

Keepers of Genes

The interdependence between
pastoralists, breeds,
access to the commons,
and livelihoods

Ilse Köhler-Rollefson
and the LIFE Network



LIFE Network



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Sadri, Rajasthan, India

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LIFE Network

Local Livestock for Empowerment of Rural
People

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Summary

A LARGE PROPORTION OF India's ruminant livestock breeds have been developed by pastoralists. Mobile and flexible, pastoralists have created numerous breeds of cattle and camels, buffaloes, sheep and goats. These breeds are closely associated with the pastoralist communities that developed them: the Raika and Gujjar in Rajasthan, the Maldhari in Gujarat, the Gaddi in Himachal Pradesh, the Van Gujjar in Uttaranchal, the Dhangars of Karnataka and the Konar of Tamil Nadu, to name but a few.

The animal breeds have evolved over centuries within specific ecological and social systems. Subject to strong natural selection pressure, they retain many of the behavioural traits of their wild ancestors, and it is these behavioural patterns that enable them to optimally use their environments. Representing the collective heritage of the communities they are associated with, these breeds cannot be conserved separately from their production systems: they will survive only as long as the knowledge systems in which they are embedded also survive.

Unfortunately, policy makers, conservationists and animal scientists have failed to recognize the importance of these long-standing human–animal–landscape associations for biodiversity conservation and for rural livelihoods. The need for adequate pasture for livestock keeping was realized early on in Indian history, and Indian rulers catered to it until the colonial period. But post-independence land-settlement and land-use plans have not

taken this need into account. The common property resources that historically formed the basis of livestock keeping in India have now been largely alienated, or access to them has been banned or restricted. Most village grazing grounds are neglected, while the official custodians of forests regard livestock as inimical to conservation. Revenue land that traditionally represented grazing areas is increasingly allotted to other purposes – most recently bio-diesel cultivation or for the establishment of special economic zones. Intensified cropping and the spread of irrigation have eliminated much of the fallow land that provided livestock fodder.

This strongly curtailed access to common property resources has put most of India's pastoralist production systems under extreme pressure. Their collapse has serious implications for both livelihoods and the conservation of biodiversity, both "domestic" and "wild".

There is much international debate on how to manage animal genetic resources in a sustainable way. Pastoralist production systems are important because they are a rich reservoir of adaptive genes. Pastoralist production systems not only embody sustainable use; they also act as a crucial counterweight to the ever-narrowing genetic base of high-performance animal breeds.

The First International Technical Conference on Animal Genetic Resources to be held in Interlaken, Switzerland, in September 2007, is expected to raise awareness on the importance of pastoralists and other livestock keepers in developing and conserving breeds.

Introduction

WORLDWIDE, FARM ANIMAL GENETIC diversity is eroding. Many locally adapted livestock breeds are becoming extinct, or are losing their distinct identity. This trend has raised international concern and the First International Technical Conference on Animal Genetic Resources, in the Swiss city of Interlaken, in September 2007, will address it. The conference will enable governments to identify, discuss – and hopefully agree upon – strategies to ensure the long-term sustainable management of animal genetic resources.

The conference is expected to produce two documents: an “Interlaken Declaration”, and a “Global Plan of Action for Animal Genetic Resources”. These texts will become the framework and points of reference for all international and national activities in the field of animal genetic resource management in the years to come.

To develop a “plan of action” that really achieves the goal of sustainable management of animal genetic resources, it is essential to understand – fully and accurately – the factors that lead to the loss of breeds. The most frequently cited suspects are:

- The intensification and industrialization of agriculture and animal production

- Large-scale promotion of uniform high-yielding breeds and cross-breeding
- Policies and developments that disadvantage ethnic minorities
- Conflicts and wars
- Natural disasters.

This book draws attention to another, largely ignored, prime reason for the extinction of breeds:

- The decline of the pastures and common property resources that form the foundation of the production systems in which the breeds developed.

This study focuses on India to illustrate this point. Rural India is commonly seen as composed of an endless number of villages. Few are aware that it also has a sizeable pastoralist population. But in almost all parts of the country, crop farmers have depended on specialized animal breeders to supply them with draft animals for ploughing. These animals are usually oxen, but they also include camels and yaks. In addition, in many marginal areas, such as the Himalayas in the north and the western deserts, mobile herds of sheep, goats and camels are the main traditional land use.

These pastoralist systems are under extreme pressure. Practically all have weakened significantly, and some have already collapsed. For a single reason: modern development leaves these animals nowhere to forage. Customary grazing lands are being enclosed and alienated at an ever-increasing pace. Throughout India, the establishment of wildlife sanctuaries, the expansion of irrigation, the construction of buildings and highways are forcing pastoralists to sell off their herds and seek new livelihoods – often with little success and at a much lower level of income and well-being. When mobile livestock production is abandoned, the breeds that are an

integral part of the system also disappear, as does the complex knowledge system in which they are embedded. Some of India's best-known breeds are victims of this process, along with many breeds that have never been documented.

These breeds cannot be “saved” outside the specific ecological, social and intellectual contexts in which they were developed. They have co-evolved with specific communities and landscapes over many generations: they form part of a system whose parts cannot be saved in isolation.

That means a systematic, *in-situ* approach is needed to conserve and sustain these breeds. It means purposefully setting aside space for them in land-use management plans, and restoring customary grazing areas. Such an approach would not only help conserve India's domestic animal diversity. It would also set into motion a cascading set of benefits: it would retain and create rural livelihoods, support crop cultivation, nurture wild biodiversity, and have the potential to develop niche-markets and regional livestock products attractive to India's growing urban middle classes.

In India, rapid population and economic growth have had especially dramatic impacts on communal grazing areas. But similar processes are at work in other countries as well.

Pastoralists and breeds

ABOUT 150 LIVESTOCK BREEDS are documented in India. There are around 40 different sheep breeds, 30 breeds of cattle, and 20 breeds of goats. In addition, India is home to 10 breeds of buffaloes, 18 breeds of poultry, 9 breeds of camels, and 6 horse breeds. In addition, India has several breeds of pigs, donkeys, yaks, mithun, ducks, geese and turkeys.¹

Because India's livestock is not exhaustively documented, "new" breeds are still being discovered. Recent additions to the inventory include the Edka and Kuzi sheep breeds in Orissa (Kornel et al., 2006), Nari cattle in Rajasthan (LPPS and Köhler-Rollefson, 2005), and Malvi camels, also in Rajasthan (Köhler-Rollefson and Rathore, 1996). Further research involving knowledgeable local people will certainly lead to additional breeds being recognized.² For instance, no donkey breeds have yet been scientifically described for India, although in western India alone, specialized

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- 1 These figures come from the National Bureau of Animal Genetic Resources, and they are at some variance with data in FAO's Domestic Animal Diversity Information System (DAD-IS).
 - 2 On the other hand, the Kheri sheep breed from Rajasthan seems to have become officially recognized, although pastoralists themselves regard it only as a colour-type that is generated by crossing Marwari and Sonadi sheep breeds (LPPS, 2003).

Table 1 Indian breeds classified as “at risk”

	Breeds at risk
Cattle	6
Buffaloes	4
Sheep	8
Goats	4
Camels	1
Horses	1
Chickens	3
Total	27

Source: Table 5.1 in Gol (2004)

donkey rearers recognize at least three distinct types (Rathore and Köhler-Rollefson, 2002).

India's breeds at risk

Twenty-seven of India's locally adapted breeds are officially classified as “at risk” (Table 1). Conservation programmes have been established for only two. However, very few breed population surveys have been conducted in India, so no accurate population data are available for the majority of breeds. The normal procedure for computing breed populations is to add up the populations of that animal species for the districts in which the breed is known to occur. The resulting figures can only provide vague – usually inflated – estimates, since they also include animals belonging to other breeds, as well as cross-breeds.

The eco-cultural context

In India, livestock breeding has remained largely a specialized activity practised by nomadic communities. That is different from Europe, where livestock keeping was largely integrated with cropping. The reasons for this were mainly ecological. In Europe, stable, regular rainfall provides a steady supply of grass that can be stored as hay to feed animals during the winter. In India, rainfall is highly seasonal and, in many parts of the country, restricted to the 3-month monsoon. India's specialized livestock keepers therefore developed a pattern of mobility: they spend the rainy season in their villages, but move around in search of fodder for the rest of the year, often covering great distances (Chaudhuri, 1992:267).

