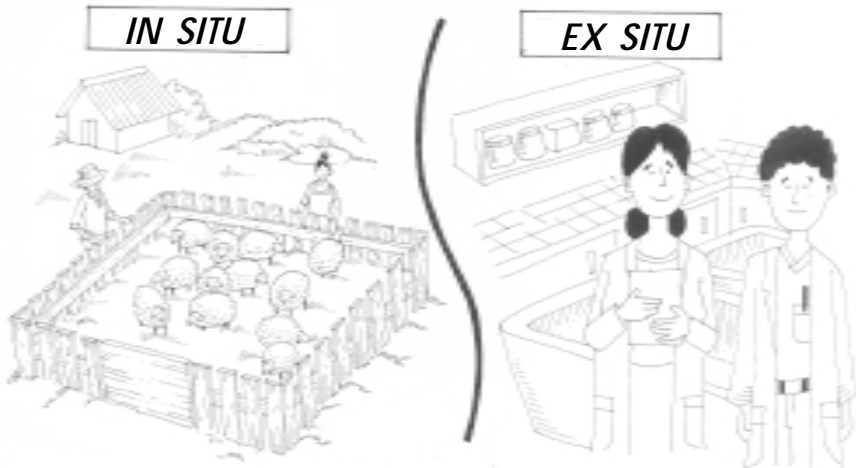


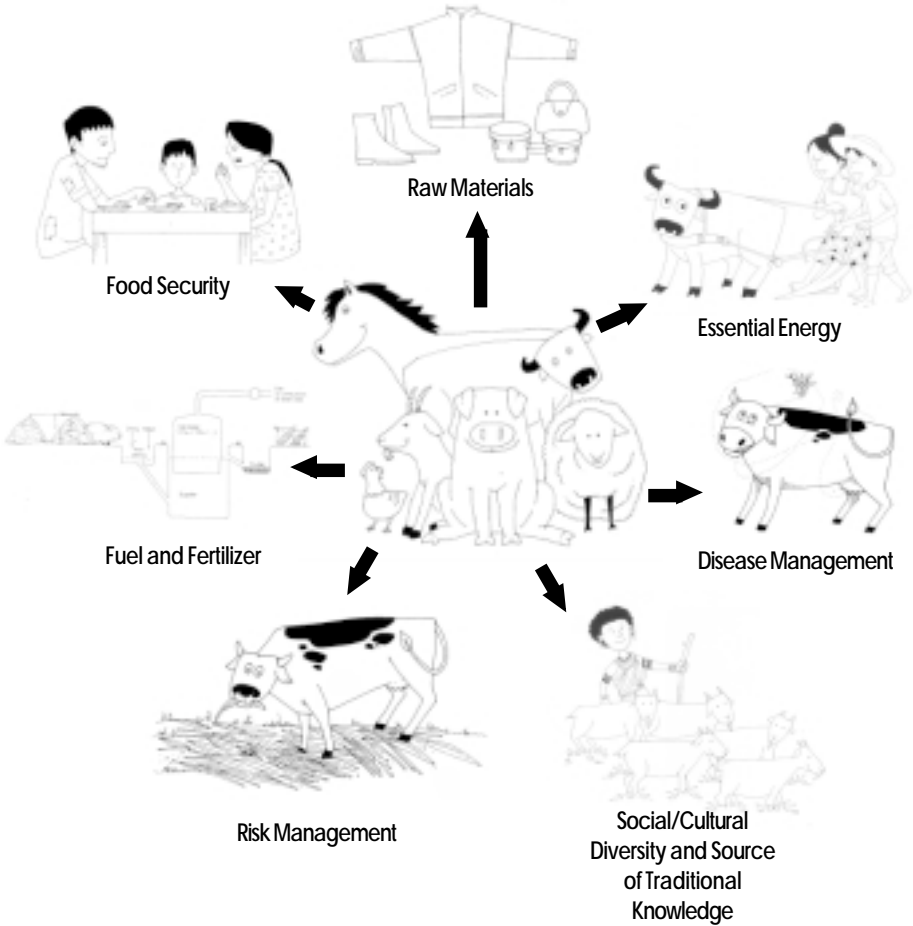
# Conservation of Animal Genetic Resources



**A**nimal genetic resources are the building blocks for livestock development. Genetic diversity enables farmers and breeders to utilize a wide range of production environments and develop diverse products to meet the needs of local communities. The diversity also allows farmers and breeders to respond to changing environmental conditions and consumer demands.

The contribution of animal genetic diversity in agriculture, economic development and resources management is a major consideration for its conservation. At the same time, being an integral component in many social and cultural traditions, diversity contributes to individual and community identity.

