transhumant Grazing Systems in Temperate Asia).

The Raika shepherds in Rajasthan, India

Income: In a study on the Raika shepherds in India, the highest returns are from the sale of sheep - 56% of the total revenues. This is nearly half as much again as returns from wool sales. However, the fluctuations in returns from animal sales (Rs. 420 to Rs. 21,020; 25 Rs were worth 1 USD at the time of the field study) are much higher than in the case of wool sales (Rs. 1,705 to Rs. 11,880). Most flock leaders earned between Rs. 600 and 900 by selling the droppings of their sheep (when divided among the individual families whose animals make up a flock, the amount may be smaller). These earnings scarcely rival the revenues from wool or animal sales, and constitute, instead, a supplementary income. Yet, families that earn less than Rs. 5,000 in an average year can by no means scoff at Rs. 600; indeed, in some cases, the amount is as much as 25% of the final profit.

Grazing expenses: The most important requirement for the survival of the migrating enterprise -- grazing for the sheep - is available free for the most part. But shepherds incur unavoidable expenses on supplemental feed for the sheep, medicines, shearing, labor, and sometimes, grazing. In rare instances, raikas are forced to transport their sheep by trucks to areas where fodder can be found. Fodder is not available uniformly abundantly through the migration cycle. In the winter months, especially, the raikas must supplement natural fodder with different kinds of purchased feed. Supplementary feed is also bought for pregnant

transportation chain are potentially profitable investments, but are logistically challenging (Eberhard Halbach and Wais Ahmad: Paper 9: Prioritizing Investments For Initiating Rural Development: The Case Of Rebuilding Afghanistan. Strategies for Development and Food Security in Mountainous Areas of Central Asia. International Workshop Dushanbe, Tajikistan June 6-10, 2005).

In Syria, the share of sheep milk decreased to 33%, as a result of an increasing cow dairy sector (FAO 2003). Production of yogurt has been rising steadily, reflecting increased demand. Whereas about 59,000 tons of yogurt was produced in the country in 1999, production rose to more than 90,000 tons in 2003 (More Yogurt, Please! Muhi El-Dine Hilali, Luis Iñiguez, and Monika Zaklouta ICARDA Caravan 22, 2005).

The migratory lifestyle of the Jabbans, or cheese makers, in Syria is slowly changing, especially in terms of working places. They are moving from the Khanasser Valley towards the steppe where more dairy sheep are raised. (Malika Abdelali-Martini, Aden Aw-Hassan, and Hisham Salahieh: The Potential of Partnership with the Jabbans of Syria, in: ICARDA Caravan 22)

Sale of goat milk is considered unethical by Gaddis in Himachal Pradesh; goat milk is never sold, it may be given to acquaintances. The only use of this milk is consumption by the graziers and making cheese for their own use. (FAO Transhumant Grazing Systems in Temperate Asia)

Camel milk

In Rajasthan, camel milk is a by-product of camel breeding which is consumed primarily by herdsman (especially on migration) and by their families. There are traditional cultural restrictions on the sale and processing of camel milk, and it is not marketed in the core camel breeding areas, such as Bikaner, Jodhpur and Jaisalmer. But in the late 1990s, there was a large "grey" camel market in the northern tip of Madhya Pradesh (Mandsaur, Jarwa, Ratlam, Indore, Bhopal, and Ujjain) and in parts of southern Rajasthan (Bhilwara, Chittorgarh, Udaipur, Kotah, Nimbahera) which proceeded at tea-stalls, to private households, or under the guise of cow/buffalo milk to dairies.

The production system is extensive – camel herds are usually stationed about 10–15 km from the towns and supported exclusively on natural graze, mostly consisting of tree vegetation. Some of the trees include *Acacia nilotica*, *Prosopis cineraria*, *Capparis decidua*, *Balanites aegyptiaca*, *Zizyphus glabrata*, *Acacia leucophloea* and *Acacia senegal*. The camels are milked twice or thrice per day, usually during the night, because the milk is collected in the early morning. The average daily yield of a lactating camel is around 2 kg, although some owners assert that individual yields can be as high as 6 kg or more. The income generated from milk sales can be substantial, exceeding the returns from selling the young male offspring.

Camels are praised for a very efficient feed conversion rate and according to some calculations require only 1.9 kg of dry matter to produce 1 litre of milk, compared with 9.1 kg in cows (Stiles, 1983, cited from Saving the Camel and Peoples' Livelihoods Building a Multi-Stakeholder Platform for the Conservation of the Camel in Rajasthan. International Conference, 23-25 November, 2004, Sadri, Rajasthan, India. LPPS, Misereor, FAO, Life Initiative).

Several years ago, the Rajasthan High Court declared camel milk as hazardous to human health and sentenced a Raika camel milk vendor to a monetary fine and jail. This decision was appealed to at the Supreme Court through a Public Interest Litigation initiated by the NGO Lokhit Pashu-Palak Sansthan. The plaintiff brought forward evidence about the high esteem for camel milk in other countries, and the Supreme Court decided that camel milk was

LPPS, Misereor, FAO, Life Initiative (2004): Saving the Camel and Peoples' Livelihoods.