Specialized livestock breeding especially thrived in the more arid parts of India, such as Rajasthan, which supplied neighbouring states with draft animals:

The main wealth of the desert lands consists of the vast herds of camels, cattle, and sheep which roam over its sandy wastes and thrive admirably in the dry climate... Horned cattle are reared in such numbers that they supply the neighbouring States and Provinces; they are almost wild and in excellent condition, but when taken out of the country, languish and get thin unless provided with grain and condiments to make up for the loss of rich grasses on which they had been accustomed to feed (Erskine, 1909).

Breeds and pastoralists

The majority of India's indigenous livestock breeds are associated with specific tribal and caste communities. According to a 1928 report by the Royal Agricultural Commission, "the best Indian breeds were the result of the efforts of the special castes of profes-

sional breeders, who were nomadic and took cattle to graze over long distances” (Habib, 1999).

- The best-known livestock breeders in Rajasthan are the Raika or Rebari (they also live in Gujarat). This Hindu caste is most closely associated with the camel, but it has also contributed substantially to the development of breeds such as Kankrej, Sanchore and Nari cattle, Marwari sheep, and Sirohi and Marwari goats.
- The Rath Muslims of northwestern Rajasthan developed the Rathi dairy cattle breed.
- In the Himalayas, Gaddi pastoralists rear sheep and goat breeds that are named after them.
- In Orissa, the Gauda, also known as Gopa, Goala, Gopala or Golla, breed and rear cows, buffaloes (Baudia and Kalahandia breeds), goats (Lankapuria, Bangiri, Pathuria), and hair sheep (Kornel et al., 2006). A sub-tribe of the Golla, the Hallikars, who had migrated to the area from the north, shaped a superior cattle breed of the same name.
- Another tribal group in Western Orissa, the Gonds, have developed the Raighar goat breed (Kornel et al., 2006)
- In South India, the Toda tribal community has collectively bred the Toda buffalo.

Scientists have only recently begun to pay attention to the social contexts of livestock breeds. That means we have this information for only a small number of them (Table 2).

Some breeds created by pastoralists were later developed further through royal patronage. This is true for some cattle and most camel breeds. In the 16th and 17th centuries, for instance, Hallikar cattle were selected by the kings of Vijayanagara and the Wadars, and developed into the Amrit Mahal breed. This new breed was raised under nomadic conditions, with its seasonal

Table 2 Some associations between breeds and communities

State	Community	Breed	
Gujarat	Maldhari	Kankrej cattle	
	Maldhari	Gir cattle	
	Maldhari	Jaffarabadi buffalo	
Himachal Pradesh	Gaddi	Gaddi goat	
	Gaddi	Gaddi sheep	
Karnataka	Hallikar	Hallikar cattle	
Orissa	Gouda and OBC ^a	Bolangir goat	
	Golla	Dalua sheep	
	Golla	Ganjam sheep	
	Yadava (Gouda)	Edka sheep	
Rajasthan	Pali and Sirohi districts	Nari cattle	
	Pali district	Boti sheep	
	Udaipur district	Gayri	Baghli sheep
		Gouda	Kuzi sheep
Tamil Nadu	Toda	Toda buffalo	

a OBC: "other backward classes", a group of castes officially recognized as disadvantaged

Gir cattle

Gir cattle are among the most famous Indian dairy cattle breeds. FAO classifies them as “trans-boundary” because they are found in several countries.

Gir cattle were originally bred in Kathiawar (part of Gujarat) by professional breeders known as Rabaris, Bharwads, Maldharis, Ahirs and Charans. These lead a nomadic life, following their cattle from place to place in search of grazing. Good pasture is usually available from July to December, after which the pasture is scanty. From January onwards, the animals were customarily moved to hillsides in the Gir Forest where good grazing is available for the next 2–3 months. The establishment of the Gir Sanctuary for the Asiatic Lion has interfered with this pattern. Besides farmers and pastoralists, local chiefs in Kathiawar also kept good herds, which they partly stall-fed and partly maintained on pastures.

Gir cattle were exported to Brazil from 1890 to 1920. There they are used to produce beef on grassland. Gir cattle were also taken to the Gulf Coast of the USA, and contributed to the development of Brahman cattle in Texas and other states (Joshi et al., 1962).

variations in fodder availability. Animals look emaciated during the dry season, but put on weight very rapidly once the rains start. This physiological ability is likely the reason that Indian cattle turned out to be so suitable for beef production when introduced to the Americas (see box above).

Breeds as collective heritage

Indian pastoralists have their own names for breeds, different from the scientific terminology. When asked for the name of their breed, they often say it is *deshi* (local) to distinguish it from

animals that have been brought in from outside.³ In general, they see their herds as an assemblage of different lineages, or maternal lines. The female animals of one lineage are always given the same name, although they are also often distinguished by nicknames referring to certain unique characteristics. Each lineage is valued for its specific characteristics. If herders have to part with female animals, maintaining individual lineages is an important consideration: They take care that at least one individual of each lineage remains represented in the herd.

Pastoralists conceive livestock not only as private property, but also as asset of the community as a whole that must be stewarded for future generations. There often are, or were, restrictions on selling female animals to anybody outside the community. Among the Raika, female camels traditionally changed ownership only through marriages in the form of *dbamini* (gift by the family of the bride), or from parents to children. The Raika applied similar customs to female sheep, although no such rules seem to have pertained to cows.

In addition, there is a moral imperative to share one's animals with other community members. For instance, among the Raika it is not possible for the owner of a male breeding camel to forbid another Raika from using it. Furthermore, when one family suffers from major losses of livestock due to a disease outbreak or a natural calamity, then others will each contribute a couple of animals for re-stocking. There is also a custom that young men who have not inherited livestock but want to start a sheep or goatherd can request – and will receive – animals from relatives and other community members.⁴

3 The Raika are a good source of information on the traits and advantages of local breeds and strains. For instance, they had been aware of the Malvi camel, a breed with high milk potential, for decades before it came to the attention of outsiders and was reported scientifically (Köhler-Rollefson and Rathore, 1996).

4 Personal communication, Hanwant Singh Rathore.

Due to such customs, the herds of pastoralists represent not only rather closed gene pools, but also have a long shared history with the community that is keeping them.

Sense of custodianship

Indian pastoralists often believe that they are looking after animals out of a god-given duty. For instance, the Raika believe their caste was created by Lord Shiva to look after camels. The Yadhavas, who live in Uttar Pradesh and Bihar, are regarded as descendants of Lord Krishna whose duty it is to take care of cattle. And the life of the Toda tribe is unimaginable without the daily rituals associated with the buffalo they are rearing. Hence, among many pastoralist cultures, there is a definite feeling of custodianship for their herds – at least on the part of the older generation.

This is illustrated by a vignette from the Raika community. Driven to an extreme step by the lack of grazing for their animals, some Raika started selling female camels at the November Camel Fair in Pushkar. It emerged that many of the animals were taken for slaughter in other parts of the country. Raika leaders responded by calling a community meeting in November 2001. They drafted a letter to the district administrators calling for a stop to such sales. The letter calls the sale of female camels “the beginning of the end of our way of life”.⁵

5 Petition to district administrators for stopping the sale of camels for slaughter, signed by 40 community representatives in a meeting held in the Ram Raika Temple, 25 November 2001.

Indigenous knowledge of pastoralists

The nineteenth century experts who examined the different forms of cattle-raising in the sub-continent were unanimous in their conclusion that the professional breeders thoroughly understood the genetic principles involved in line-breeding and were experts in selecting the right feed for their animals (Chaudhuri, 1992: 296).

Breeding and selection criteria

In contrast to herd-book societies, pastoralists do not usually have a narrowly defined breeding goal. They are very much aware that there is no ideal animal in the uncontrolled and unpredictable production environments where they operate. They know that a highly productive animal will be less resistant to environmental stress. Herd-book societies aim for a uniform, high-performance animal with specific traits. Pastoralists strive instead for a good mix of animals in their herds, with a range of production and adaptation traits. This enables them to adapt to changing climatic and production circumstances.

Pastoralists select male camels for breeding with great care – though due to economic constraints, not all breeders can use the highest standards. They take a large number of criteria into account: looks, size, colour, temperament, the milk yield of the mother and other female relatives, and so on. In the first year, a male camel is allowed to serve only a limited number of females. If the offspring turn out well, then the male is used more widely. The breeders regard it as a good sign if the calf is more like the father than the mother. To prevent inbreeding, the bulls are changed every four years (Köhler-Rollefson, 1992a, 1992b, 1997).

