

Part 1: Putting the conservation and sustainable use of farm animal breeds on the international development agenda

Why this dossier?

Farm animal diversity is vanishing at an alarming rate. As industrial livestock production expands, it is relying on fewer and fewer breeds. Already, 15% of the world's livestock and poultry breeds are extinct, and another 35% are endangered. We are coming to depend on a livestock population with a dangerously narrow genetic base: because of their genetic uniformity, huge numbers of animals could be wiped out by a new disease.

Locally adapted animal breeds carry genetic material of immense value. These breeds must be conserved. The only realistic way to do so is by maintaining the production systems they are part of – by supporting the small farmers and pastoralists who manage these animals.

This dossier is intended for decision-makers and field staff from governmental and non-governmental institutions and organisations working on agriculture, livestock production, natural resources management, food security and other aspects of rural development in the South. The goal is to stimulate policy makers, project staff and members of grassroots organisations to support in their policies and actions the sustainable use and community-based management of farm animal breeds.

The twentieth century has witnessed spectacular advances in many areas, including agriculture and medicine. The consequences have been both positive and negative: extended human life spans, increased food production and other achievements stand against a staggering growth in population, widespread environmental degradation and the fact that about 826 million people, or about 13% of the world's population, still go hungry.¹

The development of high-performing livestock and poultry breeds has no doubt greatly contributed to the increase of food production, especially in temperate climates. But their indiscriminate export into tropical countries has often ended in failure, as the animals cannot stand the heat, need optimal inputs and readily succumb to disease. To overcome these weaknesses, the ongoing approach is the widespread promotion of crossbreeding high-yielding breeds with hardy and well-adapted local animals. The price of this and other developments is high: local breeds are disappearing at a rate of two breeds a week.² This has far-reaching consequences, not only for our generation but also for the generations to come.

Preventing further losses and conserving local breeds is not a romantic or nostalgic adventure; it is a must. The situation is urgent: we risk destroying valuable resources; reducing the world's ability to react to changing nutritional requirements, unforeseen diseases, and natural disasters; and endangering the food security not only of the poor but of us all. The loss of local breeds means a reduction of the part of the world that can be sustainably utilised by humankind.

To be effective, measures to maintain local breeds have to be as broad and diverse as possible and involve stakeholders at all levels: farmers and herders, staff of non-government organizations (NGOs) and extension services, government organizations (GOs), donors and policy makers from all over the world. So far activities have

consisted mainly of the acquisition and distribution of information, with little involvement of the farming and herding communities that have developed and stewarded the local breeds. Only recently this strategy – the involvement of communities – has been recognized as an important tool for the effective management of animal genetic resources. It involves herders and farmers as equal partners and enables them to optimise their livestock systems, continue the use their breeds and market their products. It also implies a paradigm shift from the emphasis on high-input intensive agriculture to sustainable livestock production.

The dossier is divided in four sections:

- **Part 1** summarises the most important facts and issues around local breeds, their loss and conservation measures.
- **Part 2** is composed of five case studies that illustrate how to combine sustainable use of local breeds with achieving food security and enhanced livelihoods for rural people.
- **Part 3** contains a set of selected papers that provide details and background information on the facts and issues highlighted in Part 1.
- **Part 4** consists of a list of organizations involved in the conservation of local breeds; a small glossary of terms such as '*species*', '*breed*' and '*in-situ*' and '*ex-situ conservation*'; and a list of abbreviations.

Biological and cultural diversity – treasures at stake

Since the beginning of life on earth an incredibly rich diversity has evolved. So far about 1.7 million plant and animal species have been identified. But this is only a small part of the actual biodiversity: there may be as many as 13 million species: estimates vary between 3 and 100 million.³

About 10,000 years ago people began to domesticate and use animals from about 40 species. Through breeding, selection and environmental influences, these species diversified into more than 6000 livestock and poultry breeds, each adapted to a particular production environment. About 90% of the animal products and services are contributed by only 14 species.^{4,5}

Throughout history, there has always been some loss of diversity: some species and breeds disappeared, while new ones evolved. During the 20th century, however, the loss of diversity has dramatically increased. It is estimated that per year about 34,000 plant and 5,200 animal species disappear, a rate 50-100 times higher than the losses expected through natural processes.⁶

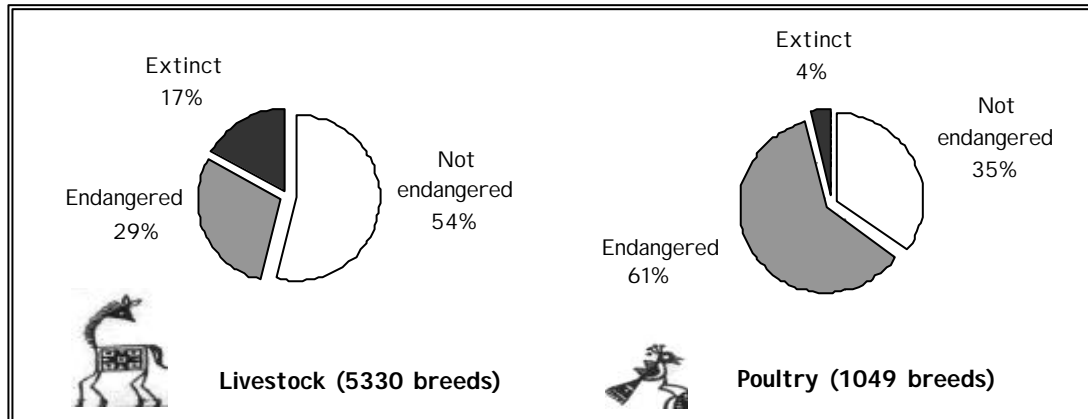
With regard to farm animals, about 1,000 of the 6,400 recognised breeds became extinct during the last 100 years, and 300 of these alone during the last 15 years.⁷ The Food and Agriculture Organization warns that another 2,000 breeds are at stake if no countermeasures for their conservation are taken (Figure 1).⁸

