Indigenous Breeds, Local Communities

Documenting Animal Breeds and Breeding from a Community Perspective

Lokhit Pashu-Palak Sansthan and
Ilse Köhler-Rollefson

LPPS

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Lokhit Pashu-Palak Sansthan and Ilse Köhler-Rollefson

Sadri, Rajasthan, India, 2005

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Cover photo: Milking Nari cattle in Rajasthan (Ilse Köhler-Rollefson)

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Foreword

Plant and animal genetic resources are the most important primary materials needed by breeders and farmers to develop new crop varieties and animal breeds. Agricultural biodiversity safeguards the natural potential of farming systems to adapt to changes in the environment, changes in ecosystems, or changing patterns of demand for food.

Agrarian producers in Africa, Asia and Latin America rely on a wide range of crop varieties and animal breeds. This is especially true of women, who are responsible for producing the bulk of the food supply. A great diversity of native varieties and locally adapted animal breeds support their livelihoods, often under difficult climatic conditions and on marginal soils. The uncertain climate and attacks by pests and diseases forces them to minimize their risks rather than trying to maximize yields with high-performance varieties and breeds.

Development efforts have long neglected animal genetic resources and their long-term conservation for the good of rural populations and the international community. The past two decades have seen an overall decline in development funding for rural areas. But recently, the Millennium Development Goals (which include halving world hunger and malnutrition by 2015) have refocused interest on rural areas. There has been a similar revival of interest in the conservation of livestock breeds.

Much time has been lost. For plant genetic resources there is already a wealth of experience and ideas for conserving and using them in a sustainable manner. The Food and Agriculture Organization of the United Nations has facilitated several agreements that lay down the ground rules for recognizing farmers' traditional knowledge of plant genetic resources, providing rights of access to these resources, and ensuring fair compensation for plant breeders' work.

The equivalent work still remains to be done for animal genetic resources. This primer provides a basis for doing this. It sets out the significance of animal genetic resources in Asia and the role of traditional knowledge. It provides an explanation of the "LIFE method" for recording and documenting traditional knowledge, which was devised and tested as part of a GTZ-financed programme, and gives recommendations on how to use this approach. It also outlines the political framework (including the Convention on Biological Diversity and the TRIPS Agreement) to clarify the key legal parameters governing the sustainable use of animal genetic resources.

We hope that this publication will give impetus to further progress on the issue of animal genetic resources and their contribution to sustainable development.

Annette von Lossau

German Agency for Technical
Cooperation (GTZ)

Acknowledgements

This book was inspired by our interaction with the Raika, the traditional livestock breeders of Rajasthan. Through them we became interested in the subject, and from them we learned about the relationships between humans, animals and the environment that shape livestock genetic resources and generate indigenous breeds. The Raika developed and stewarded the famous livestock of Rajasthan, including the camel, the Sirohi goat, most of its sheep breeds, and the Nari and Sanchori cattle breeds. But they have never received any official acknowledgement or credit for this huge contribution to their country's resources, and they continue to be dismissed as 'backward' and in need of development. While they certainly are a marginalized people, it is precisely their reluctance to join the mainstream that has rendered them the custodians of India's livestock wealth and domestic animal diversity.

This publication provides a welcome opportunity to redress some of the common misperceptions about indigenous livestock breeders. For this we are enormously grateful to Annette von Lossau of the GTZ's agrobiodiversity project, whose support, interest and farsightedness enabled the research this booklet is based on. BeateScherf of the FAO's animal genetic resource unit took an interest in the subject at a later stage, and enabled the National Coordinators of several Asian countries to participate in a workshop held in October 2003, in which the research was disseminated.

This publication also owes much to the efforts and inputs of others. A special mention is due to Ellen Geerlings and Ramesh Bhatnagar, who contributed substantial effort and dedication to elucidating the Raika sheep classification. They were ably assisted by Jagdish Garg, LPPS field assistant. ANTHRA Hyderabad contributed a case study on the Kanchi Mekham goat, and ANTHRA Pune on Dangi cattle. We thank Sagari Ramdas and Nitya Ghotge of ANTHRA, P. Vivekanandan of SEVA, and their teams for their enthusiasm for the subject and cooperation. As always, we are extremely grateful to Paul Mundy and Evelyn Mathias for their deft editorial inputs.

Hanwant Singh Rathore and Ilse Köhler-Rollefson

1 Introduction

LIVESTOCK PLAY a vital role in supporting the livelihoods of millions of people throughout the developing world. From the householder who keeps a few chickens in her backyard, to the pastoralist who treks his herds vast distances over barren hills and plains, animals serve people in many ways: they provide meat, milk, eggs, skins and hides; they haul carts and ploughs; they power wells and mills; they bring cash and prestige; they act as savings and insurance. Even their wastes are used: they are fertilizer, cement and fuel.

Livestock are far from uniform. There is considerable variation within the main domesticated species of cattle, sheep, goats, buffaloes, pigs, horses and chickens, as well as in less-common species such as dromedary and Bactrian camels, yaks and donkeys. Over millennia, livestock holders have created a vast range of different breeds, each with specific characteristics, and each adapted to the conditions where it was developed. They carry genes that enable them to cope with difficult environments, thrive on thorny vegetation in drought-prone areas, walk long distances, and resist pest and disease attacks.

But many traditional livestock breeds are in danger. They are dying out because of crossbreeding, the expansion of intensive agriculture and of wildlife reserves, changes in the economy, and other factors. Already, 17% of livestock mammals – over 900 of 5330 breeds – are extinct, and another 29% (1500 breeds) are thought to be endangered (Geerlings et al. 2002). Must more breeds disappear forever?

Modern agriculture relies on a few high-performance animal breeds. These breeds grow quickly, produce gallons of milk or cratefuls of eggs... but they rely on good-quality feed and a constant flow of medicines to keep them healthy. And the gene pool of high-performance breeds is becoming ever shallower: intensive selection, artificial insemination and other breeding tech-

niques have squeezed most of the diversity from these breeds, and herds are becoming more and more uniform. That is risky: a disease outbreak could suddenly wipe out entire national herds, ruining a country's farm economy, destroying rural communities, and leaving consumers hungry – and angry.

Traditional breeds provide the genetic diversity that modern agriculture needs to ensure stability. They are vital building blocks for future livestock breeding. Conserving them is important, not only for the communities that keep them, but also for the future of modern agriculture.

Conserving livestock breeds is possible only if (a) the breeds are first identified and adequately documented, and (b) if the communities which keep the animals participate fully in conservation efforts. This book shows how to work with local people to document their breeds, as the first step in developing strategies to conserve them.

There are three important reasons for bringing out this book:

First, indigenous communities – especially pastoralists – play an important role in developing domestic animal diversity and in stewarding livestock breeds with important genetic traits. We would like to make this important contribution visible.

For too long, these societies have been cast as backward, ignorant, even primitive. But they often have highly evolved systems of managing livestock and the genetic resources they embody. These societies have accumulated a rich stock of indigenous knowledge about animal breeding. This knowledge should form the basis of all breeding programmes and of sustainable management of farm animal genetic resources at a global level.

For several reasons this knowledge has so far remained largely invisible. For one, very few researchers have investigated indigenous knowledge and concepts about animal breeding.

Second, indigenous knowledge on animal breeding often represents "tacit" rather than expressed knowledge. It is structured differently from scientific knowledge, and takes skills to make visible.

Communities know better than anyone else the special characteristics of their animals. While scientists can quantify many aspects of indigenous breeds under the controlled conditions of a research station, it is the communities who are familiar with the qualitative traits that are so important for survival and subsistence in harsh environments. These qualitative traits include the ability to walk long distances, resist diseases, or defend offspring against predators.

Breeding programmes that ignore these aspects are doomed to fail – as has been shown many times. But it is possible to build on indigenous knowledge and use it as a starting point for development interventions. Projects that do so have the potential to generate large benefits for the communities and for the sustainable utilization of marginal environments. Such an approach could form the basis of endogenous, bottom-up development.

This brings us to the **second** intention of this publication: to familiarize animal scientists and veterinarians with principles and basics of participatory approaches. Veterinary and animal science training in most developing countries is modelled on the curricula of the developed world. It provides few opportunities for developing communication skills or preparing young veterinarians and animal scientists to work in the different cultural environments of remote rural areas. Quantitative methods get priority. This is probably one of the reasons livestock projects and programmes have such a high failure rate.

A **third** goal of this book is to explain the importance of community-based documentation of breeds to international and national bodies charged with tracking and managing domestic animal diversity. We hope that these institutions will adopt some of the methodologies presented here. This would make their databases, and their work in general, much more relevant, both from the perspective of sustainable use and to respond to urgent emerging questions of property rights over farm animal genetic resources.

While most of the information and data in this publication refer to Asia, and especially India, this is because it arose from a project focusing on this region. Nevertheless, the contents are just as applicable to other continents, especially Africa.

2 Farm animal genetic resources of Asia: An overview

Animal domestication in Asia

Asia is origin of the majority of the world's livestock. The Near East is considered the cradle of animal domestication: this is where sheep and goats were first brought under human control about 9,000–10,000 years ago. Within a millennium or so, they were followed by taurine (humpless) cattle. The earliest evidence for zebu (humped) cattle derives from an archaeological site located in Pakistan. The pig was domesticated at several locations, including the Near East and the Far East. While these four species – sheep, goats, cattle, pig – dispersed throughout the world, other species, such as buffalo, yak and Bactrian (two-humped) camel, have retained narrower adaptations and remain typically "Asian" livestock. Minor cattle species exist in both wild and domesticated forms: the banteng (Bali cattle), and gaur (mithun or gayal).

Asia has also given rise to most of our poultry. The chicken is derived from the Red Jungle Fowl in India. Ducks and other poultry species offer great genetic diversity in Asia.