In sheep breeding, the Raika continuously adapt their breeding goals to market demands and the ecological situations. Traditionally, they had a set of nine criteria (*nauguna*) for selecting breeding rams. They distinguish a large number of different breeds and strains, but their classification shows little overlap with the scientific one (Geerlings, 2001, 2004). Some of their breeds, such as the Boti, are drought- and disease-resistant to the extreme, and will survive the most scorching temperatures. Others, for instance the Bhagli breed, are less resistant, but have higher production potential and give better yields during good years. Keeping a mix of genotypes enables the Raika to optimize both good and bad years. They select breeding rams with great care, only from mothers regarded as excellent. These rams are singled out as lambs and are given special care. The rams are prevented from breeding during certain times of the year to ensure that lambs are born only during favourable seasons. They are also exchanged with other herds at regular intervals to avoid inbreeding.

In the current economic scenario – a global glut of wool, especially of the coarse carpet-type wool they used to produce – it makes little economic sense to produce wool. So the Raika have changed their breeding goal and purposefully purchase rams with desired characteristics from far-flung areas, such as long-legged animals of the Dumi breed from Gujarat to improve meat yields. Because there is a chronic shortage of milk in the villages (most is taken to the cities), some Raika have begun selecting for milk yields as well. These community-led efforts contrast with those of the government's Sheep and Wool Department, which for many decades sought to upgrade the local breeds for prolificacy and wool yields by crossbreeding with exotic rams such as Rambouillet and Merino (Kavoori, 1999). High mortality, problems with feed supply and other factors meant these measures failed.

Village breeding institutions

Most nine–tenth century observers were agreed that the cattle bred by peasants as part of the village economy failed to meet the standard of nomadic cattle and degenerated in size as well as in milk yield... as no one took much care to separate the young bulls from the heifers. Wealthy farmers, who were anxious to improve their stock, sent some cows to be kept in the folds of the larger breed and obtained the use of good bulls (Chaudhuri, 1992:292).

Historians and colonial veterinary officers felt that the breeding system of pastoralists was much superior to that of settled farmers. Indeed, even today, pastoralists take care to keep their cattle herds separate from village animals in order to maintain their superior genetic quality. Nevertheless, at least in Rajasthan, village-based breeding institutions, in the form of a communally owned bull (*godda*) and/or male buffalo (*padha*), also exist. A survey of 50 villages in the Godwar area of Rajasthan, conducted in 2000 by Lokhit Pashu-Palak Sansthan, demonstrated that in most of them this institution was still alive and well. In most of the villages, community members jointly selected the animal, with each household contributing to its purchase cost. Some villages went to great lengths to obtain good-quality bulls and buffaloes of a superior genotype, sending out scouting committees to distant villages that had a reputation for such animals. Each household shared the expense of the community bull's upkeep (in green fodder and grain) and of its keeper's salary (in cash and in kind) (LPPS, field notes; Anderson and Centonze, 2006).

Traditional rules for conserving resources

In traditional Raika society, there were many rules designed to ensure the social and ecological sustainability of their herding system. Unfortunately, many of these rules are in conflict with mainstream development and not attuned to staying competi-

tive in a world where resources are being privatized. The need to ensure access to grazing and to preserve pastures was reflected in rules barring landownership and construction of houses. Until quite recently, the caste *panchayat* (council of elders) punished the building of *pucca* (permanent) houses with banishment from the caste, because this undermined mobility. Even in the late 1990s, some Raika communities punished individuals who bought private land with outcasting, fearing that the land would then not be available for grazing.

Aware of the need to conserve pastures, community elders manage their grazing resources very carefully. They used to practise rotational or sequential grazing by different livestock types, restricting access to pastures to specific times of the year. Other villagers regarded them as protectors of the *gochars* (village grazing grounds).⁶ Even today, in villages where the Rebari have a majority in the *gram panchayat* (village council), the village grazing grounds are in excellent condition; while in most other villages the grazing lands have deteriorated and are encroached upon.

Pastoralist breeds: On the border between wild and domestic

Conservationists usually see a stark dichotomy between wild and domesticated animals. Seeing domestic animals as harmful to the environment and to wild animals, they try to eliminate them from protected areas. But it can be argued that there is no fixed boundary between the two categories. “Domestic” animals are defined as animals whose reproduction is controlled by humans and which are selected for certain traits. However, applying this criterion to India’s recognized breeds would mean quite a few would have to be classified as semi-wild. For instance, the Toda

⁶ Information provided by Bhopa Otaramji in a village meeting in Mundara held during All-India Meeting of Pastoralists, 22 March 2002.

do not themselves select male buffaloes for breeding, but instead leave this entirely to natural selection. The male buffaloes roam around on their own in the forest. Only the most dominant male has the opportunity to breed with the female buffaloes.

A similar system appears to obtain among the Pullikulam cattle breeders in Tamil Nadu. They do not purposefully select male breeding animals, but allow them to establish dominance among themselves. And in the Rann of Kutch in Gujarat, where a population of half-asses exists, it has been reported that donkey owners deliberately arrange opportunities for their female donkeys to be covered by wild asses. Such mating systems ensure that a maximum number of fitness genes survive in these breeds.

Although camel breeders select the male breeding camels in the western Thar Desert in Rajasthan, the camel herds range freely and without any supervision for most of the year. They are herded only during the breeding season – and during the rainy season, when crops are grown. For the rest of the year, they are on their own, forming family groups. Their owners keep track of them only through their footprints and by exchanging information among each other. Young camels are habituated to humans by feeding them titbits when they come to drink at the well, but otherwise the natural behavioural patterns are not interfered with. Interestingly, the quality of camels raised in such free-ranging systems is considered much superior to those kept in herded systems.

Migratory behaviour

The livestock kept in pastoralist systems retain many behavioural patterns that are typical for wild populations. One of them is the instinct to go on migration according to the season and the availability of forage. One example is the buffalo breed kept by the Van Gujjars that live in the Himalayan foothills. At a certain time of

year, the animals become restless and start moving towards their summer or winter grazing areas. The Van Gujjars basically take the cue from their animals, and merely follow them. The Nari cattle breeders of Rajasthan report a similar situation.

These behavioural traits are often a prerequisite for utilizing certain environments. The Gujjars around Alwar in eastern Rajasthan point out that only their own indigenous buffalo herds are able to go and graze in the hills. This trait is missing in the “improved” Murrah bulls provided by development agencies. Another example is the Chilikula buffalo breed in Orissa, which feeds on water plants in the Chilikula Lake during the night. When well-meaning efforts were made to replace these low-productivity animals with high-performing Murrah buffaloes, the whole livelihood system of the tribal people broke down. The Murrah buffalo did not feed in the lake, with dramatic repercussions on the population of fish that had been nurtured on buffalo dung (D.K. Sadana, pers. comm.).

Ability to fight predators

The breeds of pastoralists often retain the ability to defend themselves from predators. When Nari cattle breeders are asked to characterize the special qualities of their animals, they usually emphasize its ability to repel predators such as leopards. If a carnivore is trying to attack them or their calves, they form a circle around the young animals and shield them with their long forward-arched horns. Many Nari keepers report that the cows also apply this strategy to protect their owners, using their dangerous horns to chase anybody whom they perceive as threatening their owner or caretaker.

Positive livestock–environment interactions

Many environmentalists see pastoralists' livestock as an enemy to wildlife conservation, even though the livestock may not be that different from wildlife. Plus, increasing evidence is emerging for positive effects of pastoralism on the environment.

Conservation of wildlife

Evidence is gradually accumulating that pastoralists' livestock can benefit the conservation of wild animals, especially predators. Often there is a long history of co-evolution between wild species and livestock. Evicting the livestock from wildlife reserves may lead to an exodus of predators, or result in habitat changes that make it unattractive for wildlife. In Rajasthan's Kumbalgarh Wildlife Sanctuary, for example, leopards and wolves prey almost exclusively on sheep and goats, and eat relatively few hanuman langurs (Robbins and Changani, 2006). In the Gir Sanctuary for the Asiatic Lion in Gujarat, lions depend on livestock for part of their diet (Casimir, 2001). Pastoralists there say that expelling the livestock from the sanctuary has caused the lions to start leaving the sanctuary too. In the Bharatpur Bird Sanctuary in eastern Rajasthan, a ban on grazing by buffaloes led to the disappearance of Siberian cranes that had frequented the sanctuary (Ramsar Forum, 1998).

Prevention of forest fires

When livestock is barred from entry to protected areas, there is often very high growth of grasses, regularly leading to forest fires. Local people know that grazing animals control the growth of grass, so preventing the spread of fires. This is supported by scien-

tific observations in the southern United States, that showed how livestock grazing measurably reduces the fire hazard by removing and breaking up potential fuel and by establishing trails through the forest (Campbell, 1954).