The alarming rate of diversity loss is linked to the loss of cultural and linguistic diversity: human cultures and languages are also vanishing rapidly. According to the World Wide Fund For Nature (WWF)⁹, about 600 languages have disappeared during the last century and half of the remaining approximately 6,000 languages are highly threatened. If a culture disappears, it irretrievably takes along a wealth of knowledge and the domestic animals and plants that had been the basis of its food production system.

The Convention on Biodiversity

In 1987, the Brundtland report *Our Common Future* drew attention to the loss of biodiversity of plants and animals. The growing evidence of the accelerating depletion of natural resources and other environmental and social problems has resulted in a global consensus on the need to focus attention on the long-term sustainability of development. This has been accompanied by the interest in related issues, such as the conservation of biological diversity and local knowledge systems.

Figure 1. Domestic animal diversity at stake (modified after GAA 2001¹⁰, Source: Scherf 2000¹¹)



In 1992, the United Nations Conference on Environment and Development negotiated the Convention on Biological Diversity (CBD), an intergovernmental convention that came into force in 1993. It is now ratified by 180 countries¹², which commit themselves to:

- the conservation of biological biodiversity,
- the sustainable use of its components and
- the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.¹³

The conservation agenda of the CBD originally focused on wild ecosystems but later the decision II/15 of the Conference of Parties (COP) to the CBD recognised the specific nature of agricultural biodiversity, which refers to all components of biodiversity found in crops and animals used for food and agriculture. This resulted in a *Programme of Work on Agricultural Biological Diversity* established in 1996.¹⁴

However, public awareness has largely remained restricted to wildlife and crop diversity. Under the leadership of FAO the International Treaty on Plant Genetic Resources for Food and Agriculture – a voluntary agreement drafted in 1983 – has been negotiated for the past seven years and was adopted in November 2001. It is now governing the use of plant genetic resources for food and agriculture in a legally binding form.¹⁵ A similar agreement for food animals still seems to be far away (see below).

☞ The paper *Implementing the Convention on Biodiversity with respect to domestic animal diversity* in Part 3 contains additional information on the CBD and its implications for animal breed diversity.

‘Species’, ‘breed’ and other definitions

We mentioned above that presently about 6,400 animal breeds of 40 species are recorded in FAO's database.

‘Species’ refers to a group of animals whose members freely mate with each other and produce fertile offspring. For example, horses and donkeys are different species because, although they may be able to mate, their offspring (mules) are not fertile.

The term ‘breed’ is more difficult to define, but it is most often understood as a group of animals ‘with definable and identifiable external characteristics that distinguish it from other groups within the same species’.¹⁶ Well-known examples of livestock breeds are the Holstein-Friesian cow and the Merino sheep. But this definition is more suitable for developed countries, where the physical characteristics of breeds are defined by breeding societies.

In developing countries, breeds are commonly the products of a specific society or culture. The term ‘local’ is used in this dossier to contrast the breeds that are the result of centuries of selection and use by ethnic and social groups living in confined habitats, from ‘international’ high-performing breeds produced through very intensive selection for one or few production traits and the use of biotechnologies in a relatively short period.

Other terms frequently encountered in connection with local animal breeds and their conservation are ‘domestic animal diversity’ (DAD) and ‘animal genetic resources’ (AnGR). The latter term makes reference to the fact that each animal carries a specific set of ‘genes’ – DNA codes that determine how an animal looks and develops. An animal's genes are a combination of the genes from both parents. Both terms are collective names for the whole spectrum of local breeds and the genetic information they harbour.

Factors shaping diversity

A wide diversity of domestic animal breeds is found in Asia, Latin America and Africa. Cultural needs and preferences, people's knowledge and ecological conditions have all been factors in the manipulation of the animals' traits and characteristics.

Whereas adaptation to natural and environmental conditions has a low priority in intensive systems, it is essential for the extensive systems in which pastoral people and livestock raisers in developing countries keep their animals. In harsh environments, animals can survive only if they can cope with fodder shortages, climatic stress and the prevalent diseases.