Origin of farm animal genetic diversity

Asia's many livestock breeds arose as a consequence of the continent's enormous cultural and ecological diversity. In the thousands of years since animals were first domesticated, they have been introduced to different envi-

Table 1 Place and date of domestication of farm animals originating in Asia[1]

Farm animal species	Scientific name	Wild ancestor	Scientific name	Where domesticated	When domesticated
Goat	*Capra hircus*	Wild goat	*Capra aegagrus*	Near East	8000 BC
Sheep	*Ovis aries*	Mouflon	*Ovis orientalis*	Near East	8000 BC
Pig	*Sus scrofa*	Wild boar		Near East	7000 BC
Zebu (humped) cattle	*Bos indicus*		*Bos indicus namadicus*		
Cattle	*Bos taurus*	Aurochs	*Bos primigenius*	Near East	7000 BC
Water buffalo	*Bubalus bubalis*		*Bubalis arnee*	Pakistan	3rd millennium BC
Dromedary camel	*Camelus dromedarius*			Southeast Arabia	3rd millennium BC
Bactrian camel	*Camelus bactrianus*			Iran, Turkmenistan	3rd millennium BC
Yak	*Poephagus grunniens*	Yak	*Poephagus mutus*	Mongolia, China	2nd millennium BC
Mithun	*Bos frontalis*	Gaur	*Bos frontalis*	India, Bangladesh, Burma	
Bali cattle	*Bos javanicus*	Banteng	*Bos javanicus*	Indonesia	Not known
Horse	*Equus caballus*	Wild horse		Central Asia	
Reindeer	*Rangifer tarandus*		*Rangifer tarandus*		
Chicken	*Gallus gallus*	Red jungle fowl		India	
Pigeon	*Columbia livia*	Rock pigeon		Near East	3000 BC
Chinese goose	*Anser cygnoides*	Swan goose		China/Japan	1st millennium BC

[1] *Based on Blench (2001)*

ronments and subjected to the breeding practices of different communities and social groups. A large variety of breeds developed that are adapted to various ecological niches and the differing needs and preferences of their breeders.

The earliest evidence for the existence of distinct breeds in Asia dates back to the 3rd millennium BC. Mesopotamian archives refer to several different breeds of sheep. Pictorial records from this time also show sheep with different horn forms (Steinkeller, 1995).

In China, a large number of different pig breeds are recorded for the Ming period (AD 1500–1644) (Tsang, 1996).

The role of pastoralists

As specialized animal breeders, pastoralists played a very influential role in developing breeds with particular qualities. This is well documented for India, where cattle played such a crucial role in the rural economy. Specialized cattle breeders supplied farmers with good draft and milk animals. The most important pastoral group in this respect are probably the Rebari from Rajasthan and Gujarat, who created such famous breeds as the Gir, Kankrej and Sanchore. The Rebari also breed camels and sheep.

The famous Sahiwal breed, named after the Sahiwal district of Punjab province in Pakistan, was originally kept by nomadic herders called Junglies, who owned large herds and managed them on available pastures. But the estab-

Box 1 Who are pastoralists?

Pastoralists are people whose economy is based on livestock-raising on common property resources. Pastoralists often define themselves by their social relationship with their animals.

Pastoralists inhabit areas not suitable for crop cultivation: deserts, steppes, and mountainous zones. In Asia, they are especially prevalent in Mongolia, western China, the Himalayas, western India, Afghanistan and Iran.

Table 2 Population size and number of breeds of major livestock species in Asia and the Pacific

	Population size ('000)	Number of breeds	Share of world total	
			Population (%)	Breeds (%)
Buffalo 	152 404	61	93	70
Cattle 	461 197	236	35	19
Yak 	n/a	9	n/a	69
Goat 	390 433	146	55	26
Sheep 	408 098	233	39	18
Pig 	525 598	184	55	37
Ass 	14 885	12	34	12
Horse 	14 859	83	25	11
Camel 	2 815	14	15	22
Chicken 	6 181 645	124	45	18
Duck 	717 811	45	92	45
Turkey 	2 142	6	1	18
Goose 	189 436	13	90	20

Source: FAO records (Scherf, 2000)

lishment of canal irrigation in the area in 1914 undermined this breeding system, and the herds declined. Now rich landowners and government and military farms are the only ones with large holdings (Joshi and Phillips, 1982; Khan et al., 1992)

Other groups in India who depend on livestock include the Toda buffalo breeders in the Nilgiri Hills of Tamil Nadu, and the Van Gujjars, Bakkarwal and Gaddi of the Himalayas (Sharma and Köhler-Rollefson, 2002).

Farmers

For farmers, livestock is interlinked with crop cultivation. Farmers usually have smaller holdings of animals. Many do not even breed their own stock, but obtain their draft animals from pastoralists. They thus have less scope for selection. But farming societies have also contributed to the development of important breeds. For instance, Ongole cattle are product of a farming society. Pig breeds have also been shaped by farming communities.

"Tribal" societies

Tribal societies in this context are communities which are heavily into neither farming nor pastoralism, but whose economy is based on hunting and gathering. This includes the Adivasi population of India, which is a main steward of poultry breeds.

Central authorities

Kings and states also played a major role in developing breeds. A prominent example in India is the Amrit Mahal cattle breed which was developed by the rulers of Mysore State.

Monitoring the risk status of animal genetic resources

FAO monitors the status of the world's animal genetic resources, based on information it receives from member countries. It has developed the following categories (Figure 1):

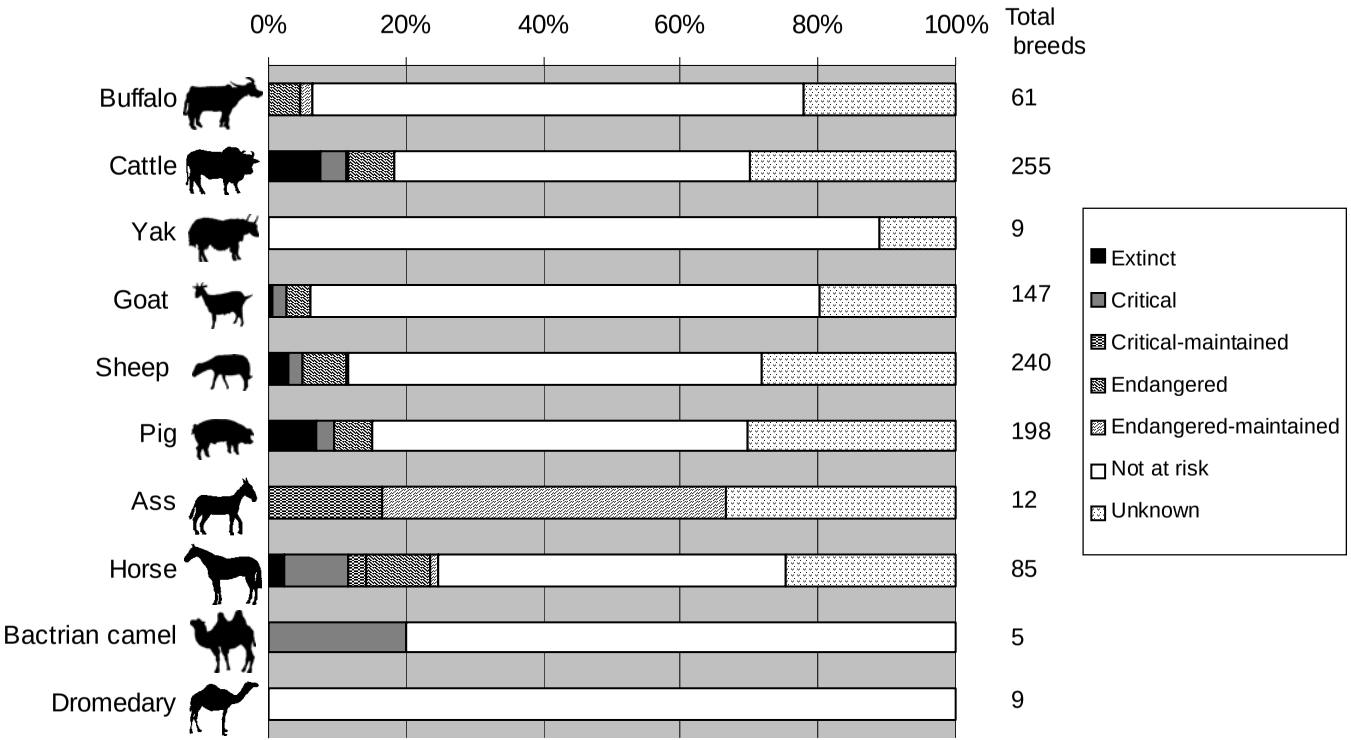
- **Extinct**
- **Critical** Fewer than 100 breeding females, or 5 or fewer males.
- **Critical-maintained** Critical populations for which there is an active conservation programme.
- **Endangered** Between 100 and 1000 females; between 5 and 20 males.
- **Endangered-maintained** Endangered populations for which there is an active conservation programme.
- **Not at risk**

Why we need to conserve and develop indigenous farm animal genetic resources

Livelihood significance

Indigenous breeds may produce less milk or meat than improved breeds. But they usually fulfil a wider range of functions for their owners, and are much easier to manage. A crossbred or exotic cow may give a high amount of milk, but their offspring are poorly adapted to local conditions. In India, many owners of crossbred cows cannot see a use for male calves, so let them die. A local cow, on the other hand, may produce bullocks that are well-suited for work under harsh conditions, as well as enough milk to cover family needs. The local cow needs fewer inputs and it is less susceptible to disease, drought or heat, making it lower-risk for its owners. Table 3 summarizes some of the differences between livestock systems based on local and on high-performance breeds.

Figure 1 **Risk status of mammal breeds in Asia and the Pacific[1]**



[1] *Based on FAO records from December 1999 (Scherf, 2000)*

Table 3 Comparison of livestock systems between locally adapted and high-performance breeds

High-performance breeds	Local breeds
Specialized, provide only one product	Multipurpose, provide wide range of products
Require high feed input, including green fodder and concentrate	Subsist on natural vegetation
Require expensive housing and stabilized climate	No, or only minimal, protection necessary
Susceptible to diseases	Disease-resistant
Need high level of care and time	Need little care
If kept in landless system, negative effects on the environment. through the accumulation of waste	Positive ecological effects by being integrated into the farm cycle, contributing manure and sometimes draft power.
Often compete with humans for grain	Utilize vegetation and areas that often cannot be exploited otherwise
Adoption requires large amount of capital	Traditional occupation inherited by forefathers
Lead to wealth differentials and offer benefits for only a few	Kept in social contexts which maintain sharing mechanisms

Source: Perceptions of participants in LIFE training courses held at LPPS, Sadri, 2004.

Sustainable use of marginal areas for food production

Many marginal areas, such as deserts, scrubland and mountainous zones, can be exploited only by locally adapted breeds or minority species. For instance, camels are the only livestock that can exist in areas with than 50 mm of rainfall. Only yaks can survive at really high altitudes. Even if conditions are not quite as extreme, extensive animal husbandry with specifically adapted breeds is more ecologically sustainable than irrigated agriculture. If these breeds die out, it will no longer be possible to use large areas to produce food.