Stimulation of tree growth

Local people also know that livestock browsing stimulates trees to branch, leading to denser and more luxuriant top growth. Research in the Sahara confirmed the stimulating effect of camel grazing on plant growth (Gauthier-Pilters and Dagg, 1981). Other researchers have observed that while browsing on young saplings can stunt growth, it also leads to better development of the root system, making the shrub or tree more drought resistant.

Conservation of plant diversity

Migratory livestock also play an important role in the dispersal and germination of seeds and in linking different ecosystems, thus contributing to plant biodiversity. Incidentally, the use of traditional low-input breeds is an accepted tool for nature conservation in Europe. The European Forum on Nature Conservation and Pastoralism has recognized pastoral farming systems and understanding their ecology as necessary for appropriate conservation and rural development policies (www.efncp.org). Some governments, including Germany's, have conservation schemes that pay livestock keepers to graze their animals in particular areas.

The commons

IN INDIA, THE “COMMONS” are divided into several different categories. Before independence, each state had its own laws on grazing that were specifically tailored to its needs. For instance, in Rajasthan, the rulers of the desert kingdom of Marwar were well aware of the significance of livestock keeping for the economy of their state. They conferred grazing rights on the Raika and other livestock keepers on the northwestern escarpment of the Aravalli Hills, although this was also the royal hunting area. The rulers of Mewar, on the other side of the hills, specified no such rights: livestock herding was less important there, and Mewar obtained its draft cattle from Marwar.

During colonial rule, the administration was concerned with collecting taxes on land. After independence, blanket land-use laws were applied over all of India. Laws were passed to restrict individual land ownership, and land was allotted to the cultivating castes. By contrast, legislators did not realize the significance of common property rights for rural livelihoods or livestock keeping. Even the pastoral communities themselves, used to having large tracts of land available for grazing, were very slow to realize the changing situation. In Rajasthan, many pastoralists were not interested in obtaining private titles to land, and Raika communities punished individuals who bought land or built permanent dwellings (see page 18).

Village pastureland

The village grazing ground (*gochar* or *gauchar*) is an ancient Indian tradition that goes back several thousand years. Kautiliyā's Arthashastra, a treatise on the art of government dated from between the 4th century BC and the 1st century AD, states that every king should set apart suitable and sufficiently large pastures in each village. Even 2000 years ago, a Chief Superintendent of Pastures was responsible for organizing pastures in the areas between villages by clearing land and providing watering facilities (Rangarajan, 1992). The boundaries of such pastures were registered by the village accountant and protected against thieves and predators. Herds were moved between pastures each season. A herdsman, hired collectively by the village, cared for the animals. He was as an important personage in the village (Randhawa, 1980).

In the 1950s, *gochars* were officially put under the control of the *gram panchayats* (local councils). But the practice of maintaining a village pasture has come under assault in most places, except in villages where pastoralists predominate and can set the rules. Elite groups often encroach on *gochar* land; the Forest Department appropriates it for tree nurseries; or the government allots it to scheduled castes and tribes. Even if it is not taken over, its management is often neglected, and it is covered by unpalatable species with no fodder value for livestock, such as *Prosopis juliflora*.

The practice of hiring a village herdsman to take care of the village's cows and buffaloes continues until today in parts of the country. In Rajasthan, the position of village *gual* was often hereditary, and was a Raika responsibility. He would be remunerated either in cash or in kind (grain), or a combination (research by LPPS; Anderson and Centonze, 2006).

Forest

In India, the word “forest” includes not just land covered with trees, but also grasslands and rangelands without tree cover. In an attempt to increase the country’s forest cover, many natural grazing lands have been turned into “jungle” by law. Forestland is very tightly controlled, and nobody is allowed to touch it. In a 2002 strategic plan document, the central government envisaged that by the end of 11th Plan in 2012, India will have restored its forest cover to at least 33% (India Together, 2005). To this end, the 11th Plan recommends planting of trees in areas that are traditional grazing lands.

Except in national parks, pastoralists used to have the right to graze their animals in parts of the forest (those not closed for regeneration), but against a fixed grazing fee. But now some forests are being closed by the implementation of joint forest management programmes. Others are being declared as wildlife sanctuaries and national parks. Some of the better-publicized examples of where this has affected the livelihoods of pastoralists and the survival of their breeds include the Kumbalgarh Sanctuary in Rajasthan (see below), the Gir Sanctuary for the Asiatic Lion in Gujarat, and the joint forest management programme adjoining the Srivilliputhur Squirrel Sanctuary in Tamil Nadu.

In land under joint forest management, herders, especially those that migrate from other areas, are usually excluded from the village forest committees. For forests that have been declared as sanctuaries, no grazing permits have been issued since 2004.

Even in those areas where pastoralists still have access, they are subjected to harassment and extortion by the Forest Department. Migration routes and access to drinking ponds are blocked, and areas that are closed for regeneration are not opened after the stipulated period of 5–7 years has passed.

Extracting bribes is a regular feature, and herders commonly pay far in excess of the official grazing fees, without being issued with any receipt. Unless livestock owners pay bribes to lower-level forest officials, they are harassed and have penalties imposed upon them. False cases are booked against pastoral communities by implicating them in hunting, setting fire to the forests, assaulting officials etc.. In Virudhunagar District in Tamil Nadu, individual cattle herders have to spend at least Rs 5,000–10,000 a year on such items just to sustain their traditional profession.

The closure of forest grazing areas has had a dramatic impact on herders and their breeds in the following cases:⁷

- The population of **Neeli Ravi** buffalo has drastically diminished because of forceful evacuation of Van Gujjar buffalo pastoralists from the proposed Rajaji National Park in Uttaranchal.
- The closure of the Kumbhalgarh Sanctuary in Rajasthan in 2005 has caused about one-third of the **sheep breeders** to sell their herds, and almost no camel breeder remains in business.
- Between 1990 and 2004, the population of **Pulikkulam cattle** has decreased from 50,000 to 20,000 because of the declaration of Srivilliputhur Squirrel Sanctuary and Tamil Nadu Afforestation Programme.
- For the same reasons, the population of **Malaimadu cattle** fell from 350,000 to just 30,000 between 1989 and 2004.
- The population of **Kachakatti black sheep** declined from many thousands to just 1350 after herders were denied grazing permits in Vaguthumalai forest in Madurai district due to a tree plantation programme undertaken by the Forest

⁷ Data compiled by LIFE Network India.

Department under Tamil Nadu Afforestation Programme/
Joint Forest Management since 1998.

- The population of **Toda buffaloes** has declined to less than 1,500 because of the establishment of the Mukurti National Park in Ootacamund and encroachment of grazing land by planting eucalyptus on the original 30,000 ha of grazing land

Wasteland

Any kind of land which could not be taxed was labelled as “wasteland” during the colonial rule. This “state revenue waste land” is now administered by the Revenue Department, and there are no defined or recognized rules for its use. The current management represents the other extreme in terms of attitudes towards common property resources. Wastelands are basically open-access, and practically everybody can lay claims on it – for instance for bio-diesel schemes. It is ignored that these wastelands usually are grazing lands that are the basis for the survival of pastoralists and their breeds. There is no provision for protecting them as grazing lands.

Fallow land

Fallow land is privately owned land that is made available for grazing to livestock keepers when it is not cultivated. Historically, the relationship between land owners and livestock keepers was mutually supportive, and farmers were pleased to make their land available in return for the manure that the animals left behind. In certain places such relationships still exist, but in many areas a change in cropping patterns has eliminated fallow land.

In Rajasthan, the government has supported intensive “green revolution” agriculture by subsidizing electricity, diesel and the construction of tubewells. This has led to year-round cultivation in low-rainfall areas, eliminating spaces for livestock to graze. Along the Indira Gandhi canal, crop farmers have started to torture or shoot free-ranging camels in order to protect their crops.

However, in certain areas, a reversal is already taking place, since groundwater resources have been exhausted. In the Godwar area of south-central Rajasthan, many wells have run empty and cropland is once again available for grazing outside the 3-month rainy season. But since the forests that formed the traditional summer grazing areas have not been opened, the problems of livestock keepers have not been solved.

In other parts of the country, the introduction of hybrid crops with shorter stalks has eliminated much of the crop residues that earlier were fed to animals. With the introduction of cash crops in Andhra Pradesh, many farmers are no longer interested in inviting herders to bring their animals to their field as they cannot afford to have their cash crops destroyed (Anthra, 2002).

The loss of traditional grazing land

THIS CHAPTER CONTAINS BRIEF case studies of how pastoralists, their livelihoods and livestock breeds are threatened by a loss of their traditional grazing lands.

