

# FOOD FOREVER

Biodiversity for Resilience



# The Food Forever Initiative:

Biodiversity for Resilient Food Systems is a public awareness and action campaign that brings together leaders within the agricultural, scientific, and culinary sectors to collectively contribute to the implementation of the United Nations Sustainable Development Goal (SDG) Target 2.5, known as “the goal of zero hunger.” This target specifically calls for the international community to safeguard and share the remaining “genetic diversity” of both crops and livestock which are crucially interdependent upon each other. Agrobiodiversity is a key component for the achievement of food security and improved nutrition for all, especially in challenging environments and climates. The initiative’s goals are to first raise public awareness on the fundamental importance of crop and livestock diversity while taking substantive action among its partners in order to secure it.

Cover: Ancient White Park  
Right: Oberhasli



## Role Of Livestock In Today's World

Global demand for livestock products is projected to increase by 70 percent to feed a population estimated to reach 9.6 billion by 2050. Animal genetic resources not only contribute to food security and nutrition, but they play very many roles beyond the obvious as outlined in this adaptation from K. Marshall's article *Optimizing the use of breed types in developing country livestock production systems: a neglected research area* in the *Journal of Animal Breeding and Genetics* (2014).

- ▶ Source of food- meat, milk, eggs
- ▶ Converters of by-products and waste material into food
- ▶ Inputs to crop production- draught power, manure, and soil fertilizer
- ▶ Production of fiber and leather
- ▶ Savings and insurance- when times are tough animals can be sold, when times are good, they are bought, production of offspring offer regular source of income
- ▶ Reduce vulnerability of farmers through diversifying livelihood options - such as in mixed crop-livestock systems
- ▶ Allow households to benefit from common-property resources, such as communal grazing areas
- ▶ Rural development in regions where large-scale crop production may not be possible
- ▶ Environmental management through holistic and sustainable grazing
- ▶ Social/ cultural identity- being used for festivals/ dowry, source of pride
- ▶ Source of employment

Livestock consumes grass improper for human consumption and produces meat, milk and eggs. The benefit of grazing livestock is essential for maintaining many of the world's landscapes, it maintains open habitats and diversifies country side. In countries or regions where there are no possibilities to cultivate soils, livestock keeping is the only survival source for the people living there.

Inversely, growing demand for livestock products can have undesirable impacts on the environment, affecting water quality or causing land degradation if sustainable practices are not incorporated into the production system. Poor animal management can threaten human health with zoonotic and food-borne diseases.



Above: Florida Cracker

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In summary, livestock have enormous **economic**, **ecologic**, and **sociocultural** impacts even in today's modern society.



## Livestock In Sustainable Agricultural Development

Sustainable agricultural systems depend on actions that protect and enhance natural resources. Choosing livestock species that are adapted to specific environments and production systems reduces the need for intensive management and high inputs (such as the need for large supplies of feed, water, and land) that may otherwise be harmful to the local ecology. Local and traditional animal breeds are adapted to local environmental challenges, making production systems more resilient to shocks. In situations where grazing or climate is not ideal, local breed may be more profitable on a per-acre basis, especially when profitability is examined over multiple years. In recent decades many producers seek to improve production through the use of introduced commercial or “improved” breeds. When these animals displace the locally adapted breeds, the local breeds can become extinct in a very short period of time through outright substitution, crossbreeding, and catastrophic inbreeding. Maintaining a diversity of breeds to choose from ensures that people and cultures can survive even in the most challenging of circumstances. **Future demand for livestock products will have to be satisfied through sustainable intensification, without competition between feed and food.** When contributing to sustainable food and agriculture, the livestock sector must address food security and health, equity and growth as well as resources and climate. It will have to reduce negative and enhance beneficial impacts such as environmental, economic and social impacts.