The combined influence of human selection and ecological factors has, for example, led to the development of the Yakut horses in Siberia. These horses are able to graze on pastures covered with 50 cm of snow, and they survive temperatures of -70°C .¹⁷ The Raika in Rajasthan have selected and bred sheep highly adapted to the extreme temperatures of the region. They commonly keep a mix of breeds able to cope with different challenges, so as to be optimally prepared for all eventualities.¹⁸

Another outcome of century-long human and natural selection, breeding and management is the enhanced ability of many indigenous breeds to cope with diseases. Southern Africans have developed the Sanga cattle, which are resistant to East Coast Fever and to the ticks that spread this disease.¹⁹ N'Dama and at least 15 other cattle breeds in Africa are trypanotolerant, meaning they are less susceptible than other animals to trypanosomiasis, a disease of major economic importance.²⁰

☞ The section *Intellectual property rights and benefit sharing* in Part 1 has further examples of disease resistant breeds.

☞ The papers *Africans manage livestock diversity* and *African cattle genetic resources: Their unique attributes and conservation through utilization for milk production* in Part 3 provide examples on the development and management of animal breeds in Africa.

Importance of local breeds

Maintaining a wide spectrum of local animal breeds is crucial to food security, poverty alleviation and sustainable development.²¹ More than half of the world's people depend at least in part on livestock for their livelihood, and 12% are entirely dependent on livestock production.

Local breeds play an important role for the livelihoods of herders and smallholders and in the utilization of marginal ecological areas. They provide a wide variety of products and yield important non-monetary benefits:

- Food, fibre, fertilise and fuel.
- Cash income.
- Draught power and transportation.
- Savings account.
- Buffer against crop failure and other risks.
- Employment.
- A way to access and use common property.
- Support for the social network and culture.

Keeping multipurpose livestock is part of a survival strategy which people have developed to cope with extreme climatic and environmental conditions. In some areas, it is only livestock that enable people to exist, since the potential for growing crops is limited or non-existent.

Although in extensive production systems hardiness and adaptability to extreme conditions have priority over production traits, local breeds can have a remarkably high production potential (Box 1). Dahlin, who intensively studied Sahiwal cattle in South Asia, points out that there is a 'tremendous genetic variation among individuals that could be utilised for further improvement of the breed'.²²

Box 1.

The production of local breeds can be optimised through selection and breeding

One of the survival strategies of herders and small farmers is risk minimisation rather than product maximisation. As a result of this strategy, and because of insufficient feed, local breeds often produce little compared to improved breeds. However, there is opportunity for breed improvement through enhanced selection for production traits. Nicobari fowl in India, for example, can lay up to 162 eggs under free-range conditions.²³ Jamunapari goats and Sahiwal cattle are high potential dairy breeds in India and Pakistan.^{24,25} In Ethiopia, a study compared the performance of crossbred (Anglo-Nubian x Somali) and local goats. The improved goats grew faster but were more susceptible to weight loss during the dry season. Improved goats gave more milk per animal, but this was not the case, when calculated in relationship to the animal's bodyweight.²⁶

Local breeds also score well if the benefits of the whole production system are considered, rather than the productivity of the individual animal. In the 1970s, a

comparison of traditionally raised versus ranched cattle in Botswana showed that the former multi-purpose herds were 95% more productive than the single-purpose beef cattle on ranches.²⁷ Also the Ethiopian goat study mentioned in Box 1 showed that crossbreed goats did not generate higher benefits than the local breed. But such comprehensive studies are still rare – they are difficult to implement, and the recognition that such studies are needed is growing only slowly.

Why are breeds disappearing at such rate?

Reasons for the high extinction rate are manifold and interrelated. They include: the intensification and industrialization of agriculture and animal production; the large-scale promotion of uniform high-yielding breeds and crossbreeding; policies and developments that disadvantage ethnic minorities; conflicts and wars; natural disasters; and inappropriate development aid focussing on short-term benefits. The following section elaborates on some of these issues.

High-performing uniformity replaces multipurpose diversity

Whereas animal production systems in developing countries often keep a variety of breeds and species of livestock and poultry, animal production systems in North America and Europe commonly rely on very few breeds or species. The diversity is even further reduced, when comparing animals of the same breed. They are quite uniform as very few intensively selected male animals are used to produce large populations for commercial purposes. This has led to the expansion of, for example, Holstein cattle, a breed dominating milk production: It accounts for 60% of European and 90% of North American dairy cattle. By 2015, it is projected that the genetic diversity within this breed will correspond to that of only 66 animals.²⁸

Intensive sire selection is leading to rapid inbreeding rates and raises questions about the long-term sustainability of high-input, high-output production systems, which rely on very narrow gene pools. If a disease that the breed is susceptible to breaks out, the economic damage can be enormous as all animals have the same ability (or disability) to cope with the disease. The situation is different for herds consisting of less uniform animals because some may be able to resist the disease and thus slow further spread.