Conservation of diversity for future breeding needs

Local breeds can be regarded as the building blocks for livestock development. The genetic diversity they embody enables breeders to respond to changes in production, marketing and the natural environment (Martyniuk, 2003). The United States recognized in the 1980s that it would depend on access to foreign genetic resources in order to prepare for the future (CAST, 1984).

Genetic traits with future economic potential

With the advance of functional genomics, scientists have begun to systematically screen indigenous livestock breeds for genetic traits that confer disease resistance, provide special production characteristics, or influence the processing of animal products. Disease-causing agents such as internal parasites and bacteria are becoming increasingly resistant to medicines such as anthelmintics and antibiotics. "Breeding for disease resistance" is an emerging trend in disease control. Indigenous breeds typically have not been subjected to strong selection for productivity, but exhibit disease-resistance traits. That makes them of interest to the livestock industries and scientists (see Table 4).

Table 4 Examples of indigenous livestock breeds with genetic disease resistance

Disease	Livestock breeds	Level of resistance
Cattle		
		
Brucellosis	East African Shorthorn Zebu	Moderate to high
Cowdriosis (Heartwater)	N'Dama	Tolerant?
Dermatophilosis	N'Dama and Guadalupe Creole	Very high
East Coast fever (*Theileria parva*)	Small East African Zebu	Complete endemic stability
Foot-and-mouth disease	Curraleiro	?
Haemoparasites (*Babesia bovis, B. bigemia, Anaplasma marginale*)	Brahman (other *Bos indicus*?)	Tolerant
Gastro-intestinal nematodes	N'Dama	Tolerant
Ticks	N'Dama	Tolerant
Ticks	Brahman (and other *Bos indicus* breeds)	Tolerant
Theileria annulata	Sahiwal (and other *Bos indicus* breeds?)	Resistant (asymptomatic, and recover from challenge)
Trypanosomosis	N'Dama (and other West African shorthorn taurine breeds)	Tolerant. Affected but still productive. Other breeds die
Trypanosomosis	Orma Boran	Partially tolerant; possibly also to haemorrhagic *T. vivax*

Source: Gibson (2002)

Table 4 continued

Disease	Livestock breeds	Level of resistance
Sheep		
		
Cowdriosis	Djallonke, West Africa Dwarf	Tolerant
Gastro-intestinal nematodes, especially *Haemonchus contortus*	Red Maasai, St Croix, Javanese Thin Tail	High levels of resistance and tolerance
Gastro-intestinal nematodes	Barbados Blackbelly, Garole, Florida Native	Moderate levels of resistance and tolerance
Gastro-intestinal nematodes	Djallonke, West Africa Dwarf	Tolerant
Liver fluke, *Fasciola gigantica*	Javanese Thin Tail and Indonesian Thin Tail	High levels of resistance and tolerance
Liver fluke, *Fasciola gigantica*	St. Croix	Intermediate levels of resistance
Rift Valley fever	Red Maasai	High under experimental challenge
Maedi visna (MV)	Red Maasai	High under field challenge
Scrapie	Wensleydale	High
Trypanosomosis	Djallonke, West Africa Dwarf	Tolerant
Goats		
		
Trypanosomosis	West Africa Dwarf	Tolerant
Gastro-intestinal nematodes	Small East African	Tolerant and moderately resistant
Gastro-intestinal nematodes	West Africa Dwarf	Tolerant

Table 4 continued

Disease	Livestock breeds	Level of resistance
Water buffalo		
		
Theileria annulata	All breeds (?)	Resistant
Horses		
		
Infectious equine anaemia	Pantaneiro	?
Pigs		
		
African swine fever	Local indigenous pigs (DR Congo, Mozambique, Angola, Sudan)	Moderate or high?
Foot-and-mouth disease	I-pig (Vietnam)	?

Threats to animal genetic resources

Indigenous livestock breeds are under various types of threat.

- **Crossbreeding with exotic breeds** Breeding programmes, by both governments and non-government organizations, have favoured the use of exotic breeds for crossbreeding, upgrading, or replacement. Although such programmes often fail to achieve their objectives (unless a stable supply of high inputs can be arranged) they have led to the dilution of indigenous breeds.
- **Agricultural intensification** Changes in cropping patterns are a major factor leading to the elimination of indigenous farm animals. The switch to certain cash crops (such as tobacco) eliminates crop residues that used to be an important component of fodder. Adoption of hybrid wheat with its short stalks also reduces the availability of straw. Irrigation makes two or three crops a year possible, eliminating the possibility of grazing on stubble or browsing on trees in the fields.
- **Establishment of protected areas** Wildlife sanctuaries, national parks and other types of protected areas almost always deprive livestock keepers of their pasture. Combined with efforts to persuade farmers to adopt high-input breeds, this contributes to the pressure on local breeds. Examples include the Kumbhalgarh Sanctuary in Rajasthan (which impinges on Nari cattle and Marwari camel) and the Grizzled Grey Squirrel Sanctuary in Tamil Nadu (which causes problems for the Malaimadu cattle breed) (Vivekanandan and Paulraj, 2002).
- **Lack of market demand** Replacement of bullocks by tractors is a prime cause for the gradual extinction of many of the famous Indian draft cattle breeds, including the Nagori cattle.
- **Disappearance of traditional livelihoods, coupled with loss of indigenous knowledge and institutions** Making a living from keeping livestock is hard work that ties people down day in and day out. Many young people succumb to the attractions of city life. Animal-handling skills can disappear very quickly, within one generation. Village-based breeding institutions, such as keeping a community bull, also deteriorate rapidly once economic returns are not sufficient or social net-

Box 2 What is meant by...?

Conservation of farm animal genetic resources

- All human activities including strategies, plans, policies and actions undertaken to ensure that the diversity of farm animal genetic resources is being maintained to contribute to food and agricultural production and productivity, now and in the future.

***In situ* conservation of farm animal genetic diversity**

- All measures to maintain live animal breeding populations, including those involved in active breeding programmes in the agroecosystem where they either developed or are now normally found, together with husbandry activities that are undertaken to ensure the continued contribution of these resources to sustainable food and agricultural production, now and in the future.

***Ex situ* conservation of farm animal genetic diversity**

- Conservation of genetic material within living animals but out of the environment in which it developed (*ex situ in vivo*), or external to the living animal in an artificial environment, usually under cryogenic conditions including, *inter alia*, the cryoconservation of semen, oocytes, embryos, cells or tissues (*ex situ in vitro*).

Genebank

- The physical location for conservation of collections of well identified genetic material in the form of live animals, *in situ* or *ex situ (as conservation herds or flocks)*, or *ex situ* stored semen, oocytes, embryos, cells or tissues. Also referred to as a *genome bank*.

Gene pool

- The total genetic information in all the genes in a breeding population at a given time.

Source: FAO (2001)

works break down. Once such institutions have disappeared, they are very difficult to resurrect.

- **Political conflicts and boundaries** Warfare has contributed to the disappearance of indigenous breeds. Moreover, new boundaries, such as the Indo-Pakistan border, also disrupt migration patterns and undermine animal-dependent livelihood strategies. This has affected the Tharparkar breed (Köhler-Rollefson, 2000).

How to conserve indigenous livestock breeds and farm animal genetic diversity

Conventional approaches

Conventional approaches to conserving indigenous animal breeds include *ex-situ* and *in-situ* conservation (see Box 2).

***In-situ* conservation** involves maintaining breeding populations of live animals in the agroecosystem where they developed (or where they are now normally found), along with appropriate husbandry activities.

***Ex-situ* conservation** can be either:

- ***Ex situ in vivo*** Conserving living animals outside the environment where the breed developed or is now normally found.
- ***Ex situ in vitro*** Conserving genetic material in an artificial environment outside the living animal. This usually involves cryoconservation (deep-freezing). Semen, oocytes, embryos, cells or tissues can be conserved this way.

In recent years, a widespread consensus has developed that the best way to conserve breeds is by maintaining them as part of functional production systems and in the social and ecological contexts in which they were developed (and continue to develop). Thus there is a strong rationale for community-based conservation of livestock breeds.

Community-based management of animal genetic resources

Community-based management of animal genetic resources is "the management of animal genetic resources in which decisions on defining, prioritizing and implementing actions on animal genetic resources are made by the local communities who own these resources". This is the process by which most of our domestic animal diversity has evolved.

Community-based management of animal genetic resources is supported by such organizations as GTZ and FAO for the following reasons:

- The multitude of local breeds results from the indigenous knowledge of many local communities which manage their animals according to local ecological conditions, production requirements and their own cultural preferences. Such communities are the natural candidates for managing these animals.

Box 3 Cornerstones of community-based management of animal genetic resources

Most breeds are the products of community management. But few projects have promoted the management of animal genetic resources by the community – i.e., supporting communities to manage their breeds in a sustainable way. The idea has been explored mostly theoretically. A workshop in Swaziland in 2001 identified the following components of community-based management of animal genetic resources (Hagmann and Drews, 2001):

- Participatory approach
- Enabling policy framework
- Market opportunities
- Intellectual property protection
- Institutional support
- Skills and capacity-building of stakeholders
- Integration of indigenous knowledge and values.

Box 4 Is it a breed?

"One of the big problems facing genetic resource specialists, especially those working on livestock, is that of determining whether animals or populations belong to different breeds or whether they represent variations within a single breed. In Africa, in particular, livestock breeds tend to occur across countries or even regions – the East African Zebu, the Boran cattle in Ethiopia, Kenya and Somalia; Nguni or Nkone cattle in Swaziland, Zimbabwe and Botswana; and Djallonké sheep in West Africa, to name but a few. These animals are known by the same name in different places, but often look quite different from one place to another. Conversely there are breeds that look alike but have different names in different places"

Source: ILRI (1996)

- Supporting these communities can contribute to their empowerment and their livelihoods.

The concept of community-based management of animal genetic resources links the strengthening of communities with managing their breeds. That means it can become a tool for rural development.

Need for documentation

The first step for conservation is to know which breeds are threatened. In many countries the documentation of breeds is inaccurate and incomplete. Population figures may be out of date, and may have been wrong (or nonexistent) to begin with. Certain breeds may never have been documented or recognized. A major problem is to determine whether a livestock population represents a distinct breed.

What is a breed?

Scientists usually define a breed as "a group of animals with definable and identifiable external characteristics that distinguish it from other groups within the same species".

Box 5 Breed: A definition from FAO

"Either a subspecific group of domestic livestock with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species, or a group for which geographical and/or cultural separation from phenotypically similar groups has led to acceptance of its separate identity.