Cashmere goat wool

China is the largest producer of raw cashmere and current estimates of production put their annual clip at approximately 10,000 metric tons. Mongolia produces somewhat more than

finer and coarser qualities may be mixed together. Sorting is vital to optimize the use of different grades of hair. Finer, brown hair should be used for making blankets and fabric in blends with wool and synthetic fibres. Dark brown hair may be used to make rugs and hand-knotted carpets. Wool is preferred as a blend for these purposes. The coarsest quality, black, hair may be blended with wool to make hand-made felts (V.K. Singh and P.C. Patni Camel

productivity is lack of adoption of scientific methods of production, and limited commercialisation of goat keeping. Nevertheless, there is considerable potential to raise the productivity of goats and their economic and food security contributions, as India has a large number of important breeds of goat.

Health is Wealth

The literature is abundant with regard to non-availability of veterinary services to pastoralists, but details on economic losses from diseases and parasites seem not to have been assessed. Also, details on traditional treatments are rarely available.

Ethnoveterinary knowledge and practices are described as well as weak and strong points of both conventional and traditional institutions and actors (Geerlings, Ellen. 2001. Sheep husbandry and ethnoveterinary knowledge of Raika sheep pastoralists in Rajasthan, India. MSc thesis, Wageningen University, Netherlands).

The graziers in Upper Khagan Valley, Pakistan, have reported that fever, cold and tuberculosis are some of the common diseases of the transhumant livestock. They treat the sick and weak livestock with some of the antibiotic and antiworms medicines available in the market. Mostly treatments are given during the winter season when livestock are in proximity to cities. The medicinal plants are used as treatment when livestock are in alpine pastures. ((Muhammad Rafique Sardar (2003) :Agro-Pastoral Production Systems Of High Altitude Pastures, Upper Kaghan Valley, NWFP, Pakistan, in: FAO Transhumant Grazing Systems in Temperate Asia).

In Jordan, animal disease is a major cost to livestock owners. Peste des petits ruminants, foot and mouth disease and blue tongue are endemic, causing debility rather than death. Internal parasites, external parasites, including lice and keds, together with nasal bots are significant problems. The effectiveness of government vaccination programmes is low. The imports of live animals and animal by-products from different parts of the world, and mobility of livestock within and across the borders, increase the potential of infection of animals with epizootic diseases. The losses through disease are reduced fertility and prolificacy, reduced growth rates, extended age at first lambing, mortality, and loss of quality of meat and products. (FAO)

Anthra, an organisation of women veterinary scientists working in the field of livestock production and development, has been involved since 1996 in a research project to document and validate local ethno -veterinary and animal management practices carried out by livestock rearing communities in different parts of the states of Andhra Pradesh and Maharashtra in India. Communal knowledge and innovations are an integral part of the day to day healing and management practices of farmers in all areas and over 80% farmers continue to use these because they are easily and quickly available, especially in remote villages. However this knowledge is today being rapidly lost. Farmers, both men and women, have expressed a keen desire to increase their own knowledge of these systems (Nitya Sambamurti Ghotge, Sagari R. Ramdas, S. Ashalata, Nandini P. Mathur, Vivek Gour Broome & M.L. Sanyasi Rao: Social Approach To The Validation Of Traditional Veterinary Remedies - The Anthra Project. In: Tropical Animal Health and Production, Vol 34, Number 2, March. 2002, pp 121-143, Kluwer Academic Publishers in association with the Center for Tropical Veterinary Medicine, University of Edinburgh).

The Raika shepherds in India rely on both indigenous and western medicines, but resort to western treatments -- vaccines, injections, antibiotics, and deworming medicines--mostly when indigenous medicine fails. Government veterinary hospitals are notoriously unreliable: needed medicines are often unavailable, and doctors inattentive to the animals of the shepherds. (Profits on the move: The economics of collective migration among the Raika shepherds in India, by Arun Agarwal, in: Human Organization, Winter 1998)

Proper access to veterinary services was one of the main concerns raised by the Kuchis in Afghanistan (FAO). A medicine against the most important camel disease, trypanosomiasis, is yet to be developed.

Is productivity of pastoralist systems lower than of sedentary systems?

The question reflects a prejudice in the first place. Systems are usually not compared. Above all, sedentary systems are associated with industrial breeds or crossbreeds. Milk and meat production per animal is compared to local breeds, and the results speak against local

Pasture management

Rangeland quality

Very detailed information on the vegetation of pastures is available from FAO on all countries under report, except for Israel and Palestine. Several of these studies assess the quality of the pastures, and point at an increasing loss of quality.

In Iran, for example, the condition of the rangelands has deteriorated drastically. The results of a recent census show that the area of good range has come down to 9.3 million hectares, fair to good 37.3 while poor ranges have increased up to 43.4 million hectares (Technical Bureau of Rangeland, 2000, cited from FAO).