Camels in Rajasthan

The dromedary has always been a symbol for Rajasthan. These distinctive animals traditionally represented the lifeline of the rural population, especially in the arid western parts of the state. Because they signified wealth and increased the odds of surviving droughts, camels were held in high esteem. The camel culture of the Thar Desert is unique, since its focus is on using the camel for transportation rather than as source of food. This sets it apart from other camel cultures around the world, where food production is often the main rationale for keeping camels. Even now, camels represent an important and ecologically sound means of transportation and traction, providing livelihoods for thousands

of camel-cart owners in urban and rural areas.⁸ Camels are also a magnet for tourists who often come to Rajasthan specifically to go on camel safari. Both central and state tourism departments make extensive use of camels in their advertising campaigns.

The use of camels to promote Rajasthan as a tourist destination camouflages an alarming decline in camel numbers. The population of camels halved during the last decade, from over a million to less than 500,000, and is continuing to fall. Camel breeders are abandoning their traditional livelihood in droves, largely because of the decline in pastureland. Former grazing lands have been diverted to other purposes, such as irrigated farming and protected areas. Even age-old taboos among Raika camel breeders against the use of camels for meat have now broken. In the last couple of years, a major proportion of the camels at the famous Pushkar Camel Fair were sold for slaughter in Uttar Pradesh, and even as far away as Bangladesh. Sadly, it is especially female camels that are sent to the meat markets – a situation that reflects higher value of male camels as work animals and the impossibility of making a living from camel breeding.

Rajasthan is thus rapidly losing a crucial element of its biodiversity, and this has potentially grave consequences for the poorer sections of the population. Already the prices for working camels have risen, so that they are becoming out of reach for camel-cart owners.

Shrinking grazing

At a national workshop of camel breeders organized by LPPS in October 2004, the participants clearly articulated the reasons for

8 According to a study by the National Research Centre on Camel, the average income from camel-carting is Rs 300 in cities and Rs 140 in rural areas, versus a daily expenditure of Rs 40/camel/day.

people abandoning their inherited profession and livelihood. They put the blame squarely on the disappearance of camel grazing areas, due to a breakdown of common property resource management. Between the 1950s and 1980s, the extent of agricultural land rose by 50%, at the expense of former common land (Jodha, 1988). (No data seem to have been collated since the 1980s, but without doubt the situation has got worse since.)

Shrinking grazing resources and a lack of pasture for large camel herds are the most significant problem and the root cause for the declining camel numbers. Hungry camels are vulnerable to disease and are less likely to reproduce. Herds have fallen below a critical size, so they no longer provide their owners with enough income. Breeders currently generate income only from selling male camels for work. Because of their slow rate of reproduction (camels give birth only every second year), four females are needed to produce one male animal for sale each year.

Reasons for the decline in pasture

The causes for the decline in pasture include the following:

- **The Indira Gandhi Canal** has eliminated prime camel-breeding areas. Not a single camel can now be found in Nachna, Mohangarh and other villages in Jaisalmer district, which used to be famous for the best camels in Rajasthan. The canal interferes with camel migrations, and farmers protect their crops from roaming camels by shooting them, or subjecting them to a slow and painful death by tying their mouths shut or attaching thorny shrubs to their tails.
- **Tube wells.** Due to government support for green-revolution agriculture through subsidized fertilizers and electricity, huge tracts of land are now irrigated from tube wells. The water supply generally lasts for only 6–7 years, after which

the farmers shift to new areas and drill more tube wells to start the process anew. The fields are abandoned without any protective vegetation cover that leaves them prone to erosion; because of the destruction of trees and other perennial vegetation they have become useless for grazing and any other productive use.

- **Enclosures by the Forest Department and Protected Areas** Under pressure to increase the acreage of forested land, the Forest Department fences in so-called “wastelands” to establish nurseries. In the process it has eliminated grazing opportunities. The establishment of wildlife reserves such as the Kumbalgarh Sanctuary also has had far-reaching repercussions on camel breeders.
- **Expansion of *gaushalas*** Popular and government support for *gaushalas* (pens for protected cattle) has resulted in huge numbers of cattle overgrazing the surrounding areas and destroying drought-adapted perennial vegetation. Major examples can be found in Sanchore district and near Pokaran. For fear of violating religious sentiments, camel breeders hesitate to speak up about this issue.

The Deccan plateau

Deccani sheep

Deccani sheep are raised by various semi-migratory shepherd communities, including the Dhangars of Maharashtra, the Kurubas in Karnataka, and the Kurumas in Andhra Pradesh. It produces meat, dung and wool. The wool is used to make a popular type of coarse shawl. According to a study by Anthra (2002), many shepherds have been forced to stop rearing Deccani sheep because of the reduced availability of forest lands. Reasons

include the creation of reserved forests and wildlife sanctuaries, the plantation of forest tracts with trees such as eucalyptus that have no fodder value, and reduced village grazing lands. Additional factors include the reduced availability of agricultural fallows (due to increased irrigation), and the replacement of traditional crops with commercial ones with low fodder value.

Dangi cattle

The Dangi cattle breed is at home in Ahmadabad and Nashik districts in Maharashtra, and Dangs district in Gujarat. Mainly a draft animal, it is famed for its ability to work on hillslopes and under heavy rainfall conditions, while subsisting mostly on grazing. The breed was originally developed in parts of Andhra Pradesh and Karnataka, but during Muslim rule under the Nizam, the Kanadies breeders were forced to emigrate to forested areas. The Kanadies worship the Dangi cow as the goddess Laxmi. They sell the male animals, as well as some of the milk (Gokhale, n.d.).

Traditional Dangi management involved open grazing in the forests, and migration. As the tree cover was destroyed and the remaining forest cover was designated as reservations, the herding families had to reduce the number of animals they kept. Their herds of 150 to 200 animals have now shrunk to only 5–6 cattle each. Many families have stopped keeping these animals altogether, as they find it difficult to migrate.

Today many Dangi owners regard the Forest Department as their biggest enemy. Earlier the forest officials charged Rs 30 to 40 per animal for the year. But under various afforestation schemes, the department planted trees like eucalyptus, acacia, gliricidia and *subabul* (*Leucaena leucocephala*) and subsequently banned animals from grazing in these areas.

The construction of dams, such as the Bhandardara Dam, has also contributed to the decline of grazing land. Dams have submerged prime agricultural land, forcing farmers to start cultivating on hillslopes that earlier were available for grazing. Similarly, small bunds have been constructed in areas like Khardikasara, Takibangala and Shahapur, where Dangi livestock owners used to take their animals. In other instances, village leaders have sold grazing land to companies, and it is now occupied by factories.

Tamil Nadu

Malai Madu cattle

This breed is at home in southwest Tamil Nadu, and especially in the Cumbum Valley, where 140 breeders keep about 7000 animals. The breed grazes in the hills and is kept mostly to produce dung and to produce *jellikut* bulls (for bull fights). Its dung is sold to farmers who cultivate cash crops such as grapes, banana and cardamom, as well as rice and coconut. The dung sustains intensive cultivation in the area. Grazing is rotated between forest and plains. During the rainy season from August to December, when fields are cultivated, animals are driven into the forest. After the harvest of the rice and other crops is finished, from January to July, the cattle are grazed on the plains and the herders pay a grazing fee to the government. The system is maintained in the face of threats from the Forest Department

Earlier the relationship between Forest Department and herders was good, but in 1989 the Forest Department passed an order (G.O. No. 364 Environment and Forests, dated 31 May 1989) raising the grazing and penning fees. Later some areas of Virudhnagar District which were an important source of grazing were declared as a wildlife sanctuary for the grey squirrel, and

grazing permits were no longer issued. An order by the Forest Department also prohibits penning throughout Tamil Nadu. Since 1992, the District Forest Officer in Theni has declared that the Megamalai and Gudalur ranges totally off-limits for grazing.

In a foreign-funded project to regenerate the forest, a large area was closed to grazing, without leaving any pathways to grazing land in the upper part of the mountains, or to sources of drinking water. Access to other water sources, such as rivers and springs, is also curtailed. At the same time in Theni District, the occupation and encroachment on forest land by farmers planting crops is not being stopped. Instead low-grade forest officials routinely threaten and hassle herdsmen (Vivekanandan and Paulraj, 2002).