Note: Breeds have been developed according to geographic and cultural differences, and to meet human food and agricultural requirements. In this sense, breed is not a technical term. The differences, both visual and otherwise, between breeds account for much of the diversity associated with each domestic animal species. Breed is often accepted as a cultural rather than a technical term."

Source: Scherf (2000)

The term "breed" is often associated with breeders' associations and herd books. According to the classic model, groups of breeders get together, formulate a breeding goal, and then select animals that fulfil the desired criteria. These are regarded as the founder population. Usually only the offspring of the founder animals are eligible for inclusion in the herd book. This process was pioneered in England with the stud book for the Thoroughbred Horse in 1791, and has since been repeated many times. Most breeders associations specify the colour, height and other physical characteristics of their breed, so all animals look very similar.

Breed societies and written records such as herd books are rare or absent in developing countries. So scientists often have problems deciding whether a given animal population should be regarded as a "breed". Two populations separated by thousands of kilometres may look like the same breed. Or a population that is regarded as a single breed may contain a great deal of diversity (Boxes 4–6).

But if we look at how indigenous communities manage their animal genetic resources, we see that they actually function much like a breeders' association. Instead written rules or bye-laws, they have culturally embedded breed-

Box 6 A strict definition of breed

"In the strictest sense, a breed designates a closed or partially closed population. Mating pairs are drawn only from within the population and relationships among individuals are documented. Members of the breed have developed under the same selection pressures and share common ancestry".

Source: Rege (2003)

ing goals. Individual cultures or communities have very divergent views of what a desirable animal should look like. Breeding stock is passed on from one generation to the next, so its genetic composition remains very stable. Female animals are usually not sold, but are exchanged at the time of marriages, circumcisions or events. They stay in the community, resulting in a closed gene pool.

We could even say that the genetic make-up of local breeds reflects the social rules of the community for exchanging animals. If they are lax and there is no circumscribed social network, then the breed will not be well defined. If they are strict – as they usually are in livestock dependent communities – then the breed will be very well defined.

In conclusion, we can conceive of breeds as products of social networks consisting either of a breed society or a community. To understand and document breeds, we need to understand these underlying social networks, the rules by which they operate, their goals, strategies and priorities.

Here is an **alternative definition of "breed"** (Köhler-Rollefson, 1997):

*A **breed** is a population that belongs to the same species and is*

- *kept by a **particular community***
- *in a **specific environment***
- *is subjected to the **same utilization pattern***
- *is **regarded as distinct** by the community that keeps it.*

3 Indigenous knowledge about animal breeding

What is indigenous knowledge?

INDIGENOUS KNOWLEDGE is:

> *"the body of knowledge acquired by a community in any given area and relating to agriculture, livestock rearing, food preparation, education, institutional management, natural resource management, health care and other pertinent subjects. It is regarded as a valuable resource for development activities that may be equal or even superior to the knowledge introduced by outsiders and should therefore be considered and applied in development projects wherever suitable"* (Mathias, 1995).

It is variously referred to as "traditional knowledge" or "local knowledge". Much indigenous knowledge is based on practical experience and is not easily expressed verbally – it represents "tacit knowledge", to distinguish it from "explicit knowledge". Skilful social interaction can make the tacit explicit.

Indigenous knowledge is not static, but develops and changes over time and as local people learn and adapt to their changing situation.

Indigenous knowledge on animal husbandry

Sometimes referred to as "ethno-animal science" (Perezgrovas, 2001), indigenous knowledge on animal husbandry consists of several components.

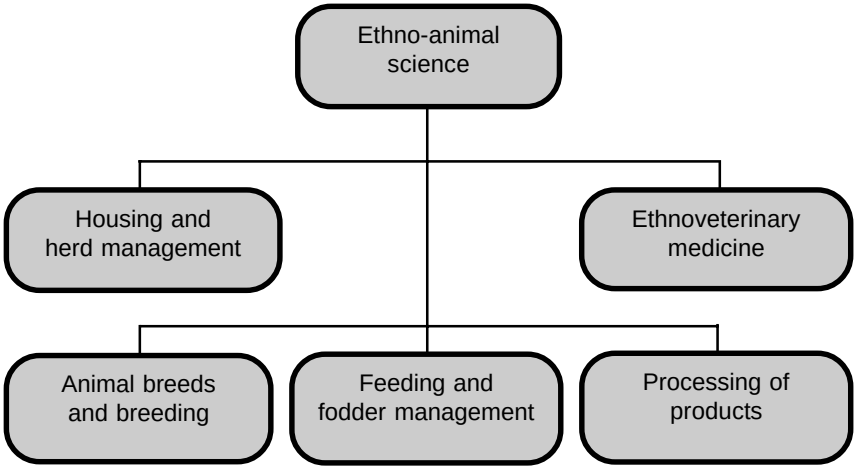


Figure 2 Ethno-animal-science and its subdivisions

The most widely known of these is **ethnoveterinary medicine**. Other branches include knowledge relating to **housing**, **herd management**, **feeding**, **fodder management**, **breeding animals** and **processing** of animal products (Figure 2). This book focuses on indigenous knowledge about animal breeds and breeding.

Indigenous knowledge of animal breeds and breeding

Indigenous knowledge about animal breeds and breeding is the knowledge that communities use to manipulate the genetic composition of their livestock. It includes knowledge and experience about the genetic attributes of livestock and inheritance, as well as conscious strategies and social mechanisms that influence the gene pool (Figure 3).

This knowledge is not evenly distributed. One culture or community has different knowledge from another. Pastoralist societies usually have a more

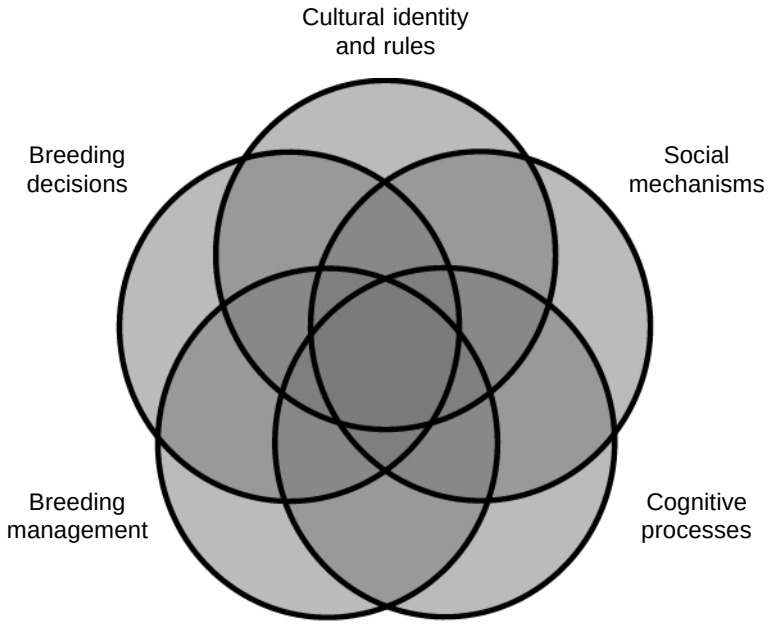


Figure 3 Elements of indigenous knowledge about animal breeding

extensive knowledge than farmers, but not all members of a pastoralist society have the same degree of knowledge. People that have undergone formal schooling usually know less. Older people have a wealth of knowledge and experience, which the young may not be interested in learning. There is also a gender gap. Men are often in charge of large stock, such as cattle and camels, while women look after small stock. That means their experience and knowledge about breeding will differ.

Sense of stewardship

Many traditional cultures do not conceive a dichotomy between humans and animals, but feel that both are part of the same system. They may have a sense of interrelatedness or responsibility for the welfare of the animals and feel obliged to nurture them. For instance, Alpaca herders in the South

American Andes say "In the same way as we nurture alpacas, they nurture us", or "the day alpacas disappear, the world will disappear" (Vásquez, 1997).

Concepts of the origin of a breed or domesticated species

Sometimes this sense of stewardship is related to beliefs about a common heritage or origin of the animals and their keepers or breeders. The Raika in Rajasthan, India, believe that the first Raika was made by God Shiva to take care of the first camel that had been shaped out of clay by Goddess Parvati. Another story links the Raika to the Nari cattle (see Box 7).

Social breeding mechanisms

Social breeding mechanisms are the socially embedded customs that influence the animal gene pool. They consolidate the population or create boundaries with other populations. Traditional pastoralist societies have strict rules about the exchange of animals, and richer people may be socially obliged to help poorer family and clan members by loaning them animals. In a sense, animals often do not represent private goods, but rather are the property of the community as a whole.

These rules ensure that animals are distributed within the community and remain a long-term asset over generations. They also are important forces for forming breeds. In fact, they mirror similar rules in breeding associations in developed countries. Here are some examples:

- **Avoidance and taboos on selling female animals to outsiders** Many pastoralist societies scorn (or scorned) selling female animals to anyone outside the community. Pastoralists regard their livestock as a heritage from their ancestors, for which they act as temporary guardians and which they have to pass on to their children.
- **Rules for passing on animals to the next generation** Communities often have fixed rules for giving animals as gifts at certain life-cycle events, such as birth, circumcision and puberty, and as dowry or bridewealth at weddings.

Box 7 Origin of the Nari cow[1]

Once upon a time, the Nari cow was living wild in the forest, very much like the Nilgai (a type of antelope). A member of the Bhil tribe went into the forest to collect honey and to hunt. His name was Dhano. He came across a grazing cow which knew how to talk the human language. Her name was Salar. She said to the Bhil "I want to come and stay with you. You make sure that there is a pen for me (*gayon ra gor/bura*) and then I'll come."

Sure enough, the next evening she came and brought a large number of other cows with her. The Bhil said to her, "We don't need so many cows." Seeing all these animals that could be used for work, he suggested to his community to cut down the forest and make fields. The next day all the people came and got to work.

It occurred to the Bhil that in order to feed the people, he could slaughter Salar's son. But Salar's son somehow came to know about this and asked his mother what to do. Salar said to her son, "Tomorrow, when you leave the pen, the Bhils will be on one side and the Gujjars on the other. You go to the side of the Gujjars." So the next morning, all the cows joined the Gujjars.

A member of the Gujjar tribe called Bhoja welcomed the cows and said, "You can stay with me". But Salar had been cheated once, so she did not trust Bhoja. She gave him a test. She put out some buttermilk which had ants in it. Bhoja drank the buttermilk and his big beard filtered out the ants. So she trusted him, and everything was fine. His son Naggar took care of the cattle.

Then Bhoja Gujjar died. At that time, the Raika community came from Jaisalmer and they started taking care of the Nari cattle.