Overgrazing has caused the near complete loss of edible species from the Himalayan pastures. Weeds such as *Stipa*, *Sambucus*, *Aconitum*, *Cincifuga*, *Adonis*, and *Sibbaldia* have heavily infested these pastures (FAO). In Pakistan, rangelands are producing only 10 to 15 % of their potential, according to FAO.

Amount of fodder from pastures and grasslands

Some of the FAO studies estimate the amount of fodder available from the pastures. The objective sometimes is to calculate the "carrying capacity", i.e. the number of livestock or livestock units that can be fed from the pastures. This may be then compared with the stocking rate – in order to demonstrate and quantify overgrazing. Other feed sources are usually taken into account.

A methodology to assess forage production and utilization is described in Muhammad Rafique Sardar (2003) :Agro-Pastoral Production Systems Of High Altitude Pastures, Upper Kaghan Valley, NWFP, Pakistan, in: FAO Transhumant Grazing Systems in Temperate Asia)

The livestock population in Pakistan, for example, is supported by feed resources derived mainly from crops, fodder, rangelands and other grazing areas, and from agro-industrial by-products. It is estimated that existing feed resources are deficient by 29 and 33 % for total digestible nutrients (TDN) and crude protein (DP, digestible protein) respectively. The details are summarized in the Table below:

Estimates of available livestock feed and nutrients in Pakistan

Feed	Quantity (M t)	Total Digestible Nutrients (M t)	Digestible Protein (M t)
Green fodder	59.0	8.2	1.1
Dry roughages	48.8	18.2	0.3
Concentrates/agro-industrial by-products	3.2	2.0	0.4
Range/pastures	-	11.2	0.8
	-	29	33

anecdotal evidence the grazing land (hard grazed for a very long time) recovered rapidly and there was excellent pasture. This situation did not last long, stock numbers in both

previously determined and certified areas for a given period of time with the set number of animals (FAO Turkey Pasture/Forage Resource Profiles. Alptekin Karagöz January 2003).

In Afghanistan, currently, a land policy review commission has been established, lead by the Ministry of Justice. It is of the highest importance that land tenure insecurity is taken into consideration and measures are identified. Local negotiation processes, such as described above for grazing rights, are probably also the best solution for solving these issues. But they will need to be embedded in a clear legislative framework, which leaves no ambiguity towards these 'residential users' rights'. (Frauke de Weijer)

From ancient times and particularly since the Islamic era, land tenure in Iran was varied and included state ownership, lands for the benefit of the public or charities, and land under customary ownership or control of tribal and nomadic pastoralists. The latter covered the greater part of the arid and semi-arid lands, where pastures were nominally owned by the khan, or tribal chief, who would assign them to tribal groupings against a share of their yearly profits (around 3% of their grazed livestock). Other land was owned by the government (khalisa) or by non tribal people who would rent them for a fee in cash or in kind. (CENESTA)

The joint policies of Agrarian Reform and Nationalisation of Natural Resources as part of the 1963 "White Revolution" of the Shah altered the structure of rural society and its livelihood system in a fundamental way, in particular as they severely weakened or even destroyed customary institutions of natural resource management and mutual aid associations, such as

curcas L., an excellent source of renewable energy in the dry areas. Eighth International Conference on Dry Lands Development 25-28 February 2006, Beijing, China)

Medicinal plants from the Drylands: An opportunity to be tapped

Harvesting me

innovative approaches to community-based conservation (Camille Richards, Extinguishing Grazing Rights in Protected Areas: The Case of the Great Himalayan National Park, India. In: Individualising the Commons - Privatisation of Grazing Lands. ICIMOD Newsletter No. 35 Management of Mountain Commons in the Hindu Kush Himalayas).

In Pali district of Rajasthan, where the traditional summer pastures have become part of the Kumbhalgarh Sanctuary and are therefore off-limits to grazing, the Raika camel breeders sold away large numbers of camels and lost their livelihoods (LPPS, Misereor, FAO, Life Initiative (2004): Saving the Camel and Peoples' Livelihoods. Building a Multi-Stakeholder Platform for the Conservation of the Camel in Rajasthan. International Conference, 23-25 November, 2004, Sadri, Rajasthan, India). After much damage on pastoralists' livelihoods was inflicted, legal action is being taken, as an unprecedented step, by several pastoralists groups.

In less densely populated areas, it may be easier to reconcile conservation needs with Pastoralism. Studies in a Snow Leopard sanctuary in Ladakh, India, showed that the three villages lost 7.1% of the total livestock holding to the snow leopard, which translated to an estimated loss of c. US\$ 185 per household per year. This study suggests ways how pastoralists could contribute to snow leopard conservation, and benefit from eco-tourism. It also evaluated the influence of domestic sheep and goat grazing on the habitat use of Tibetan argali (*Ovis ammon hodgsoni*) in a prospective wildlife reserve in Ladakh. (Interactions between argali and livestock, Gya-Miru Wildlife Sanctuary, Ladakh, India. Final Project Report by Tsewang Namgail to The International Snow Leopard Trust January 2004) Similarly , the

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