Breed imports and crossbreeding reduce local stock

For the past decades, the import of exotic breeds and more recently crossbreeding have been widely promoted in developing countries. But many attempts have proven unsuccessful.²⁹ Although crossbreeding with exotic breeds has advantages under certain circumstances, it can also have negative consequences:

- Large-scale crossbreeding without appropriate measures to conserve sufficient numbers of purebred animals threatens the survival of the local breed.
- Crossbreeds may not be as well adapted to local climatic and management conditions as the local pure breed. Even if a crossbreed's production potential is higher than that of the local breed, its performance might be poorer under the given conditions. It may need more and better fodder and improved management, as it may be less resistant to the prevalent diseases.
- As noted above, livestock in developing countries is often kept for multiple purposes. Changing an animal's characteristics by improving one trait (e.g. milk production) can negatively affect other traits (e.g., an animal's work ability).
- The introduction of exotic (cross)breeds can implicate a change in the gender-labour division. In many cases, it will mean a bigger workload for women. However, it can also deprive women of their income. For example, replacement

of local cows with high-performing dairy crossbred animals means commercialisation and therefore to more prominent roles for men.

Policies disadvantage pastoralists and low-input production systems

Many distinct livestock breeds have been developed and sustained by pastoralists. But few governments are supportive of this population group. The collapse of pastoralism due to unsympathetic development policies leads to the disappearance of local livestock breeds. This in turn triggers a cascade of socio-economic consequences such as hunger and impoverishment among the pastoralists, loss of their cultural identity and emigration to the cities.

Policies and subsidies commonly favour intensive large-scale producers, neglecting the fact that pastoralists and smallholders can make a substantial contribution to the economy. In India, for example, livestock contributes about 30% of the total farm output, and 80% of livestock products come from small farmers with 3–5 animals and less than 2 hectares of land.³⁰ Nevertheless, official development strategies such as that in the Indian State of Andhra Pradesh favour large-scale commercial dairy and poultry complexes and promote crossbreeding.³¹

☞ The paper *Food insecurity and industrial animal farming* in Part 3 discusses the intensification and industrialisation of agriculture and animal production, the large-scale promotion of uniform high-yielding breeds, crossbreeding, policies and developments that threaten animal domestic diversity.

The conservation of local breeds

The debate on the conservation of agricultural biodiversity concentrates on two approaches: *ex-situ* and *in-situ* conservation. '*Ex situ*' refers to conservation approaches outside of a breed's natural habitat – for example, in zoos and in gene banks. '*In situ*' is 'the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings, and in the case of domesticated [...] species, the surroundings where they have developed their distinctive properties' (Article 2 of the 1992 Convention on Biological Diversity).

There is a growing consensus that the most rational and sustainable way to conserve farm animal breeds is to maintain them as a functional part of local production systems.^{32,33,34} Measures should be comprehensive and enable communities to continue and improve their animal production through:

- Instituting supportive and enabling policies, for example by ensuring access to pastures and markets.
- Exploring and generating niche markets for specialty livestock products. In France, this approach has led to the revival of the Aubrac milking cow. It has also been a remedy for the low profitability of the camel production system in different parts of Rajasthan (see Part 2 for details).
- Considering the requirements of the breed in land-use plans.
- Keeping alive the knowledge that the keepers have accumulated on the breeds, their management and other related aspects. This should become a prior concern because the erosion of the knowledge is even faster than the erosion of breeds.³⁵

Efforts in this direction require the active involvement of farmers and herders who own and use these animals. Community-based management of farm animal breeds fulfils the foregoing requirements (Box 2).

Present state of conservation

The Food and Agriculture Organization (FAO) has taken the lead in the worldwide acquisition and dissemination of information on local breeds and other *ex-situ* conservation efforts. Another important player in these areas has been the International Livestock Research Institute (ILRI) in Nairobi, Kenya.

Box 2.

Community-based management: The key to success

Community-based management is a rural development tool that recognises the need to involve grassroots stakeholders, namely herders, farmers and non-government organisations in the conservation of farm animal breeds. It is a dynamic approach that:

- Combines sustainable use of livestock breeds with empowerment and poverty alleviation for farming and pastoral communities.
- Builds on experiences made during community-based natural resource management projects and indigenous knowledge and values.
- Recognises participatory approaches, appropriate institutional support, and integration of all stakeholders as critical success factors.
- Strives for policy frameworks, marketing opportunities, intellectual property rights regimes and economic valuation of local breeds.

Beginning in 1988, FAO's activities have included setting up gene banks in Africa, Asia and Latin America, publishing the *World Watch List for Domestic Animal Diversity* (now in its third edition³⁶) and setting up a database on animal breeds.³⁷

In 1998, an Intergovernmental Technical Working Group on Animal Genetic Resources initiated, under the leadership of the FAO, the development, of a country-driven *First Report on the State of the World's Animal Genetic Resources*. The compilation of this State-of-the-World Report, scheduled from 2000-2005, aims to provide a foundation for setting country, regional and global strategies and get national governments and scientists involved in the conservation of local breeds.³⁸

With regard to *in-situ* conservation of farm animals in developing countries, efforts mostly centre on the conservation of selected breeds. Examples are the Vietnamese I-Pig and the Galla goat in Kenya.³⁹

Systematic efforts to promote community-based management through appropriate legislation and mobilising herders, farmers and non-government organisations are only at their beginning. One such effort is 'LIFE', an initiative founded in 1999 by a group of NGOs, including the League for Pastoral Peoples and Lokhit Pashu-Palak Sansthan, to involve the prime stakeholders in all stages of breed conservation (Box 3). With the support of the GTZ, LIFE is currently developing and testing a method for documenting local breeds on the basis of indigenous concepts and knowledge, including traditional breeding strategies and mechanisms. The goal of this project is to fully record the intellectual contribution of pastoralists and farmers in sustaining a broad genetic base for the world's farm animals.