# Roles and Values of Animal Genetic Resources



# Key Elements for a Successful Conservation Strategy

## Establish a Committed and a Strategic Approach to Use, Develop and Conserve Animal Genetic Resources and Mobilize Financial Resources

A conservation strategy is more than just a technical program. It must contain an awareness building component and a planning process that promote wide involvement and commitment of all stakeholders. Within countries, the building of partnerships among government agencies, local authorities, farmers, researchers, business interests and non-governmental organizations is critical to a successful conservation strategy. Farmers, who own and utilize livestock, must be involved in the process as their decisions influence the direction of animal production and the future of a given local breed. Ensuring profitability of production is the most important goal for farmers; therefore, conservation activities must consider the need of farmers to generate income.



In 1995, the **Global Strategy for Management of Farm Animal Genetic Resources** was adopted by the Food and Agriculture Organization of the United Nations (FAO-UN) with the aim to provide a comprehensive framework for the management of farm animal genetic resources. Within the Global Strategy Framework, each country was invited to establish National Focal Point for Animal Genetic Resources and to nominate a National Coordinator. In assisting countries, the FAO-UN has produced a wide range of technical guidelines. Another major initiative for animal genetic resources has resulted from a decision from the FAO Commission on Genetic Resources for Food in Agriculture, that agreed in 1999 to launch preparation of the first **Report on the State of the World's Animal Genetic Resources**. This country-driven process is intended to provide a comprehensive assessment of the state of animal genetic resources and the capacity to manage them now and in the future, and identify priorities for national, regional and international action.

In Europe, the need for conservation of animal genetic resources was recognized in the 1960s, when many countries already initiated programs to maintain their native endangered breeds. The first conservation program in France, with the Solognote sheep, was started in 1969. The following decade, in the British Islands, the Rare Breeds Survival Trust and the Traditional Livestock Foundation have initiated their activities.

In the European Union, a special premium is available within the framework of the agri-environmental program to support farmers who maintain local domestic animal breeds that are in danger of extinction. There are also situations where conservation activities are directly supported by non-government foundations such as the Rare Breeds Survival Trust in the United Kingdom.



## Employ Effective Conservation Methods

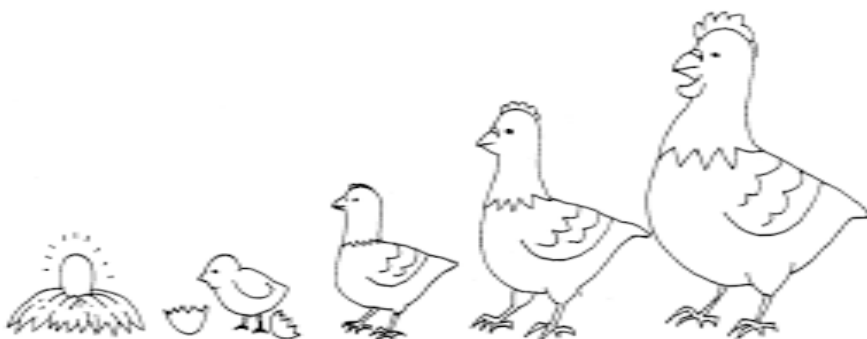
Conservation efforts can be broadly categorized as *in situ* and *ex situ*. *In situ* conservation means that animals are kept within their production system, in the area where the breed developed its characteristics. *Ex situ* conservation applies to situations where animals are kept outside their area of origin (herds kept in experimental farms, farm parks, within protected areas or in zoos) or more often, when genetic material is conserved and stored in genebanks.

Both conservation approaches have advantages and disadvantages. Until recently, there was a lot of enthusiasm regarding the potential of *ex situ* conservation as the most reliable and cost-effective conservation strategy. This view was further reinforced by the development of biotechnology. However, *in situ* conservation, particularly in cases where specific breeds are endangered, is now recognized as a more effective, primary approach and efforts in this regard are increasing.

### *In situ* Conservation

*In situ* conservation facilitates breed characterization, evolution and adaptation. Under *in situ* conditions, breeds continue to develop and adapt to changing environmental pressures enabling research to determine their genetic uniqueness.

The most cost-effective approach to *in situ* conservation is to maintain locally adapted breeds within commercial or subsistence production systems. Specific traits, often expressed in indigenous breeds, including hardiness, fitness, longevity, low feed requirements, resistance to diseases and relatively high reproduction performance can be extremely beneficial. Moreover, lower yields from locally adapted breeds can be compensated by higher lifetime production, as well as from their lower total maintenance costs.



Locally adapted breeds can also be used in crossbreeding programs especially when their prolificacy and maternal abilities are high. The ability of locally adapted breeds to perform in low-input stressful production systems provides the basis for sustainable agriculture. This is true especially in many regions of the world where there is routine exposure to environmental stressors such as disease and extreme climatic variation.