According to local tradition ("Hirola Gana", sung on Diwali); related by Beraram Raika, Lundara (District Sirohi, 10 March 2002)

- **Sharing mechanisms: Lending or gifting animals to poorer relatives** Wealthier members of the community may have obligations to share their resources by giving long-term stock loans or by helping out poor relatives in times of need (see Box 8).

Box 8 *Vaata:* A traditional sharing mechanism among Adivasi in Andhra Pradesh

Vaata is a traditional system of sharing and building assets. The owner gives a 6-month-old female goat to another farmer on a *vaata* basis. This is the age when the young goat is weaned and starts grazing on its own. If the first-born kid is a male, it is sold and the money shared between owner and recipient. Females are shared between owner and recipient: the first-born goes to the owner, the next to the recipient, and so on. The mother goat belongs to the original owner.

Both owner and recipient are equally responsible when the animal falls sick. The recipient is responsible for day-to-day feeding and grazing of the goats.

Based on ANTHRA and Girijana Deepika (2003)

Socio-religious practices

Many socio-religious practices also influence the gene-pool.

- **Devoting male animals to the memory of an ancestor** In Rajasthan, the Raika used to devote a male camel to a god in memory of a highly esteemed person at their death. The camel, called *suraj-ka-sant*, was set free and acted as a stud animal. Since it belonged to the god, it was protected by the whole community. In southern India, the custom of dedicating a "Brahmini bull" contributed to the creation of the famous Ongole breed (see Box 9).
- **Devoting animals to gods** Dedicating animals to gods is also quite widespread. This means that they become divine property and cannot be sold or killed, but have to stay in the herd. Often this protection also extends to their offspring. The Raika declare animals, including camels, goats and sheep, that are born on certain days of the moon cycle as belonging to Shiva. These animals are known as *amr*.

Box 9 The "Brahmini bull"

The Ongole is a famous draft and milk breed of cattle that received its name from its breeding area, the Ongole Taluka in Andhra Pradesh. It is also known as Nellore cattle. This breed developed through the practice of the "Brahmini bull": dedicating a good stud bull to the local deity when a well-to-do man died. A special committee searched far and wide for a superior bull, which became the property of the community.

Source: Nath (1992)

Animal identification

To make breeding decisions and to avoid inbreeding, livestock keepers must know each individual animal in their herd and its relationship with other members of the herd. Traditional livestock keepers usually do know each of their animals, even if the herd is quite large and although all animals look very similar to the outsider. Most animals are given individual names. How do people manage to distinguish between all the animals or, even more impressively, notice immediately if one is missing?

The anthropologist John Galaty studied the "cognitive processes" the Maasai in East Africa use to describe and distinguish their many cattle. They look at the "status" of the animal – its sex, age (newborn, weaned, adult) and reproductive status (pregnant, lactating, castrated, etc.). The animals are classified by their colour and pattern, the shape of their horns, and by other criteria, such as being blind, lame, or having only one ear (Galaty, 1989).

In addition, the Maasai think of their herd as structured into "houses", or female lineages. All descendants of a single cow form a "house", and they are all called by the same name. Raika pastoralists in India use the same system for naming their camels, and on this basis are also able to distinguish individual sheep from one another.

Pedigree keeping

Pedigree keeping is often associated with herd books, so is regarded as a Western invention. However, the tradition really developed in Arabian culture. The Bedouin, famous for their horse breeding skills, were very particular about pure-breeding. They had to know the pedigree of a horse for 10 generations in order to regard it as "pure".

Local terminology and ethnotaxonomy

Many indigenous breeders have developed a large vocabulary to describe the various types and colours of animals, and to classify their products. The number of terms used is a useful indicator of the depth of indigenous knowledge.

Breeding objective

People shape a breed so that it corresponds to their livelihood needs. The **breeding objective** can be defined as the traits that are necessary for a breed to fulfil its role in the overall production system. In traditional breeds, the breeding objective is often multifaceted. It may, for instance, consist of reasonable milk yields combined with ability to survive in an unfavourable environment. For a sheep breed kept in a pastoralist system, it could be meat and wool yields in tandem with ability to migrate. Good mothering instincts may also be a breeding objective in extensively raised cattle. Need for social currency (acting as dowry or bride price) may be another breeding objective.

Breeding goal

The **breeding goal** is defined more narrowly. It also includes the personal preferences of the owner, which do not necessarily relate to the animal's functionality. For instance, breeders often like certain colours and patterns, or shapes of ears, horns and tails.

The breeding objective refers to rational, production and fitness-related criteria, while the breeding goal pertains to individual owners aesthetic and personal preferences. Both the breeding objective and the goal are reflected in breeding decisions and selection criteria.

Breeding and selection criteria

Herd book breeds have a clearly defined breeding goal, and registered animals must fulfil specific criteria. In traditional societies, breeding goals are not that narrow, and diversity is often striven for. Kenyan camel pastoralists try to build a herd with different types of animals, which helps them prepare for all eventualities. They do not have the concept of an "ideal animal" (Adams and Kaufmann, 2003). A similar situation prevails with the Raika and their sheep. They keep a mix of animals with a range of production potential and ability to resist drought, so that they can capitalize in good years, but also survive bad years (LPPS, 2002).

Nevertheless, indigenous breeders usually have a list of criteria they use to select animals for breeding. The Raika even have a catalogue of nine criteria

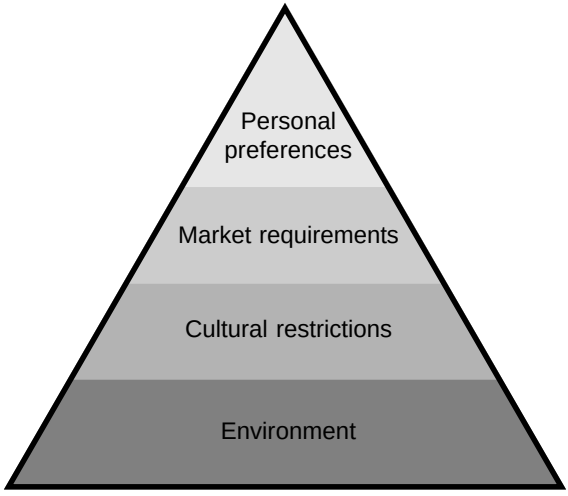


Figure 4 Influences on breeding decisions

(*nauguna*) they use to choose rams – although this concept is becoming forgotten (LPPS, 2003). Criteria used in breeding decisions can be wide-ranging. They include:

- **Ability to put on fat and strength in the summer and autumn** Mongolian herders usually retain for breeding those animals which are able to build up fat resources when pasture is abundant in summer and autumn. They reject animals that get thin during winter and spring (Purev, 1990).
- **Fertility** Fertility is a major criterion for selection among Mongolian herders. Females that do not become pregnant when they are first mated, or dams that stay barren for two years, are eliminated (Purev, 1990).
- **Mothering qualities** The Raika consider mothering qualities as very important in sheep (Geerlings, 2001; LPPS, 2003)
- **Love of the owner and docility** For many breeders, it is important that they feel the animal likes them and responds to its name. This can be a selection criterion in both male and female animals. (Geerlings, 2001; LPPS, 2003)
- **Growth.** Young animals must grow well to be selected for breeding (Purvev, 1991).
- **Appearance.** In Mongolian animal husbandry, the animal's general appearance is important. Horses can be selected for speed based on their appearance, without actual racing trials being necessary (Purev, 1990).

Box 10 Selection for colour diversity

The Bodi of southwest Ethiopia are pastoralists who subsisting on cattle, sheep, and sorghum. Cattle are important for their rituals, and specific ceremonies require animals with particular coat colours and patterns. The Bodi therefore select their cattle to generate a wide spectrum of colours. They have detailed knowledge about the pedigrees of their animals and how the different colour patterns are inherited. They even have a concept of dominant and recessive gene action.

Source: Slaybaugh-Mitchell (1995), quoting Fukui (1988)

Breeding management

Breeding management is the practices and institutions pastoralists or farmers use to implement their breeding decisions. It includes ways to control mating, such as running a bull with the herd during the breeding season or throughout the year, castrating male animals not desired for breeding, deciding how many males are needed to cover all females, and keeping a community-owned bull.

Controlling mating Here are some ways livestock holders control (or do not control) mating.

- A community-owned bull to which cows are brought when they are in heat.
- Rams are kept with the flock, but are prevented from breeding during part of the year (perhaps by an apron tied in front of the genitals). They are allowed to mate only during a few months, so the lambs are born when there is enough fodder available.
- Bulls may be kept with the herd during the breeding season only, or throughout the year.
- Toda buffalo breeders do not actively manage breeding. Male buffaloes are not tamed, but live wild. They mate with female buffaloes without human control.

Castration Castration is widely practised among indigenous people, independently of veterinarians and governments. Castration restricts reproduction to those male animals that have been selected for breeding. It is an important way to manage the gene pool and improve breeds. Some cultures, however, do not allow animals to be castrated.

In the Marwar region of Rajasthan, communities mandated castration of all male animals not meant for breeding. Male calves of the famous Nagori breed were castrated at about 6 months, and only one bull was kept for 80 cows (Joshi and Phillips, 1982). A particular caste, the Satyas, specialized in castrations (Alstrom, 1999).

The Syrian Bedouin castrate only those lambs that have been selected as a bellwether (an animal chosen to lead the flock, with a bell tied on its neck).

They do this either by biting through the spermatic cord or tying a string around the upper scrotum (Epstein, 1985).

There are some cases of negative selection by castration. From Thailand it is reported that superior buffalo males are castrated so they can be used for draft (Chantaraprateep et al., 1986).

Crossbreeding

Traditional societies crossbreed animals to achieve their breeding objectives. Animals may be bred with other breeds, with wild relatives, or with different species.

Backcrossing with wild relatives To upgrade their animals' vitality and strength, a few owners intentionally backcross their domesticated animals with wild relatives. Obviously this is possible only if wild populations still exist (see Box 11). In Asia, there are still wild yaks, Bactrian camels, banteng, gaur and pigs. For the mithun (or mithan) in northeast India, Popenoe at al. (1983) report "Naga owners encourage the interbreeding with gaur, regarding it as an improvement to the race. They arrange this by placing salt licks in the forest. After gaur bulls have formed a habit of coming to the licks, mithan cows are left there and in due course mating takes place".

Crossbreeding with other species There are many instances of crossbreeding livestock with wild or domestic animals of other species, in order to capitalize on hybrid vigour or to improve vitality.

Box 11 Wild ancestors of domestic animals in Asia

Yak About 15,000 wild yaks – only in remote parts of Tibetan plateau in China (Miller 1996, in Miller et al.).