Toda buffalo

The Toda are a very distinct community in the Nilgiri Hills. Their whole spiritual and ritual life revolves around their buffaloes. The Toda consider their animals as an essential part of their life and afterlife. They believe they were created by the gods along with their buffaloes, and they consider buffaloes as their equals. Traditionally, every stage in the life of a buffalo was carefully noted and recorded in the communal memory. Every animal is given a name at the time of its first milking. The Toda perform various ceremonies for their buffaloes: a naming ceremony, ear-marking of the calves, periodic offerings of salt, and ceremonies marking the migration to grazing grounds. Taking out buffaloes for grazing in the morning and bringing them back in the evening is considered a pleasant and auspicious activity. Every village has a temple with sacred buffaloes, called *post-ir*. The milk obtained from these animals is first offered in the temple. Milk from domestic buffaloes (called *pit-ir*) is used in the village.

The Toda buffalo is quite different from other buffalo breeds. It has a wide head, wider and thicker curved horns, light coloura-

tion (with varied shades of greyness), long tails, and thicker hair. The Toda can easily distinguish their animals from the plains buffaloes. In spite of the availability of crossbred animals, the Toda still require purebred Toda buffaloes for certain purposes. For instance, they need *post-ir* to produce milk for the temples. The female calves from a *post-ir* are traditionally considered to be *post-ir* too. However, if there is no *post-ir* animal with the correct lineage, a ritual can be performed to designate a *pit-ir* animal as a *post-ir*. A non-Toda buffalo can never be designated as a *post-ir*. Thus the genetic resources of Toda buffaloes affect both the mundane and spiritual spheres of their owners' lives.

Before the Nilgiri Hills were "discovered" by the British, the Toda regarded themselves as the owners of the rolling pasturelands whose rich, varied vegetation supported their buffaloes. Under colonial rule, large areas of pastureland were converted into tea plantations, and exotic trees such as eucalyptus, pine and blue gum were introduced. These extensive plantations destroyed the pastureland.

Until a couple of decades ago, each Toda family would own more than a hundred buffaloes, some *post-ir* and some *pit-ir*. They used to sell clarified butter or ghee made from their milk. But now each household has far fewer animals, and they sell the milk directly to Milk Societies (Vasamalli, 2003).

Lobbying for change

SINCE ABOUT 2000, A group of NGOs working with and supporting pastoralists has been drawing attention to the worsening situation of pastoralists, their decreasing access to resources, and the threat this poses to India's domestic animal biodiversity.

The **Sadri Declaration**, linking the conservation of breeds to the access to resources was passed at an international workshop on indigenous livestock breeds and local livelihoods in Sadri, Rajasthan, in 2000 (Appendix 1).

In 2002, members of pastoral communities from all over India, including the Changpa, Raika/Rebari, Gujjar, Toda and Dhangar, and breeders of Malaimadu cattle, Kurma and Vembur sheep, and the Andhra Pradesh Sheep and Goat Rearers' Association again met in Sadri to discuss their common problems and exchange experiences. This meeting issued the **Alsipura Statement** (Appendix 2).

Subsequently, NGOs have been involved in legal action, or have supported pastoralists to seek legal redress to obtain their grazing rights. Nomadic Raika camel breeders have used what is now the Kumbalgarh Sanctuary in Rajasthan as summer grazing grounds for many decades. When village forest-protection committees on the northern edge of the sanctuary denied the herders access, a writ petition was filed in the Rajasthan High Court on behalf of

the Raika. This petition requested that the Raika not be prevented from grazing their animals in the sanctuary. In an order dated 26 March 2003, the High Court upheld the Raika's grazing rights. But in August 2004, the issuance of grazing permits was again interrupted: a letter dated 2 July 2004 by the Central Empowered Committee had directed state governments and those responsible for forests to ban a large number of activities, including animal grazing, in national parks and sanctuaries.

The Raika formed a struggle committee and submitted an interlocutory appeal first to the Rajasthan High Court and then the Supreme Court of India, requesting clarification of their grazing rights. The Supreme Court asked the Chief Wildlife Warden of Rajasthan to determine the carrying capacity of the Kumbalgarh Sanctuary. The warden recommended that no grazing should be allowed at all, to protect this last remaining remnant of the Aravalli eco-system. The matter remains pending until now – but meanwhile, the non-issuance of grazing permits has forced a large number of sheep and camel breeders to sell off their herds.

Under the banner of the **LIFE Network**, the NGOs organized a meeting on grazing rights in Delhi on 8–10 December 2006. This was attended by pastoralists from all over India: Raika, Rajput and Sindhi Muslim from Rajasthan; Maldharis from Gujarat; Gaddis from Himachal Pradesh; Buttiyas from Uttaranchal; Konar and Udaiyar from Tamil Nadu; and Kurumba from Karnataka. On 10 December, UN Human Rights Day, they submitted a **memorandum to the Prime Minister's Office** (see Appendix 3).

While the case on grazing rights at the Supreme Court remains pending, there have been some promising political and legal developments. Due to lobbying by members of the LIFE Network, the so-called **Forest Rights Bill** that seeks to protect the rights of forest-dwelling communities has been expanded to underscore the forest grazing rights of nomadic and settled pastoralist com-

munities (Chapter II Section 3-d). It has already been passed by parliament.

Furthermore, the **National Draft Policy for Farmers** (Appendix 4) puts a lot of emphasis on grazing. Its Paragraph 2.1.3 states:

The livelihoods of pastoralists and smallholder farmers are threatened by the progressive loss of grazing land for their animals, limitations to mobility, inadequate or inappropriate government policies, and lack of animal health and other services. These developments are also causing the progressive loss of the livestock breeds and species that provide rural livelihoods and life-style options.

Legal frameworks are being created recognizing India's animal genetic resources as part of its biodiversity, and their interdependence with livelihoods and access to common property (Appendix 4). But strategies and actions for implementing the theory still need to be devised. The situation at the grassroots will not improve until a paradigm change in approaches to nature conservation takes place, and the training and perspective of forest officials is adapted accordingly.

Recommendations

ACTION IS NEEDED TO ensure that India's pastoralists can continue their livelihoods and conserve the valuable genetic diversity their animal breeds represent. This chapter presents some recommendations.

Acknowledge the links between the “commons” and breeds The conservation of the commons and the survival of breeds are interlinked, and this dependency needs to be acknowledged. Especially in India, but also in many other countries, it will not be possible to conserve domestic animal diversity outside the specific ecological and social contexts in which it developed. Breeds are components of systems – systems comprised of peoples and cultures, production systems and landscapes, and herds of animals. These systems have co-evolved, so the breeds cannot be conserved in isolation.

Apart from the conservation angle, there is also the livelihood perspective. If pastoralist systems break down, the majority of families involved will not be able to find other employment in the countryside. They will end up as unskilled labour in the cities.

Recognize the value of pastoralists' breeds The livestock kept by pastoralists must be recognized as a crucial pool of genetic traits: for hardiness, disease resistance and so on, as well as for behaviour that enables the animals to use their environments so well. Pastoralist herds retain many of the genes that were present

in the wild ancestors of domestic animals but have disappeared from the genetic make-up of high-performance breeds. Embodying “sustainable use” in the true sense of the word, they form a kind of genetic baseline population or reservoir. In times when high-performance populations are subject to ever-increasing selection pressure, they represent a crucial counterbalance to the ever-narrowing genetic base of industrial breeds. This important role of pastoralist production systems in maintaining domestic animal diversity needs to be appreciated and fully recognized.

Unfortunately, at present the livestock kept by pastoralists falls through all institutional gaps. Wildlife conservationists scorn pastoralist livestock as “domestic” animals and therefore inimical to the environment and wildlife. Animal scientists, on the other hand, compare pastoralist breeds negatively with high-performance breeds.

It might be helpful if we stopped looking at domestic and wild animals as a dichotomy. Rather, there is a fluid border between them, and the livestock of pastoralists retain many characteristics of wild animals.

Domestic herd animals not only enhance the landscape; they also represent important bio-cultural heritage. Without pastoralists and their herds, India will be so much poorer, and will lose some of its attraction for tourists.

Provide access to common property Unless pastoralists and their herds are provided with legally sanctioned access to common property resources, and unless they receive respect instead of derision and harassment, these age-old systems are doomed to disappear within just a few years. This will have serious implications for the conservation of animal genetic resources, for rural livelihoods, for migration to the cities, and for sustainable crop cultivation.

The best way to conserve mobile livestock production systems is to deliberately create space for them in land-use plans. In India, this means allotting “revenue wasteland” to livestock keepers so that they have a stake in its regeneration and long-term sustainable use. In forests and protected areas, pastoralists must be integrated into management systems. This is not an argument for open access, but for genuine and monitored participation of livestock keepers. While pastoralist livestock can have positive interlinkages with wild biodiversity conservation, this is not a given, but very much depends on maintaining mobility. Livestock keepers will only act accountably if they are given responsibility. Controls need to be put in place.