## Livestock's Challenges With Future Threats

**Improvement of agricultural techniques, climate change, socio-economic and cultural developments, population growth, and urbanization with modifications in diets were among the recent main drivers that have threatened biodiversity of the livestock sector.** The results from a 2017 study conducted by the group Biodiversity International suggests that three-quarters of Earth's food supply now draws on just 12 crops and five livestock species. Within the livestock species, they increasingly are dominated by only a few highly productive breeds leaving behind a wealth of diversity for the species. In cases where a local breed would otherwise be non-competitive in the market, if carefully managed, they could be used as an input into a crossing system. The system would produce terminal cross individuals that could benefit from hybrid vigor, making them more profitable while still being better adapted to the environment than improved modern breeds alone. This system however will ultimately fail if consideration is not sufficiently given in the long term management of diversity within the local breed population used for the crossbreeding.



Above: Carabao Water Buffalo

At a time when animal production impacts to the health of the planet are being questioned, there is mounting evidence that dispels the notion that livestock are as harmful as perceived by the general public. A new study by the International Livestock Research Institute finds that “greenhouse gas emissions from dung patches in developing countries are likely highly overestimated” and “based on our own measurements and an extensive literature review we show that GHG emissions from dung patches are likely highly overestimated as poor feed quality and differences in environmental conditions strongly limit GHG emissions. Our work calls for a revision of emission estimates from this important GHG source for developing countries” (Yuhao Zhu et al. 2018). Genetic adaptation of livestock to new production systems might be an important factor to meet the challenges of future climate changes. Other improvements include managing grazing, feed, livestock rearing techniques as well as animal health and managing effluents.

## Livestock's Importance In Food Security

**Livestock makes a considerable contribution to protein production by using and transforming forages that are not food sources for humans** (A. Mottet et al. 2017). Livestock-derived foods are among the richest and most efficient resources of important micronutrients, macronutrients and fatty acids. Animal-source proteins are also considered high-quality proteins and excellent sources of other required nutrients, including iron, calcium, and vitamin D, some of which are absent in plant-based diets. Consuming livestock-derived products such as meat, milk and eggs in the first 1,000 days of life are a viable option to improve a child's prospects of growth, cognition and development (D. Grace et al. 2018).



Above: Wyandotte (chickens) Gulf Coast Native (sheep)

**The need for more sustainable production and consumption of animal-source food is central to the achievement of the SDGs.** In a 2016 study, published in the International Journal of Life Cycle Assessment, researchers found that “land is used most efficiently if people would derive 12 % of dietary protein from animals (% PA), especially milk. The role of animals in such a diet is to convert co-products from crop production and the human food industry into protein-rich milk and meat. Below 12 % PA, human-in-edible products were wasted (i.e., not used for food production), whereas above 12 % PA, additional crops had to be cultivated to feed livestock. Large populations (40 million or more) could be sustained only if animal protein was consumed. For such populations, land unsuitable for crop production was necessary to meet dietary requirements of the population, and contributed to food production by providing animal protein without competing for land with crops.” (Van Kernebeek H. R. J. et al. 2016).

## Animal Genetic Resources: Use, Conservation And Exchange

**In the case of the animal genetic resources sector, its distinctive breeding, selection and exchange practices, ownership and most of all gene flow, are opposite to what is observed in the plant genetic resources.** Farm animal genetic resources are privately owned; in the majority of cases, they belong to livestock keepers. Livestock keepers therefore make the breeding decision, they decide on the use of their animals and are the key players for conservation and exchange within their farming activities and within their herds. Driven by increasing demand for higher output, as well as major developments in livestock management and reproductive techniques, the genetic diversity of the world's livestock species is continuously declining, leaving the animal genetic resources that remain not utilized in the most efficient way (S. J. Hiemstra, 2016). Main conservation strategies for animals are in-situ (maintain live animal breeding populations with continued use by livestock keepers and breeders) and ex-situ (genebanks - collections of well characterized animals, or cryopreservation) strategies. The conservation and sustainable use of animal genetic resources requires a mixed approach through in situ and ex situ efforts.