Camel The wild dromedary (with one hump) has been extinct for about 2000 years. There are no text sources referring to wild dromedaries in Arabia.

Bactrian camel 800–1200 animals in China and Mongolia (Lop-Nur) (Hare, 1998).

- Yakows are crosses between yaks and humped cows that are produced and traded by the Sherpas throughout northeastern Nepal (Popenoe et al., 1983). Female offspring are usually fertile, while male crosses are sterile.
- On the Tibetan plateau, yaks are crossed with taurine cattle. People in some areas favour mating yak bulls with cows, while in other areas the reverse is done. But even in the same village, there can be variation. Different families choose different strategies depending on their wealth and the location of grazing grounds (Popenoe et al., 1983; Wu Ning, 1998).
- In Bhutan, especially in the eastern region, breeders cross mithun bulls with Siri cows. The offspring produce higher milk yields for making cheese and butter.
- In Java, "degenerate domestic cows are sometimes driven into the forest to couple with wild banteng, for the sake of improving that breed." (Popenoe et al., 1983, quoting Sir Stamford Raffles, founder of Singapore).
- In the Rann of Kutch (Gujarat, India) people often have their female donkeys intentionally covered by wild half-ass stallions.

4 The LIFE approach to documenting livestock breeds

Breed descriptions have conventionally focused on phenotypic characteristics and emphasized quantitative data, including body and performance measurements, as well as population figures. See for instance the information on the Nagori cattle from Rajasthan as it is represented in the FAO's Global Database, based on the information provided by the Indian authorities (Table 5).

These data have the weakness that they neither reflect the real situation at the farmer level, nor the contribution the breed makes to livelihoods. Cash products are often of secondary importance, especially in marginal and remote areas. Traditional breeds generate an array of benefits that are more difficult to grasp, and to quantify, than outputs of meat, milk, eggs or wool. These include their contribution to social cohesion and identity, their fulfilment of ritual and religious needs, their role in nutrient recycling and as providers of energy, and their capacity to act as savings bank and insurance against droughts and other natural calamities. Ability to survive a drought may be much more important to the farmer than milk yield.

The Nagori breed, for example, was selected and managed for quick draft power. This important aspect is not reflected at all in the DAD-IS data.

Conservation approaches should not only view breeds as genetic resources for the future, or for humanity as a whole. They should also involve and benefit, as much as possible, the communities that developed the genetic resources in the first place. Such approaches need an understanding not only of the performance of breeds, but also of their meaning to rural peoples' lives and livelihoods.

Table 5 Description of Nagori cattle in DAD-IS

General information	
Species:	Cattle
Most common name:	Nagori
Taxonomic classifications:	Breed
Current domestication status:	domestic
Country:	India
Main location of breed within country:	Nagaur, central Rajasthan
Main use:	1- work: draught power
Risk status (1977):	not at risk
Population	
Year of data collection:	1977
Total population size:	229000
Population figures based on:	census at species level
Reliability of population data:	Reliable
Total number of breeding females:	103500
Total number of males used for breeding:	500
Population trend:	stable
Percentage of females being bred pure (mated to males of own breed):	70
Number of males in AI service:	50
Additional information on population data:	1977: Ratio of breeding males to breeding females 1:195.
Morphology	
Adult live weight males (average, kg):	362
Adult live weight females (average, kg):	317
Adult wither height males (average, cm):	150
Adult wither height females (average, cm):	124
Colour:	uni colour: grey, white
Specific visible traits:	Zebu
Number of horns (male):	2
Number of horns (female):	2
Horn shape and/or size:	outward, upward and turn in at points

Source: http://dad.fao.org/cgi-dad/$cgi_dad.dll/BreedEdit?1642,-1,s,Simp

Table 5 continued

Origin of breed	
Origin:	Grey-White Shorthorned type
Herdbook/register established:	no
Special qualities of breed	
Other special qualities:	The cows are adapted to the acute water shortage during the summer.
Management conditions	
Mobility:	stationary
Management system:	extensive (non backyard)
Feeding of adults:	grazing
Performance	
Birth weight male (kg):	18
Birth weight female (kg):	16
Age at first parturition/egg (avg, month):	47
Age at first parturition/egg (min, month):	42
Age at first parturition/egg (max, month):	49
Parturition/clutch interval (avg, day):	461
Parturition/clutch interval (min, day):	423
Parturition/clutch interval (max, day):	549
Milk yield per lactation (avg, kg):	603
Milk yield per lactation (min, kg):	479
Milk yield per lactation (max, kg):	905
Lactation length (avg, day):	267
Lactation length (min, day):	237
Lactation length (max, day):	299
Milk fat (avg, %):	5.8
Management conditions under which performance was measured:	Performance recorded under farm conditions.
In-situ conservation and ex-situ conservation	
In situ conservation programme implemented:	no
Cryo-conservation semen:	no
Cryo-conservation embryos:	no
Date of last modification	**01.05.1995**

Box 12 Documentation methods should...

- Be efficient, reliable and practical.
- Serve as a foundation for a community-based project by establishing the livelihood significance of a breed.
- Safeguard the breed against possible **biopiracy**: Currently, traditional breeds are not safeguarded against biopiracy. Genetic material can be extracted from a single animal, inserted into another animal, and the result patented. A **written record** of the community's indigenous knowledge on animal breeding may help to challenge such theft.

The LIFE approach

LIFE stands for "Local Livestock For Empowerment of Rural People). The LIFE approach for documenting breeds is based on the knowledge, concepts and priorities of the communities that raise each breed. This approach understands breeds primarily as a product of social networks that are operating according to certain rules. It is not a fixed method or recipe, but rather a conceptual framework that uses participatory, flexible methods. It can be adapted to situations as required, instead of having to follow a predetermined form, but it is important that it be integrated into any breed survey that is conducted.

The LIFE approach has been developed and tested in India with larger animals, such as cattle, sheep, and goats, and mainly in pastoralist contexts. It has not yet been tested and adapted for other social contexts and with other species, especially poultry and pigs.

For more information, see www.lifeinitiative.net

Figure 5
Logo of the LIFE Initiative

Table 6 Overview of the LIFE approach

1	**Social and cultural context**
	Association with the community
	Breeding institutions
	Local perceptions about the origin of the breed
	Local terminology and ethnotaxonomy
2	**Ecological and production context**
	Breeding area
	Local soil types and classification
	Local farming system
	Seasonal forage calendar, preferred grazing species
3	**Livelihood significance (types of products)**
	Range of products and uses
	Production performance
	Reproductive performance
4	**Management of the gene pool**
	Local preferences (breeding goal)
	Special characteristics
	Breeding mechanisms
	Identification of top breeders
5	**Population**
	Population estimate
	Population trend
6	**Chances for sustainable use and conservation**
	Pressures
	Interest in revival and conservation by the local community
7	**Baseline data to monitor social impact**

1 Social and cultural context

Association with the community

Ask the following questions to find out the social context of a breed, as well as to decide whether the animal population of a given area represents a "breed":

- Is the breed associated with a **particular community**, cultural entity or social stratum? (See Box 13.)
- If the breed is not associated with any particular ethnic group or social entity, what is the underlying **social network**?

A community can be an ethnic group whose members intermarry, a caste, a social stratum, the people who share a certain area, or a group of breeders that has agreed on a common breeding goal.

Since animals also confer identity and status, farm animal species and breeds are often associated with particular social subgroups. For instance in Rajasthan, donkeys are kept only by lower castes (Kumhars), camels and sheep are the domain of the Raika pastoralists, while chicken are kept only by the Adivasi people. Pig-keeping is socially unacceptable for higher castes. Only goats are largely "neutral" animals from the social perspective.

Methods
Informal enquiries, interviews and discussions

Box 13 Definition of "community"

A community is a group of people having a long-standing social organization that binds them together, whether in a defined area or otherwise.

Breeding institutions

The following questions can help you decide whether a population represents a breed:

- Are there any **breeding institutions**, such as a communally kept bull? How are male breeding animals distributed, by whom are they owned?
- Are most animals **born into the herd**, or are livestock keepers **buying new animals**? If the latter is the case, then the research area is not a breeding area and a distinct breed may not be present.
- Are there social regulations about the **exchange of animals**?
- What is the **social meaning** of the animals?
- Is there a **myth of origin** for the breed or species?

If all or most of these answers can be answered with Yes, then it is likely that a distinct breed is present.

Methods
Informal enquiries, interviews and discussions

Local perceptions about the origin of the breed

Ask about **stories and local folklore** about the origin of the breed. Where there has been a long association between the community and its livestock, there will often be a "myth of origin" which tells where the animal came from and how it arrived in the community.

This may not seem scientifically relevant, but it provides important insight into peoples' perceptions and values and their understanding of themselves.

Methods
Informal conversations and unstructured interviews. Look for traditional storytellers and bards; ask community elders.

Local terminology and ethnotaxonomy

Many indigenous breeders have a large **vocabulary** to describe the various types and colours of animals, and to classify their products. The number of terms used is a useful indicator of the depth of indigenous knowledge about the breed. Document these terms and use them. This helps establish rapport with the people, promotes an understanding of their concepts, and facilitates communication.

Methods
Interviews with knowledgeable people; participatory observation, listening

2 Ecological and production context

Defining the breeding area

The **breeding area** is the region in which both female and male animals are kept. This core area can be surrounded by or interspersed with a mixed breeding area, in which either male or female animals are kept.

- If the breed is well known and **in demand**, then people from surrounding areas might purchase male animals from the core breeding area to upgrade their animals.
- If a breed is in **decline** then there may be a shortage or absence of male animals fit for breeding.

Methods
Ask local people to draw a map of the breeding area. Crosscheck this by undertaking a transect across the entire ecological zone associated with the breed. Enquire at regular intervals about the presence of male/female animals of the breed.

Understanding local soil types and classification

Breed distribution is often closely linked to local **soil types** and their mineral content. Some breeds can cope only with sandy soil. Others are adapted

to loamy soil or to rocky terrain. According to the "son of the soil" theory in Rajasthan, India, animals (and humans) are shaped by the soil in the area where they were born and grew up, and this is reflected in their physiques. Local cattle breeds in this area are clearly linked to particular, locally recognized soil types and topographical features. The Nagauri breed is related to *swalak* soil, Nari cattle to the *magra* area, and Modi cattle to sandy soil.