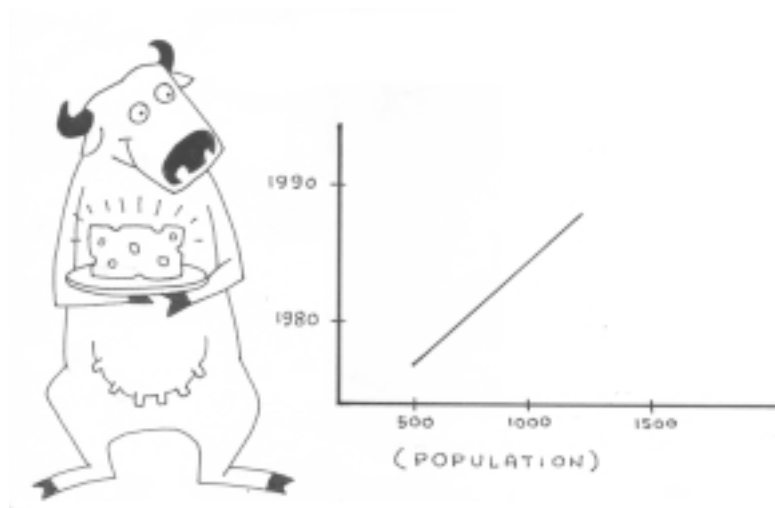
For example, trypanotolerant cattle breeds like the N' Dama, Muturu or the Keteku in Nigeria make possible dairy production in areas where other breeds cannot survive.

### *Ex situ* Conservation

*Ex situ* methods are generally regarded as an accompanying measure to *in situ* conservation. Cryoconservation provides a long-term insurance to conserve genetic diversity for future needs and demands for animal products. However, cryoconservation neither permits characterization of breeds nor provides a full range of socio-economic, ecological or cultural benefits that can be achieved through *in situ* methods. Moreover, as the genetic make up of a breed is frozen, it cannot adapt to changing environmental conditions. Another disadvantage of cryoconservation is that breed restoration may be extremely costly and time consuming. But as a complementary conservation approach, cryoconservation provides a long-term insurance system to *in situ* conservation.

Cryoconservation requires modern facilities, and skilled personnel and is expensive. In the majority of *ex situ* banks, semen and embryos are the most common genetic material. There are also programs that include the storage of oocytes, tissue and DNA. *Ex situ* establishment is most advanced for cattle and small ruminants, although other farm animal species, especially pigs, horses, rabbits, poultry and fish, are being stored through cryoconservation.

A key element of the operation of *ex situ* conservation banks is the establishment of protocols for the collection of genetic material, health and quarantine requirements, evaluation of biological value of stored material, access to stored resources and replenishment procedures.



## Production of Specialty Products

Production and successful marketing of goods and services that are highly valued by consumers can promote maintenance of minor breeds. For example, in Italy, the population of the Reggiana cattle increased from 500 in the early 1980s to approximately 1200 by 1998 because of the development of Parmigiano Reggiano cheese that is made exclusively from milk obtained from Reggiana cows. This cheese commands a high price, about 16 % higher than other brands of parmigiano cheese. This provides an economic incentive for farmers to conserve and use a breed that may otherwise be lost. This incentive-based approach has been successful in other regions.

Market identification is a type of incentive approach that has also proved successful in Mediterranean countries where local or regional sheep and goat dairy products and traditional processing are highly valued by consumers (e.g., Ossau Iraty, Roquefort, Pecorino Romano, Manchego, Serra da Estrela, Feta, etc.).

Market-based linkages have also been established for meat products that are derived from locally adapted breeds. Examples include the Mirandesa cattle in Portugal, Piemontese, Chanina, Merchigiana and Ramangola cattle in Italy and Hinlerwalder cattle in Germany. Successes were reported in Vietnam where a local breed of black chicken commands a high price. In Poland, eggs from the Greenlegged Partridge hen are marketed as low cholesterol organic products that are highly valued, commanding high prices.

### Promotion of Agro-Tourism

In Europe, increased interest in agro-tourism provides opportunities to conserve locally adapted breeds and increase economic diversification. It can also create public awareness of the roles and values of diverse breeds. In the United Kingdom, for example, there are now 22 Rare Breeds Survival Trust Approved Centres. One such farm, the Costwold Farm Park, attracts over 100,000 visitors annually.

#### Consider these .....

The first step to conservation and sustainable use of animal genetic resources is understanding its critical roles and values. Such understanding has to be developed through continuous communication with stakeholders and society, through educational programs, and widespread dissemination of information and knowledge about animal genetic resources. When it has been determined that a breed conservation initiative is required, it must be strategically planned considering local capacities and conditions, market opportunities and potential for collaboration among stakeholders.



## References:

- Boyazoglu, J. 1999. Livestock Production Systems and Local Animal Genetic Resources with Special Reference to the Mediterranean Region. Invited paper, VII Congress of the Mediterranean Federation for Ruminant Health and Production, Santarem, Portugal 22-24 April, 1999.
- FAO. 1998. Proceedings of the 6th World Congress on the Genetics Applied to Livestock Production, FAO/6th WCGALP Workshop on Animal Genetic Resources and Sustainable Development, Armidale, NSW, Australia, January 1998, Volume 28.
- Gandini, G. and J. K. Oldenbroek. 1999. Choosing the Conservation Strategy: Genebanks and the Conservation of Farm Animal Genetic Resources, Edited by J.K. Oldenbroek ID-DLO, The Netherlands.

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