Another initiative that seeks to involve communities is the Farm Animal Genetic Resources Management Programme of the Southern African Development Community (SADC), covering 13 countries in southern Africa. In May 2001, a workshop organised by the Ministry of Agriculture of Swaziland, FAO/UNDP/SADC, SACCAR and GTZ (see *List of abbreviations* in Part 4 for the full names of these organisations) recommended to bring the importance of community-based management of local breeds to the attention of FAO; formulate policy frameworks that support research on and implementation of this approach in the Southern African region; and develop policies on the rights of local communities, farmers and breeders

and the regulation of access to and benefit sharing of animal genetic resources. Different follow-up activities have been implemented. An example is an initiative of the South African Ministry of Agriculture, the Animal Improvement Institute, the Provincial Department of Agriculture of the Eastern Cape and GTZ. They have initiated a project to develop a Nguni cattle leather product industry in South Africa (see Part 2 for details).

Box 3.

'LIFE': An initiative to foster community-based conservation approaches

LIFE stands for 'Local Livestock for Empowerment of Rural People'; it focuses on bottom-up approaches to complement the efforts of the FAO that are channelled mainly through governments. The initiative seeks to conserve domestic animal diversity by building on farmers' and pastoralists' indigenous knowledge and institutions within the context of local and regional development. Aims include:

- Promotion of 'endogenous livestock development', which builds on local knowledge, genetic resources and local fodder resources.
- Intellectual property protection for farming and pastoral societies that have created unique breeds.
- Consideration of local livestock in land use and regional development planning and creation of positive marketing environments for its products.

In November 2000 LIFE, in collaboration with the GTZ, organised an international workshop in Rajasthan, India. Approximately 80 scientists, NGO representatives, herders and others participants drew up the 'Sadri Declaration'. This acknowledges the diverse roles of local animal breeds for sustainable rural livelihoods, especially in marginal areas, and urges concerted action such as support for local institutions and breeding organisations and legal recognition of indigenous breeds as national assets.

☞ The paper *Intellectual property rights regime necessary for traditional livestock raisers* in Part 3 provides the full text of the Sadri Declaration.

Such efforts must be supported and expanded to achieve the critical mass necessary to facilitate breed conservation on a large scale (Box 4).

☞ The paper *Marketing rare breeds in sub-Saharan Africa* in Part 3 discusses community-based breeding and marketing strategies.

☞ The paper *Conserving the Aseel poultry* in Part 3 describes a collaborative effort of Adivasi communities and four local organisations to develop strategies to preserve and promote the Aseel poultry breed.

Intellectual property rights and benefit-sharing

While industrial livestock-breeding companies and research institutions guard the information about their breeds like trade secrets, farmers and herders seem to be expected to share the genetic material of their breeds and their knowledge for free.

As yet, few benefits percolate down to pastoral and farming communities from activities relating to local breeds conducted by formal sector international institutions. Agendas are pursued predominantly from the so-called 'genetic resource-angle' that seeks to save or rescue breeds in their role as carriers of genetic material that might

have some economic potential in the future and could be valuable for humanity at large.⁴⁰

Box 4.

Support for community-based management should be prioritised

By 2005, when the State-of-the-World Report and its recommendations are to be published (see text), another 300 breeds will have gone (assuming the present extinction rate of two breeds per week). Therefore it is urgent to prioritise conservation activities with and within communities now.

Local livestock keepers, who have been the chief custodians of the world's domestic animal diversity, should directly participate in and benefit from these activities. So far their role in conserving threatened breeds remains largely unrecognised and unrewarded. It is vital that they be able to continue managing and breeding their breeds because only then will the animals be exposed and adapt to changing environmental and disease conditions.

The situation is even more urgent as the consumption of meat and milk in developing countries is expected to more than double over the next two decades.⁴¹ Some major development organisations see the expansion of intensive livestock production into the South as the key solution to meet the rising demand. If this development is realised (and it is already well on its way), millions of small farmers and herders will lose their livelihoods and the extinction of breeds will accelerate further -- despite all conservation efforts.

There is more than a moral obligation for extending similar protection to traditional stockbreeders. Actions are urgently needed as the prospecting of livestock breeds for desired genes has already begun, especially pigs, poultry and cattle.

Unfortunately there is still no movement to assure stockraisers' rights, as is the case with plant genetic resources -- and even in the case of plants, companies have been granted patents on neem, pepper, turmeric and basmati rice, all of which have been developed by local communities.⁴² Fighting such patents is difficult and has succeeded only in a few cases, including an antifungal oil made from neem seeds⁴³ and the medicinal uses of the Ayahuasca plant⁴⁴. In these instances it was possible to prove traditional use prior to the patent but such proof is difficult to bring.