Understanding the local farming system(s)

Local breeds have been shaped by the local **farming system**, and have co-evolved with it. It is important to understand how animals are integrated into the cropping system (in a farming context) or how they utilize local vegetation (in pastoralist systems). Adopting cash crops and high-yielding varieties, with their shorter stalks, has often undermined the fodder base of local breeds and is a major factor in their decline. Consider these aspects:

- Types of **crops** (traditional or high yielding) and cropping patterns
- Use of **external inputs** (fertilizer, pesticides)
- Use of **local inputs** (manure)
- **Size of land holdings**
- Use of **local knowledge and extension services** and others.

Seasonal forage calendar and preferred grazing species

Ask where animals **graze**, at what time of the year, and which fodder or forage species they prefer. The answers will often reveal pressures on a breed due to reduced grazing areas (see Box 14).

3 Livelihood significance

Range of products and uses

Products do not just include the obvious (meat and milk), but can be very diverse. For instance, many animals are used mainly for pulling carts and ploughs. Dung is often very important and can be the prime purpose of keeping certain cattle breeds. Social and ritual roles can be important in some societies.

Production performance

Animal scientists are typically interested in establishing milk yield and weight gains, usually recording these parameters under controlled conditions. More important for the livelihoods of people is **productivity under local conditions** and constraints. Focus on measuring those types of performance that are relevant to the people.

Box 14 Feeding preferences of Dangi cattle (Maharashtra)

Participatory rural appraisal tool used: Matrix ranking and scoring

The Dangi breed likes the following grasses best: *mugar*, *vavshi*, and *bela*. They also eat *ghon*, *kaundal*, *patinga*, *turde* and *karvi* leaves. In areas with irrigated farming, Dangi animals like to eat fodder such as sugarcane, maize, *bajri* (bullrush millet) and lucerne.

Grazing patterns

The Dangi breed prefers to be grazed in the open rather than stall-fed. Earlier, when forests were abundant Dangi owners grazed their animals largely in the open forests near their villages. However, when these forests started disappearing they started taking their animals for grazing to the villages of Igatpuri, Takibangala, Khardikasara and Shahapur.

Source: ANTHRA (2003)

- **Milk yield** Enquire and crosscheck by measuring.
- **Fat percentage** Take milk samples from various animals and herds at various stages in the lactation cycle, and analyse them for the percentage of fat.
- **Lactation length** Enquire and crosscheck by measuring.
- **Weight** Ask about the weight at birth and other critical stages in the animal's life (e.g., first mating, marketing) and crosscheck by measuring.

Reproductive performance

To find out about reproductive performance, collect the following data:

- **Age at first birth**
- **Seasonality** Is breeding limited to certain months of the year, or does it occur throughout the year?
- **Birth interval**
- Symptoms or indicators of **pregnancy**
- **Abortion rate**
- **Offspring survival rate**
- Total number of **calves** per lifetime
- Total **lifespan**.

Methods

These aspects are best established by questioning local experts, with crosschecking through the progeny-history method.
Ask owner about the above, then apply the progeny-history method to at least 35 animals (see Box 15).

4 Management of the gene pool (breeding management)

Local preferences ("breeding goal")

The breed criteria are determined by the overall production system. But people usually also have more narrowly defined, particular ideas on what is a **desirable animal**. They may prefer a certain colour, size, or type of behaviour. These preferences depend on the culture, and may be regarded as a "breeding goal". Certain physical traits may be genetically linked to certain performance characteristics.

Methods

Ask expert breeders to point out their best, their second best…, and their worst animal.

Box 15 Progeny history

Progeny history involves recording the life history of female animals and their offspring. Questions include:

- How old is that camel? (Owners may deliberately give the wrong answer, so look at the teeth to crosscheck.)
- How many times has she given birth?
- What happened to the offspring – still in herd, sold (to whom and at what age), died (why and at what age), slaughtered (when), loaned or gifted to somebody else?

Repeat the exercise with the female offspring of the animal. This way you will establish the female lineages in the herd. It is useful to start out with asking for the oldest animal.

The progeny history method, also called "animal biographies" or "Interviewing cows" provides a basis for calculating fertility, mortality, age at first birth, calving intervals, etc.

Source: Waters-Bayer and Bayer (1994)

Ask them the reasons for their evaluation.
If certain body characteristics are important, it can be useful to take photos of animals and ask a selection of breeders to rank them according to their preference.
Make an effort to understand the local terminology.

Special characteristics

What **distinguishes this particular breed** from others kept in adjoining areas, or from high performance breeds?

Special characteristics can relate to **disease resistance** (or also proneness to certain diseases), **behavioural patterns** (e.g., Nari cows are said to defend their owners), or the processability or taste of their products. The milk of Nari cows is especially sought after to make traditional Indian sweets, while Parmesan cheese originally derived from one particular Italian breed.

Defining key characteristics

There is always some variation between the individual animals that form the breed. If you are doing a population survey, it may be necessary to decide which animals belong to the breed in question, and which do not. For this, decide on certain **key characteristics** – based on the breeders' own concepts.

For the Nari cow, for instance, the key characteristics would probably be the shape of the horns, shape of the face, colour of the eyes, the ridge (*goli*) between the ears, and the colour and the length of the tail.

Breeding mechanisms

Traditional means of genetic manipulation can either be **unconscious** (social mechanisms) or **conscious** (rational strategies).

Mechanisms are usually of a **social** nature. They include:

- **Taboos** on selling female animals to anybody outside the community
- The custom of **lending animals** to poorer relatives
- Devoting certain **male animals** to a god or goddess.

Strategies are practices used to shape a breed intentionally according to peoples' preferences and priorities. Examples include:

- **Selection** (of either or both male and female animals)
- **Offspring testing**
- **Oral record-keeping** of genealogies
- **Castration** of unwanted male animals
- **Avoidance of inbreeding**, by regularly exchanging male animals.

Methods
Group discussions, interviews with local experts, consultation of anthropological studies.

Identification of top breeders

Try to identify and meet with **dedicated breeders** who are known for the high quality of their animals. They will be a source of valuable information and may become key actors in future projects.

5 Population size and trends

Population estimate

After determining the breeding area, establish the **population size** of that species in the region from official records (if such records exist).

Methods
Find out which percentage of animals belongs to the breed by doing a survey in a random sample of villages (10% of the breeding area?).

Conduct a household survey to find out which percentage of animals belongs to the breed (see "Defining key characters" above).
Find out if the breed is concentrated in certain village or pockets by asking key informants.
If the breed is close to extinction, a door-to-door household survey might be necessary to track down purebred animals.

Population trend

You can get a first impression of the general **population trend** by asking older members of the community or other knowledgeable people. For more precise information, conduct household surveys and review official livestock statistics or past census data.

6 Chances for sustainable use and conservation

Pressures

What **pressures** does the breed face that threaten its survival or sustainable use? These may include:

- Loss of **grazing** opportunities
- Changes in **agricultural production systems**
- Loss of **traditional institutions**
- Lack of **health care**
- Lack of **market demand**
- Lack of interest by **young generation**
- Drought, floods or other natural **catastrophes**
- **Conflict** or war.

Table 7 Local perceptions of sheep breeds in the Godwar area of Rajasthan (LPPS 2003)

Local name of breed	Boti	Bhakli	Dumi
Scientific equivalent	Marwari	Sonadi	Patanwadi
Origin	Native to Godwar area (but came from Jaisalmer?)	Obtained from Gayri pastoralists in Mewar (Udaipur area)	From north Gujarat
Disease resistance	Most disease resistant, disease spreads slowly, if infected with foot-and-mouth disease walks on three legs. Low mortality from sheep pox		
Drought resistance	Very drought resistant	Needs good food and water	
Walking ability	Can walk on hilly and stony terrain, as well as on flat land	Not good for migration	Very fast walker on flat terrain
Reproduction	Lambing twice a year	Only 4–5 births in a lifetime	Long reproduction interval: 8–9 months
Longevity	Has long life		
Food requirements	Can withstand lack of food	Selective eater	Eats everything
Wool quality	Wool is soft and thin	Wool is coarse	Wool is long, soft and fine
Milk production	Very low. Raika use goat milk to feed lambs	Good milk	
Meat quality	Is coloured like goat meat		
Growth rate	Very slow	Grows twice as fast as Boti	Grows very fast

Source: LPPS (2003)

Interest in revival and conservation by local community

Are local people **interested** in maintaining the breed for livelihood reasons, identity or culture? What existing local institutions could be mobilized to help maintain the breed? What are the constraints? What types of action do respected local people and other community members suggest?

7 Baseline data to monitor social impact

How many people (families and individuals) are partly or totally **dependent** on the breed – at the beginning of a conservation project and at the end? A community-based project can work only if local people benefit from keeping the breed.

The objective of a community-based project must be to create opportunities to earn money or produce food. To monitor the success or impact of an intervention, you must know how many families or households depend on a breed before the project and after it.

5 Tips for field work and notes on methods

DURING THEIR university training, veterinary and animal scientists are oriented towards conducting "scientific" research. They are trained to collect "scientific data", which usually mean quantitative measurements. As a result, most research on indigenous breeds has consisted largely of establishing quantitative data. Descriptions of indigenous breeds abound, with extensive measurements of body size or parts of the body, and calculations of production outputs (milk yield, fat content, weight gain, wool yield). Usually these data are collected on station (i.e., under controlled conditions) or on a government farm. They therefore have little semblance to the situation as experienced by a farmer.

Documenting indigenous knowledge about animal breeding requires a fundamental change in approach and technique. Its goal is to understand a breed from an insider's perspective – to comprehend what it means to its breeder and owner. The most important skills relate to being able to communicate with local people and to pay them respect.

An attitude of respect and empathy is vital. You must be respectful of local customs and knowledge; you must treat their interview partner or data-provider as an equal, and never talk down to her. If the informants feel that you are taking a sincere interest in them and in their values and welfare, they will open up and talk freely. Once this rapport has been established, then much unexpected information will come out. People may reveal complex knowledge and details that you would never have been able to envision. Never abuse this trust. Developing such a relationship with people takes time, and is a process which will never be exactly predictable.