Negotiating these changes will be time-consuming and arduous, because of deeply ingrained prejudices among conservationists and the forest bureaucracy. However, official international recognition of the unique and invaluable role of pastoralists in conserving biodiversity – both domestic and wild – would strongly support efforts of pastoralists and their support organizations to maintain their mobile production systems and save both their livelihoods and their breeds.

Educate forest and biodiversity specialists There is an urgent need to educate forest and wild biodiversity experts about the potentially positive role of livestock grazing for ecology and biodiversity. This could be done through publications and films, and should become part of the curriculum in the relevant institutions.

Learn from other countries Experiences with using livestock grazing for nature conservation in other countries, especially Europe, should be analysed for their applicability to India. Indian stakeholders, including livestock keepers, nature conservationists, and animal genetic resource scientists, could gain much from exposure to such programmes.

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Appendices

Appendix 1 Sadri Declaration

Recommendations of the participants of the International Conference and Workshop on Local Livestock Breeds for Sustainable Rural Livelihoods, Udaipur and Sadri (India), 1–4 November 2000.

ACKNOWLEDGING THE DIVERSE ROLES of indigenous animal breeds for sustainable rural livelihoods in India (for food security, soil fertility, draught power, as social and cultural asset, source of income and saving etc), especially in marginal areas,

Being conscious of the threat to domestic animal diversity, (due to government policies, economic pressures, increasing poverty, cultural erosion etc., and

Concerned about the lack of awareness in all spheres of stakeholders,

We recommend:

- 1 Policy changes concerning:
 - Access to resources (grazing, water ...)

- Changes in emphasis in the curriculum for veterinary and animal husbandry scientists, extension workers, etc. (more emphasis on bio-diversity, conservation of indigenous breeds)
- Breeding policy reviews through consultative processes involving all stakeholders
- Formulation of land use plans that guarantee land use/rights for indigenous breeds and indigenous livestock keepers.

2 Concerted actions by NGOs, community-based organizations and communities, including:

- Networking, documentation, awareness raising and dissemination of information about the situation and advantages of indigenous breeds
- Improvement of marketing (niches) for the products of indigenous breeds
- Developing of local institutions and breeding organizations.

3 Changing/expanding research towards the needs of poor livestock keepers towards achieving:

- Improved economic situation of livestock keepers
- Legal recognition of indigenous breeds as national assets
- Maintenance of Indian domestic animal diversity for the benefit of future generations.

Sadri, 4 November 2000

Appendix 2

Alsipura Statement

Issued by the Indian Pastoralists and Herders Association on 23 March 2002

Members of pastoral communities from all over India, including Changani, Raika/Rebari, Gujjar, Toda, Dhangar, Malaimadu cattle breeders, Kurma sheep breeders, Vembur sheep breeders, Andhra Pradesh Sheep and Goat Rearers' Association as well as national and international NGOs seeking to protect the interests of pastoralists and other livestock rearers, met at the training centre of Lokhit Pashu Palak Sansthan in Alsipura (near Sadri, District Pali, Rajasthan, India) on 22–23 March, 2002 to discuss their mutual problems and exchange experiences about their situations.

They agreed on the following statement.

PASTORALISTS PLAY AN IMPORTANT role in the ecology of India. Their production of organic manure contributes to the maintenance of soil fertility. Their grazing controls invasive exotic species. Contrary to their reputation, pastoralists have many traditional practices for conserving vegetation, for instance by rotational grazing.

Pastoralists make a significant but largely unacknowledged contribution to India's economy in terms of food security (milk), provision of draft animal power, as well as foreign exchange earnings (meat, fibre, e.g., pashmina wool).

Since pastoralists usually do not own land, their produce is generated exclusively by dependence on communally and state-owned grazing land. Due to neglect by officials and policy makers, pastoralists face deprivation from their traditional and customary rights to these grazing areas. Because their grazing areas are in decline everywhere, their populations are also declining throughout India.

Pastoralists play an important role on the conservation of indigenous livestock breeds (such as one-humped camel, Toda buffalo, Nari and Malaimadu cattle, Deccani sheep), while Adivasis conserve valuable poultry genetic resources (Aseel chicken). These breeds harbour a wide variety of adaptive traits, being able to cope with harsh climates and landscapes and resisting diseases that affect crossbred animals. It is imperative to conserve them.

For many pastoralists, these farm animal genetic resources are the basis of their cultural identity and they have a moral and social attachment to them.

Pastoralists face severe pressures and many of them feel threatened by the continuous decrease in grazing resources, due to factors such as:

- They are usually excluded from participation in the Village Forest Protection Committees that are promoted by the Joint Forest Management Programme.
- In Rajasthan, the allotment of *gochar* land for private use at the discretion of District Collectors is undercutting their resource base of pastoralists.
- There are a large number of cases where pastoralists are banned from their traditional grazing areas because these have come under various “forest protection” or management schemes. Examples include: Malaimadu breeders in Tamil Nadu and the Grizzled Squirrel sanctuary, Toda buffalo

breeders, camel breeders and the Kumbhalgarh Reserve in Rajasthan.

- In many places, for instance Ladakh, protection of wildlife has proceeded at the expense of the availability of grass biomass for the herds of pastoralists.
- Elimination of fallow areas, due to increase in irrigation agriculture.

In order to maintain their cultural identity and continue to fulfil their crucial role in India's ecology and economy, pastoralists recommend and demand the following policy changes as absolutely essential:

- Revival of traditional norms for use of grazing lands (such as rotation).
- Land use policies that protect grazing areas and ensure sufficient space for their livelihoods.
- Linkages between the government departments responsible for the two components of their livelihoods, i.e., animal husbandry and forest/environment.
- Educational facilities that integrate and reinforce important elements of their culture and indigenous knowledge (experience is already available from Ladakh).
- Acknowledgement and support for their essential role in conserving India's farm animal genetic resources and valuable genetic traits.
- Animal health and livestock extension services that are suited to their particular situation and integrate/utilize the considerable indigenous (ethno-veterinary) knowledge of pastoralists.

Alsipura/Sadri, 23 March 2002

Appendix 3

Memorandum to the Honourable Prime Minister of India

By India's herding communities for affirmation of their customary grazing rights

LIFE Network India

AT THE OCCASION OF Human Rights' Day (10th December), we, as representatives of herding (pastoralist) groups from all over India, have come to Delhi to draw the attention of your government and of the general public to the progressive loss of our customary grazing rights that is undermining our livelihoods. For hundreds of years, we have held together rural life and made important contributions to the rural economy by providing draught animals, milk, meat, wool, manure, as well as general eco-system services, but over the last decades government policies have totally ignored our needs.

Establishment of wildlife sanctuaries and national parks, joint forest management schemes, allotment of common land for commercial plantation or bio-diesel cultivation, expansion of irrigation agriculture are all developments that have constricted our customary grazing areas and are forcing us to give up our livelihoods.

The situation is much the same throughout India. The present situation of humiliation and harassment is driving our young generation to look for alternatives to traditional herding activities, and forcing them to take up low-paid, menial labour in cities.

Moreover, this trend is also leading to the disappearance of many of India's livestock breeds, such as camels, Kankrej cattle, Gir cattle, Nari cattle, Malaimadu cattle, Neeli Ravi buffalo, Toda buffalo, Kachakatti black sheep, Pulikkulam cattle and many others that can cope with difficult environmental conditions. Loss of our grazing areas and our livelihoods therefore also means a loss of an important part of India's biodiversity. As a signatory to the UN Convention on Biological Diversity, India has committed itself to recognize and support traditional people that conserve biodiversity, and we want to emphasize that as conservers of native livestock breeds we are an example of such groups.

However, instead of receiving support, our customary – and once officially recognized – grazing rights are now being done away with, due to pressures exerted by the Central Empowered Committee on state governments to no longer issue grazing permits in wildlife sanctuaries. The Raika Sangarsh Samiti has requested clarification from the Supreme Court about their grazing rights in the Kumbalgarh Sanctuary, in Pali District (Rajasthan). Now the Chief Wildlife Warden of Rajasthan has recommended that no grazing be allowed. If the Supreme Court supports this, it means that age-old existing rights are eliminated without proper procedure.

Another instance in which pastoralist needs were ignored concerns three dams constructed in the foothills of the Siwaliks that have forced the Gaddis of Himachal Pradesh to change their migration patterns with deleterious effects for themselves and the environment.

We also want to emphasize that demand for the products of pastoralists is on an unprecedented high: practically all the goat and sheep meat in India is produced by herding groups; there is a huge need for manure for fruit cultivation, organic agriculture and to sustain crop yields in general, while camel milk is making headlines as treatment for diabetes.