There are already cases of genes being appropriated from indigenous livestock breeds into commercially kept animals. For example, the patented 'booroola' gene that is responsible for a high incidence of multiple births in Australian Merino sheep is thought to have originally been derived from the Garole sheep kept by the Haider community in the Sunderban area of India.⁴⁵

Another example concerns worm-resistant sheep breeds owned by pastoral communities. The world over, farmers spend billions of dollars on chemical drenches to fight intestinal worm infections, leading to increased resistance of the worms against these chemicals. Hence genetic traits conferring worm resistance would be of immense commercial value.

The Maasai in East Africa have nurtured such a breed, the 'Red Maasai sheep' that is genetically resistant, or less prone, to infestation with intestinal worms. In the 1970's, the International Livestock Research Institute (ILRI) became aware of the Red Maasai and its scientists have now developed new research tools to help identify the genes which are responsible for its resistance. The goal of such research is to combine the resistance genes of livestock from developing countries with the

production genes of developed-country livestock to provide optimal animals for both tropical and temperate regions. The prospect that the genetic sequence related to helminth resistance is identified by scientists, raises the question of the ownership of this information and of the genes.

ILRI states 'The world's diverse animal genetic resources have taken millennia to evolve into their current complex diversity. Only by making use of that diversity will we be able to preserve valuable genes for future generations. The modern tools of biotechnology provide us with the weapons we need to win this battle. They also provide us with the means to make fuller use of what nature, with human intervention, has provided – the myriad combinations of genes that are represented by today's livestock breeds and types'.⁴⁶ ILRI admits that it 'will need to rely on commercial partners to deliver the results of some biotechnological products to users. These potential partners may not be interested in ILRI products unless they can have intellectual property protection on them, and hence confidentiality becomes important'.⁴⁷

There is clearly a crucial need for an open debate, which involves the main stakeholders, notably the pastoralists and small farmers who have created the breeds in question. As a response to this need different organisations (ILRI, IPGRI, FAO, SADC and GTZ) have initiated a discussion on how to stimulate the awareness and create capacity on access and benefit sharing issues on regional and international level. The proposal is to organize a workshop, which will explore the implications of the existing international legal framework on access and benefit sharing and intellectual property rights on the conservation and sustainable use of local breeds.

At the NGO level, LPP is joining forces with like-minded organisations to press for negotiating an International Treaty on Animal Genetic Resources. In collaboration with the German Forum for Environment and Development, as well as other NGOs, LPP is also organising a special workshop during the *World Food Summit: 5 years later* in Rome in June 2002 to alert attending delegates about the rapid erosion of farm animal genetic diversity and the necessity of involving farmers and pastoralists in conservation.

☞ The paper *Intellectual property rights regime necessary for traditional livestock raisers* in Part 3 discusses the need to recognize the intellectual property rights of pastoralists and other traditional domestic animal raisers.

Recommendations

Grassroots level

- Involve local communities that have developed unique livestock breeds in all stages (decision making, planning, and implementation) of conservation projects.
- Document local livestock breeds from the perspective of their owners, adopting their concepts and terminology, and recording their knowledge about animal breeding.
- Evaluate the economic benefits of local breeds in the context of local livelihoods.
- Prepare genetic impact assessments (i.e. evaluate the qualities of the existing breeds and the impacts on them of a possible project) before promoting exotic or non-local breeds.
- Develop the capacity of NGOs and extension services to support community-based management of local livestock breeds and implement related projects.

National level

- Increase awareness of the value of local breeds and their significance as a reservoir for certain genetic traits.
- Focus on improving the competitiveness of local breeds by means of selective breeding rather than cross-breeding.
- Incorporate the conservation of existing local livestock breeds into regional development plans.
- Provide secure land rights and access to water and grazing resources for pastoralists.
- Eliminate subsidies and credit for resource-intensive agriculture in marginal areas.
- Promote the development of markets for products and speciality items from local breeds.
- Give emphasis to the sustainable use of indigenous breeds in the training and curricula for the various groups involved in livestock development (e.g., veterinarians, animal scientists, extensionists), and build capacity in this field.
- Facilitate indigenous communities to enter decision making and policy processes and national bodies by supporting intermediary NGOs.

International level

- Put in place policies and legislations that enable and courage farmers and pastoralists to continue keeping local breeds.
- Stop promoting the indiscriminate expansion of animal industries in developing countries. Livestock keepers in marginal areas are in danger of being squeezed out of the market by such capital-intensive enterprises.
- Create a special forum for discussing IPR issues related to animal genetic resources.
- Support development of international framework regulations – similar to the International Treaty on Plant Genetic Resources - that recognise pastoralists' and smallholders' rights over the breeds they have created.

Endnotes

¹ FAO. 2000. *Ernährungssicherheit: Wenn Menschen mit dem Hunger leben und den Tod durch Verhungern fürchten*. Food and Agriculture Organisation of the United Nations, Rome, Italy.

² Scherf, B. 2000. *World watch list for domestic animal diversity*. Food and Agriculture Organisation, Rome, Italy.

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Part 2. A different approach – case studies on the importance and sustainable use of local breeds

This part presents case studies demonstrating the importance and potential of indigenous breeds and community-based management approaches.