General principles

- The information gathering should be empowering, not extractive. It must go hand-in-hand with raising the awareness of the local keepers. Before you ask them for information, tell them about the significance of local breeds, how these breeds are being replaced by high performance breeds, and about the need to document this particular breed. At the same time, avoid raising their expectations.
- If other people collect data for you, make sure they too do not have a top-down attitude. Ensure they demonstrate their willingness to learn. They should regard their interviewees as local experts.
- Emphasize the use of participatory methods (group discussions, mapping, ranking etc.).
- Generally speaking, at least 50% of the informants should be female. This can vary depending on whether it is primarily men or women that are involved in making breeding decisions.
- Document breeds using local terms and classification (the "ethnotaxonomy"). Avoid scientific jargon.
- Be flexible, and keep an open mind. No standard method or blueprint is suitable for all species, contexts and situations. The data you need and how to gather them will depend on population size of the breed, the size of the breeding area compared to the size of the survey team, and the amount of time and resources available.
- Get in touch with your **National Coordinator for the Management of Animal Genetic Resources**. See this address for contact information: http://dad.fao.org/cgi-dad/$cgi_dad.dll/nfptable

Getting ready: Preparing for field research

Collect background information

On the area If you are going to undertake a breed survey in a new area, try to collect as much background information as possible beforehand. Find

out the agroclimatic zones of the area, including rainfall patterns and soil types, the main crops, and the types of farmers and social groups represented. Sources of data include national census reports, district gazettes, anthropological studies, and whatever grey literature is available, such as project reports and feasibility studies. Good maps, either topographical or ecological, are essential.

On the breed If you are surveying or documenting a known breed, thoroughly review any secondary data available.

- Is the breed officially recognized, and has it been documented previously? If yes, when and by whom?
- What efforts exist to save or maintain it, e.g., government farms, projects or breeders' organizations?
- What publications exist: the official and grey literature, FAO's DAD-IS database?
- Check historical records to discover the origin of a breed and its earlier significance.

Enter the community

Communities are not always well defined, and they may overlap. A village community may consist of many different ethnic or tribal subgroups which are part of horizontally linked larger social groups (see Box 16).

Obtain prior informed consent

You must get the community's "prior informed consent". This means you must inform the communities about the nature of the research and its possible consequences. This is often easier said than done, because there maybe competing community leaders and the community may be divided, or may not be very interested and fail to understand the implications of research. In this case just be patient and just keep explaining what you are doing.

Box 16 Entering the community

- Obtain the permission of the community and relevant officials to conduct the project. For this you need to contact the local government and community leaders. If there is already an NGO working with the community, it will be useful to obtain its cooperation.
- Explain the objectives to the community so as not to raise wrong expectations.
- Let the people know you have come to learn from them.
- Discuss with the community how this study will benefit them.
- Inform participating community members how much time the study will take.
- Discover what key local terms mean.
- Show an interest in learning the local language, and speak it. This facilitates the building of rapport.

Source: Mathias (1995)

Work with an interpreter and facilitator

Before each interview or when you collect measurements, introduce yourself, say where you are from, and describe the background of the project and its purpose. Be aware that people often are not willing to open up or provide correct information on a first encounter, but may take a very long time to establish enough confidence to speak what is on their mind. They may just tell you what they think you want to hear in order to get rid of you quickly.

You can speed up your entry or acceptance into a community with the help of a local facilitator or translator. Try to find a member of the community who is knowledgeable about livestock keeping to help you. This person will be able to identify important community leaders. Their support and backing can greatly ease the project. NGOs that are established in the area and have the trust of the community can play an important role for researchers and you should explore their interest in cooperation. They may in turn benefit from your scientific expertise.

Rewards or payment for informants

Informants are providing their time and knowledge. Especially active animal breeders often have very little spare time, since they have to spend so much time grazing their animals. It is therefore entirely justified to compensate them for their inputs – though not necessarily in cash. If you interview people on your "territory" (in your house or office), offer some tea or the locally appropriate beverage. You might express your gratitude by giving interviewees photographs. Veterinary drugs are very much appreciated.

Share and check results with community

When you have finished your research, you should share and check its results with interested members of the community. This can be done by means of a small interactive workshop. You should also try to make arrangements for depositing a copy of your field notes with the community or a local NGO. It is good practice to send copies of all resulting publications to a designated community institution (if it exists).

Publication

Scientists usually need to publish the results of their research. But if involved in biodiversity research, they also need to consider the implications of publishing data, where the information will end up, and what reactions it will cause among third parties. At the very least, the role of the community must be acknowledged in the publication; in certain cases the possibility of granting co-authorship should be considered.

Biodiversity registers

Establishment of a community biodiversity register has been promoted as a means of protecting the interests of communities with biodiversity related knowledge. Examples in India include the Honeybee-Network and the People's Biodiversity Registers. They are seen as a way of protecting claim rights over traditional knowledge and preventing its appropriation (Laird, 2002).

Investigate whether the community you are working with has interest in setting up such a register.

Follow-up activities

If your research reveals the need for follow-up activities, for example the desirability of a conservation project, then this should also be discussed with the community, without however raising their hopes. Mobilising funds for a project will be time-consuming and may be very difficult.

6 Safeguarding indigenous knowledge

DOCUMENTING INDIGENOUS knowledge is controversial. It may lead to this knowledge being misappropriated and exploited commercially by outsiders. Some believe that recording indigenous knowledge and then disseminating it can pave the way for biopiracy. Others argue that by providing a written record of indigenous knowledge, biopiracy can be prevented and attempts at patenting pre-empted. Some NGOs, especially in India, promote community registries or "people's biodiversity" registers, where documents about people's knowledge of biodiversity and their conservation practices are deposited. Within the context of current intellectual property rights regimes, such registries establish indigenous knowledge as "prior art", and the community as the primary rights holder. So far such registries have not been extended to animal genetic resources.

International legal frameworks

At the international level, two major agreements govern access and rights over genetic resources. These are the United Nations Convention on Biological Diversity and the TRIPs Agreement of the World Trade Organization. However, they are to some extent in conflict with each other.

Convention on Biological Diversity

The United Nations Convention on Biological Diversity was negotiated at the UN Conference on Environment and Development in Rio de Janeiro in

June 1992. It came into force in December 1993. It is a legally binding framework that confirms the sovereignty of states over their genetic resources and stresses the importance of *in situ* conservation. It stipulates that access to resources is to be granted on mutually agreed terms, and subject to prior informed consent of the contracting party and fair and equitable sharing of the research and development results and commercial benefits. The Convention recognizes the central role of indigenous and local communities in biodiversity conservation through their traditional and sustainable practices and knowledge systems. In Article 8j, the Convention commits its contracting parties to:

> *"subject to national legislation, 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 and promote their wider application with the approval and involvement of the holders of such knowledge, innovation and practices and encourage the equitable sharing of benefits arising from the utilization of such knowledge, innovations and practices."*

Website: www.biodiv.org

TRIPs Agreement

The Agreement on Trade Related Aspects of Intellectual Property Rights of the World Trade Organization is usually known as the "TRIPs Agreement". It obliges all member states to develop minimum standards for the protection of intellectual property rights and a mechanism for their enforcement – although Article 27b provides the option to exclude plants and animals from patentability.

Developing countries had until 2000 to pass laws in this direction, and least-developed countries until 2006. Contrary to the Convention on Biodiversity, TRIPs does not require prior informed consent or benefit-sharing, nor protection of indigenous and local knowledge.

Website: www.wto.org/english/tratop_e/trips_e/trips_e.htm

Bonn Guidelines on Access and Benefit Sharing

The "Bonn Guidelines" of the Convention on Biological Diversity are a voluntary agreement on the conduct and practices of access and benefit-sharing. They pertain to genetic resources and traditional knowledge in general, and are therefore also applicable to animal genetic resources. They flesh out the principle of "prior informed consent", which is of importance for livestock breeding communities whose animal genetic resources are of potential scientific and commercial interest.

The Bonn Guidelines make the following recommendations:

- Prior informed consent for taking samples from animal genetic resources should be given by the "competent national authority". This authority in turn should make sure that relevant lower levels of government and the livestock breeding community have the right to agree to, or refuse, the decision. To ensure local communities are involved, they should either be members in the competent authority or there must be a procedural rule for their consultation on a case-by-case basis.
- No access should be possible to animal genetic resources without arrangements for sharing of benefits from the use of these resources.
- For intellectual property rights involving animal genetic resources to be granted, the origin of the genetic resources must be disclosed. It must be certified that existing benefit-sharing arrangements are being honoured.

Websites: www.biodiv.org/decisions/default.aspx?m=cop-06&d=24
www.biodiv.org/programmes/socio-eco/benefit/bonn.asp

World Intellectual Property Organization

WIPO's mandate is to ensure the worldwide protection of the rights of creators and owners of intellectual property, and to ensure their recognition and reward for their ingenuity. WIPO has set up an Intergovernmental Committee on Intellectual Property and Genetic Resources, Traditional Knowledge and Folklore. This deals with intellectual property issues relating to

genetic resources and benefit-sharing, protection of traditional knowledge with or without respect to genetic resources, and protection of expressions of folklore. WIPO is currently working on the worldwide standardization of patent law. WIPO has a working group on genetic resources and is looking into ways of extending intellectual property rights to traditional knowledge. However, this is also a hugely contentious issue.

Website: www.wipo.int

The Karen Commitment

In October 2003, representatives of indigenous livestock breeding communities met in Kenya to discuss issues surrounding animal genetic resources, genetic engineering and intellectual property rights. They issued a statement, known as the "Karen Commitment". This calls for an internationally binding agreement recognizing the historical contribution of pastoralists and other communities to the development of domestic animal diversity. It also calls for the right to have breeds recognized as products of communities and indigenous knowledge, and therefore to remain in the public domain.

NGOs are pressing for integration of indigenous knowledge into DAD-IS, FAO's Domestic Animal Diversity Information System, and for the creation of a community-registry of livestock breeds. They regard the process of data collection as an important tool for empowerment and a capacity-building exercise for traditional livestock breeding communities, many of whom have always been very marginalized.

Websites: www.pastoralpeoples.org/karen.htm, www.ukabc.org/karen.htm

Other resources on intellectual property law

Public Interest Intellectual Property Advocates (PIIPA). This is a *pro-bono* referral service for developing country clients, supported by Venable Attorneys at law, New York.

Contact Michael Gollin, magollin@venable.com, www.venable.com/attorney.cfm?attorney_id=130

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Indigenous breeds of livestock are uniquely adapted to the conditions where they developed. They thrive in conditions where modern "high-performance" breeds quickly succumb to drought, hunger and disease. They are vital for the livelihoods of millions of farmers and livestock keepers throughout the developing world. They are also an undervalued resource for the outside world, since they represent a wide range of genetic diversity on which animal breeders can draw.

This book describes the threats to these breeds, and describes how to document them as a first step in conserving them in collaboration with the communities where they evolved.

LPPS (or Lokhit Pashu-Palak Sansthan) is a non-profit organization based in Rajasthan, India, and working closely with Raika pastoralists. Its goals include people-centred livestock development and long-term sustainable natural resource management.

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