**Livestock-derived foods are among the richest and most efficient resources of important micronutrients, macronutrients and fatty acids.**





Above: Tamworth

## Access And Benefit Sharing (ABS)

Trade of live breeding animals is most common and is based on well-established domestic or international rules and procedures. The exchange and trade of breeding stock is mostly implemented through the transfer of private ownership over animals or their reproductive material. In every transaction, agreements are bilateral and the price reflects the value of animals or their biological material. Within pastoral communities, exchange of breeding stock might be guided by customary law. The implementation of the Nagoya Protocol changes conditions for access to animal genetic resources. But any Party to the Protocol may take sovereign decisions regarding access to its genetic resources, including animal genetic resources. In some countries access may become more difficult, more complicated or more restricted. If such access measures are implemented, trade of animal genetic resources might be hampered. In the long-term this could have negative consequences in the overall development of the livestock sector worldwide. **It is therefore important for the livestock community to provide arguments and to advocate for facilitating unhampered trade in animal genetic resources**, which can be achieved by exemption of livestock genetic resources from domestic ABS legislation (Martyniuk et al. 2018).



Breed loss continues to be on the rise in the 21st century and threatens the globe with the genetic erosion of animal resources.

## Livestock Diversity And Breeds

There are very many definitions of what is a breed. FAO has defined it as follows: Either a sub-specific 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. The five dominant livestock species used by humans are cattle, sheep, goats, pigs and chickens. Other species used to a lesser extent to produce food are ducks, geese, guinea fowls, turkeys, rabbits and hares, rodents, horses, camels, and donkeys. Subpopulations or breeds have been developed within each species. Examples within cattle are the Hereford of England, Nguni of southern Africa, or the Gasconne of France which are only several among a large variety of breeds developed around the world. In 2018 (FAO), the DAD-IS Database reported 8803 breeds within 38 species. For local breeds, 7.6% were classified not at risk and for 65%, their risk of extinction is unknown. Breed loss continues to be on the rise in the 21st century and threatens the globe with the genetic erosion of animal resources. The animals at risk are mainly local breeds used in traditional production systems and kept by small scale farmers. These are often referred to as “heritage” or “traditional” breeds.

In a more health conscious societies, families looking to fill their plates with more vegetables and less meat are turning to higher quality, sustainably raised and nutrient dense meats to fill their protein needs. People are beginning to realize that eating less meat means that, when they do eat meat, they can choose the best quality meat available. Heritage or traditional breed meats fit that model perfectly – the flavor is proof (A. Martin, The Livestock Conservancy, 2018). This establishes a pathway for local breeds and their products. **To meet future production needs and to facilitate adaptation in various environments, livestock genetic diversity must be maintained.** Pierfrancesco Sacco, the Italian permanent representative to the FAO put it best when he said “Agricultural biodiversity represents a revolutionary approach to food systems and nutrition and is progressively taking shape as a critical resource to help all countries achieve several of the Sustainable Development Goals.”

## Actions To Promote Animal Genetic Resources For Food And Agriculture – Awareness Raising Activities

Despite its value, few beyond the scientific sphere know the importance of agricultural biodiversity in our food systems. In order to engage the policy-makers and various other actors who have made commitments to implement SDG Target 2.5, this message must be communicated to a much broader audience. **The objective of the Food Forever Initiative is to inform and activate new audiences around the benefits and opportunities associated with more diverse food systems**, as a basis for implementation of SDG Target 2.5. Activities to raise awareness in the livestock sector are very different according to their contributions – marketing products or ecosystem services –and according to countries, regions, conservation strategies, and consumers' identification with species. There is no perfect formula for raising awareness, but rather many opportunities to do so.

Below: Texas Longhorn



## The Way Forward

The Food Forever initiative and its partners will place their livestock focus on **promoting diversity with an emphasis on the varied roles of livestock in today's world**. This includes their place in global food security, in sustainable agricultural systems development, as tools for carbon capture and land management, and as irreplaceable pieces of human culture around the world. **Every breed loss is a loss for the globe**. Renowned conservationist Cary Fowler summarizes this need when he states, "We need that collection of traits represented in the breeds because we don't have a crystal ball. We don't know what's coming in the future, and we don't know which of those traits will be useful or important in that future."





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Left: Raika Camel