Local goats are as good as crossbreeds

The Government of India and Swiss Development Co-operation initiated the Indo-Swiss Goat Project (ISGP) in Rajasthan, which aimed at improving goat production in semiarid environments in order to raise family income and improve the nutrition of the rural poor. The performance of local milk goats was to be enhanced by artificial insemination with semen from imported bucks. At the onset in 1981, both partners knew little about local goat husbandry. In 1988, an innovative system to keep track of animal performance was introduced: recording was done in the field rather than on a government farm. 'Field performance recording' and a study of the local farming system revealed that the crossbred animals were not superior to the local goats under the given conditions, and that the new breeding technology was not appropriate for the extensive agropastoral production system. The project was reformulated to promote selective breeding within the local Sirohi breed, using field performance recording to identify superior bucks for natural service.

However, small ruminants played only a marginal role in the livestock policy of Rajasthan State. The Animal Husbandry Department showed no interest in the project. By mutual consent, the project was closed in 1992. Fortunately, the knowledge gained and the approach of field recording and selective breeding was taken up by BAIF Development Research Foundation, a strong Indian NGO with keen interest to promote the 'poor (wo)man's cow'. The ISGP was very well documented, thus allowing others to learn and benefit from the work carried out.

Source:

Indo-Swiss Cooperation. 2000. *Capitalizing on experience in Indo Swiss cooperation in livestock development in India*. Intercooperation, Bern. P. 26.

Revival of the Aubrac milking cow

Traditionally, the Aubrac cow has been used as a draught animal and its milk was used to produce a local pressed fresh cheese called Laguiole cheese. Because of mechanisation and for social and economic reasons, the number of Aubrac cows being milked dropped in the 1920s. However in the 1960s Laguiole cheese was still wanted and the 'Young Mountain' Cheese Cooperative was created to collect milk from producers and make the cheese. Farmers started experimenting with Holsteins. However, these breeds could not thrive on the mountain fodder, and their milk was low in protein, resulting in much rejected cheese. Thereafter farmers started experimenting with the multipurpose Simmental breed. Although this breed was better adapted to the mountains, the farmers were still not satisfied. This led to re-introducing the Aubrac cattle breed in the early 1990s.

Source:

FAO. 1999. *Sustaining agricultural biodiversity and agro-ecosystem functions. Opportunities, incentives and approaches for the conservation and sustainable use of agricultural biodiversity in agro-ecosystems and production systems*. Food and Agriculture Organization of the United Nations, Rome, Italy.

Preserving the one-humped camel in Rajasthan through camel milk marketing

In Rajasthan, India the camel production system has lost its profitability. Camel herd sizes have been reduced significantly. The decrease can be attributed to an interrelated set of circumstances: a shortage of grazing lands, the impact of diseases, and the delayed and reduced fertility of female camels. It is therefore not surprising that many Raikas (the traditional camel herders) thought that all camels would disappear within ten years, and that camel breeding was dying. Some years ago the idea of selling camel milk was brought up. At first many Raikas were unwilling to consider marketing of milk for cultural reasons. However, in Udaipur and Chittor some started selling camel milk to tea stalls and to private households, even dairies. The idea spread throughout southern Rajasthan and into northern Madhya Pradesh. For many Raikas, the income from camel milk exceeds that gained from the sale of male animals. The camels are milked twice or three times a day. The average amount of milk obtained per day per camel is about 2 kg.

Most of the milk is bought by tea stall owners. Camel milk is significantly cheaper than buffalo or cow milk. This explains to a large extent the popularity of the camel milk. Furthermore the milk is said to have a neutral taste and has a longer shelf life, so it can be stored for a longer period outside the refrigerator.

Although the Raikas still face many problems, such as a lack of grazing opportunities and a decreasing quality of their camels, the marketing of camel milk forms an incentive for many to re-invest in camel breeding and in the conservation of the one-humped camel in general.

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Conserving the South African Nguni through utilisation

The Nguni is a hardy breed of cattle that survives in the harshest and most disease-infested areas of Africa. It is mainly found in Swaziland, Zululand and Mozambique. Although the Nguni is becoming increasingly popular as a beef breed, it was originally a draft animal that played an important social role. In Swaziland the standard bride price until today is 15 head of cattle.

Because the South African government regarded this breed as inferior, it started crossbreeding programmes with exotic stock. In Swaziland, American development aid promoted Brahmin cattle, while the British sponsored the introduction of Hereford cattle. As a result the number of pure Nguni cattle had decreased significantly at the end of the 1990s, although some white farmers had started buying up pure Nguni cattle in the 1970s. The crossbreeds needed a high level of management and healthcare services. When input supplies broke down in the 1990s because of political changes, the crossbreeds could no longer perform economically. This led to the re-evaluation of the Nguni breed. This evaluation highlighted its potential for beef production. Furthermore, Nguni proved to be the most fertile breed in South Africa. The cows are less prone to birthing difficulties because they have sloping rumps, a small uterus and low birth mass. Besides, cows have good mothering qualities.

Other qualities of the Nguni include heat and light tolerance. Animals have an excellent resistance to ticks and immunity to tick-borne diseases, and disease incidence and mortality are low. They are excellent foragers and will graze and browse on steep slopes and in thick bush. Nguni fatten well on natural grazing as well as in the feedlot. Additionally the cattle have thick, pigmented skins covered with fine short hair of different mixtures of colour. The patterns have an attractive mirror image, which together with the variability in colour make the hides a valuable item suitable for niche marketing.