From European countries we can learn that pastoralism is necessary to sustain the environment and maintain landscapes. For instance, in Germany, where people stopped grazing livestock in the forests, this caused a major change in vegetation and began totally altering the landscape. The government now in some cases, actually pays herders to graze their animals in the forest and to maintain the pasture landscape that people see as their bio-cultural heritage.

In India, two important pieces of policy and legislation in draft form support the cause of pastoralists. The draft National Policy for Farmers that has been circulated by the Ministry of Agriculture in April 2006 has emphasized in its Section 2.4.8.4 the need for securing pastoralists' forest grazing rights including those areas which are declared as Joint Forest Management, Wildlife Sanctuaries and National Parks. The Recognition of Forest Rights Bill 2005 tabled in Parliament by a Joint Parliamentary Committee has also underscored in Chapter II Section 3-d the forest grazing rights of nomadic and settled pastoralist communities.

We strongly urge the government to implement these policies, otherwise pastoralism in India is likely to become a piece of the past, which will lead to a tremendous loss of social capital and destroy systems of self-governed livelihoods which cost the governments next to nothing and instead make a tremendous contribution to the national economy in terms of meat, milk, manure and bio-energy production. On the occasion of Human Right's Day, we request establishment of a platform between concerned ministries, such as Agriculture/Animal Husbandry and Forest and Environment, to look into long-term solutions for the plight of pastoralists and identify options for creating grazing opportunities for pastoralists and other livestock keepers that depend on common property resources for their livelihoods and livestock production.

Delhi, 7 December 2006

Appendix 4 The legal framework

THIS APPENDIX SUMMARIZES SOME of the existing or pending legal and policy frameworks that support pastoralists.

Biological Diversity Act, 2002

This Act (Sections 36 and 41) stipulates...

conservation, sustainable use of biological diversity including **in-situ conservation of breeds of domestic animals** under their surrounding natural habitat,

where the breed has been evolved or maintained by communities. This calls for recognizing the role of pastoralists or indigenous livestock keeping communities who conserve native breeds by use indigenous knowledge in livestock breeding.

United Nations Convention on Biological Diversity

As a signatory to the United Nations Convention on Biological Diversity, India has committed itself to respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity.

Right to Food

India also recognizes the Right to Food in the context of national food security and therefore should adhere to the voluntary guideline 8d: Genetic Resources for Food and Agriculture which stipulates that:

States, taking into account the importance of biodiversity and consistent with their obligations under relevant international agreements should consider specific national policies, legal instruments and supporting mechanisms to prevent the erosion of and ensure the conservation and sustainable use of genetic resources for food and agriculture including, as appropriate, for the protection of relevant traditional knowledge and equitable participation in sharing benefits arising from the use of these resources, and by encouraging, as appropriate the participation of local and indigenous communities and farmers in making national decisions on matters related to the conservation and sustainable use of genetic resources for food and agriculture.

Durban Action Plan

As a member of the Durban Action Plan (IUCN, 2004), an outcome of Vth IUCN World Parks Congress (September 2003), India has the mandate of:

securing the rights of indigenous peoples, including mobile indigenous peoples, and local communities in relation to natural resources and biodiversity conservation.

Recognition of Forest Rights Bill, 2006

This Bill provides:

rights of uses or entitlements such as grazing in forests and traditional seasonal resource access of nomadic or pastoralist communities (both settled and transhumant).

Draft National Policy for Farmers

Excerpts from the draft:

2.1.3 The livelihoods of pastoralists and smallholder farmers are threatened by the progressive loss of grazing land for their animals, limitations to mobility, inadequate or inappropriate government policies, and lack of animal health and other services. These developments are also causing the progressive loss of the livestock breeds and species that provide rural livelihoods and life-style options.

2.4.3.3 Livestock

2.4.3.3.1 According to the 17th Livestock Census released in January 2005, India has 57% of the world's buffalo population and 16% of the cattle population. Also, we rank third in sheep wealth and second in goat population. The contribution of the livestock sector to agricultural GDP has increased from 18% in 1981 to 26% in 2004-05. **It is clear that livestock and livelihoods are very intimately related in our country and that crop-livestock integrated farming is the pathway for farmers' well being.**

2.4.3.3.2 The ownership of livestock is much more egalitarian since resource poor farming families own a majority of cattle, buffalo, sheep and goats. The major constraints experienced by such families relate to fodder, feed and health care. There is an urgent need for establishing **Livestock Feed and Fodder Corporations** to assist SHGs [self-help groups] to produce good quality animal feeds. Such a Corporation should be a facilitating body for providing seeds and planting material of improved varieties to SHGs for local level production. The productivity of our livestock is low and can be easily improved through better nutrition and healthcare. Agri-clinics operated by veterinary and farm science graduates will be very helpful to enhance the income of livestock owners through higher productivity. At the same time, crop-livestock mixed farming systems should be promoted since this will help to improve both income and household nutritional

security. **It should be noted that suicides by farmers are rare in areas where there are multiple livelihood opportunities.** India's achievement in becoming the largest producer of milk in the world has an important message, namely concurrent attention to all links in the production, processing and marketing chain through cooperatives and group endeavour will lead to striking results.

2.4.3.3.3 The Union Finance Minister in the recent budget has announced that banks are being asked to provide a separate window for SHGs as well as for joint liability groups of tenant farmers. This window will provide an opportunity for achieving a fodder and feed revolution for enhancing the health and productivity of our unique livestock wealth. Livestock insurance also needs revamping and made accessible to small livestock owners. Livestock rearing can be linked to organic farming, so that there is value addition to the produce from small farms.

2.4.4.5 Animal Genetic Resources

2.4.4.5.1 Apart from conserving genetic diversity and acknowledging the vital role of livestock keepers, there is need to document the indigenous knowledge of pastoral communities about animal maintenance and breeding. Community-based conservation and development of indigenous livestock breeds and species should be encouraged. There should be a special focus on both hot and cold arid and semiarid areas where the genetic diversity and associated indigenous knowledge are particularly well developed. Wastelands could be used to promote *in situ* conservation of animal breeds, even those that are amenable to *ex situ* conservation. A policy focus will need to be created to conserve grazing lands to enable the conservation of animal genetic resources. Documentation of special traits should be done in the context of the new biology and new nutritional needs or for other economic traits like hide/ leather quality. There is need for offshore Genetic Resource Centres for screening germplasm for resistance to serious diseases like the H5N1 strain of avian influenza virus.

2.4.4.5.2 The burden of conservation cannot be allowed to fall on the largely impoverished communities that maintain animal genetic diversity. A system of rewards and incentives must be developed to enable and motivate people to conserve their breeds under the Biodiversity Act. The Biodiversity Fund should be used for such purposes. Livestock keepers' inherent rights to continue to use and develop their own breeding stock and breeding practices should be acknowledged. The government must recognize these rights, acknowledge livestock keepers' contribution to the national economy, and adapt its policies and legal frameworks accordingly. This is particularly important to pre-empt attempts to use the intellectual property system to obtain control over animal resources that are an important component of the country's food and livelihood security systems.

2.4.8.4 Pastoralists

The Draft Scheduled Tribes (Recognition of Forest Rights) Bill, 2005, envisages, "rights of uses or entitlements such as grazing in forests and traditional seasonal resource access of nomadic or pastoralist communities". This Act is yet to be passed by Parliament. Many of the Joint Forest Management Committees are designed to provide opportunities to tribal families and pastoralists for access to non-timber forest products. The following steps are needed to ensure the right to livelihood of pastoralists:

- i. Restoration of traditional grazing rights and camping rights in forest areas including wildlife sanctuaries and national parks, and also those areas earmarked for grazing purpose in village common lands.
- ii. Formalizing entitlements (including issue of permanent grazing cards) for the traditional pastoralists/herders maintaining native animal breeds and who depend upon them for their livelihood for enabling their free access to notified or demarcated grazing sites and migration routes.
- iii. Whenever a tree planting programme is to be implemented, alternative grazing land and drinking water resources for animals

should be allotted by the concerned authorities. It should be made mandatory for the implementing agency before initiating afforestation to seek prior consent from forest dependent communities including pastoralists. Rotational system of grazing should be encouraged instead of complete closing of forest zone for tree plantation purpose.

iv. In-depth documentation, characterization of indigenous livestock breeds should be carried out to recognize and protect intellectual property rights of the local communities/individuals conserving these livestock breeds.

v. Pastoralists should be involved in all local natural resource management programmes including village forest committees.

vi. Common land assigned to forest departments and unutilized or encroached land should be retrieved and brought under the control of village level committees or grassroots institutions for pasture development.