During a workshop on 'Community-Based Management of Animal Genetic Resources (CBMAnGR)' in Mbabane, Swaziland (see section *Community-based conservation of animals: The missing link* in Part 1), participants agreed to formulate an initiative for the development of a viable Nguni leather product industry to directly benefit resource-poor communities in South Africa.

To develop the hide industry, this initiative is collaborating with two rural development projects in South Africa, the South African Department of Agriculture and the Animal Improvement Institute with an existing project, which introduces market-quality Nguni bulls into local Nguni cattle herds and provides training on management and marketing. Other partners will include the Nguni Breeder's Society, which is planning a similar project, and the Eastern Cape Development Corporation. All these initiatives aim to add value to hides, which is expected to lead to the development of small and medium enterprises in the communities and to alleviate poverty.

The initiative proposes the following structure for developing the marketing potential and overcoming constraints. Different farmers' organisations and co-operations will be responsible for collecting and delivering hides and skins. Their members will be trained to prepare hides and skins for transport. A central umbrella organisation, which is envisioned to be a private marketing company, will receive the tanned hides and skins and market those of sufficient quality to the commercial market. A part of the earnings will be used to support the infrastructure of the central organisation; the remainder will be equally shared amongst the suppliers of the hides and skins. The communities will buy back the unsold hides and skins from the central organisation. The first step of this initiative is to evaluate the potential market for on-hair hide and hides tanned for ordinary purposes. Is there a national market (furniture industry, curios) or even an international market (car industry)? Are small tanneries able to deliver high-quality hides? Which arrangements are possible to involve large-scale tanneries?

The initiative hopes that the process just outlined will ensure true community benefits while avoiding some of the more obvious constraints such as low production volume and monopolies. As an initial step the project has initiated a study to assess the market potential of Nguni hides and the feasibility of developing this potential. Depending on the results, the above structure will be modified and alternatives elaborated.

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Chiapas sheep: Crossbreeding failures and a participatory breed improvement programme

In the 16th century when Spanish monks and colonists arrived in Latin America, they brought along various sheep breeds, such as the Spanish Churra, Manchega, Lacha and Castellana, none of which were previously known in this region. In Chiapas, Mexico's southernmost state, Tzotzil women adopted some of the animals introduced by the Spanish. Over time the sheep and their wool became a part of Tzotzil culture and religion through a complete mixture of ancestral concepts and old Spanish herding practices. Eventually the sheep evolved into what is now known as the Chiapas sheep.

The Chiapas breed produces 1.2 kg of wool per year on average -- low compared to typical wool breeds such as Merino and Rambouillet which produce roughly eight times more. For this reason, extension services in the area have made several attempts to introduce exotic breeds to increase wool production. The first project started in 1973 when 800 Rambouillet rams were introduced into village flocks. This attempt was a disaster, since all the introduced animals died within a week. In 1977, a group of Columbia rams were introduced -- with the same aims and results. The introduction of the exotic breeds was not successful because they were not well adapted to the mountainous climate, low-quality forage and parasite infestation. Besides the interests and needs of Tzotzil women were totally different from those extension workers had envisioned. The women had problems handling the big sheep, which they considered as 'not obedient', and the women did not like the thin and long wool quality since it was unsuitable for hand weaving.

In 1981, a third crossbreeding attempt started with a large flock of Romney Marsh sheep, aiming to use crossbred rams of the second generation in the village flocks. There were many problems because the breeding seasons of the two breeds were not compatible. Furthermore, as the Romney sheep were adapting to the environment (and adapting to the Chiapas breeding season), they were also reducing their size and wool production considerably. The Romney project was abandoned in 1990. Probably one of the biggest mistakes was that the extension workers, mainly men, communicated only with Tzotzil men. But in Tzotzil society it is the women that are entirely responsible for sheep husbandry while men are engaged in agricultural work and paid labour in nearby cities.

The Institute of Indigenous Studies, a department of the University of Chiapas, has been taking a different approach. Its work with Tzotzil communities started in 1985. During the last ten years, the Institute has been implementing a genetic improvement programme aiming at the improvement of quantity and quality of wool production of the Chiapas sheep. A group of about 10 Tzotzil women participates every six months in evaluating fleece quality at the university's sheep farm. The selection of superior sheep is based on these women's criteria. They include colour and cleanliness of the fleece, volume and length of the wool, suitability for processing, and size and character of the animals.

The selected sheep are taken to the university farm where they produce offspring of the 'improved Chiapas sheep'. Out of these, the rams undergo a two-year evaluation programme for their fleece. Based on the records of four shearing seasons, superior animals are identified and assigned to the communities. The selection programme has resulted in significant increases in quality and quantity of wool. At the university

farm, selected rams produce wool twice as much as village rams of similar age and under similar management. Up to date the acceptance of the 'improved Chiapas sheep' by the Tzotzil women is high because the animals commonly adapt to local conditions within three days and Tzotzil women are involved throughout all project phases. The Institute's participatory work with the Tzotzil women has resulted in a process of mutual understanding and learning.

Source:

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