

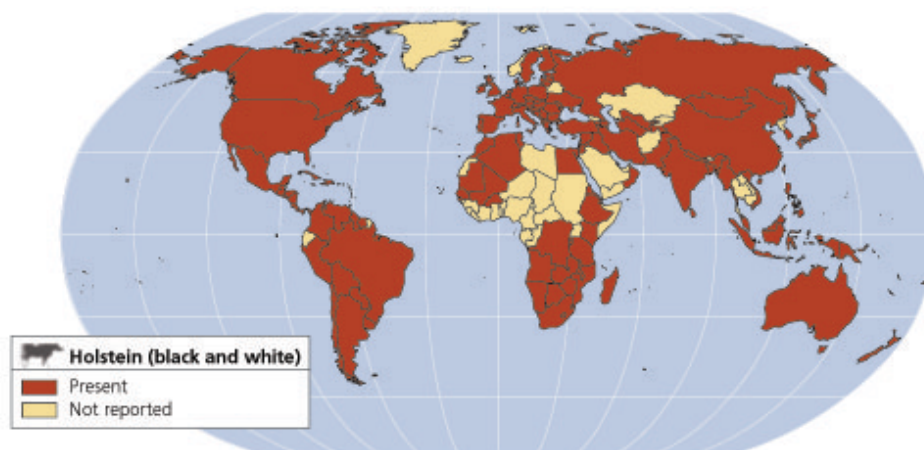
Origins and distribution of animal genetic resources

The livestock species contributing to today's agriculture and food production are shaped by a long history of domestication and development. At least 12 major centres of domestication have been identified, based on archaeological and molecular genetic research. Goats, for example, are thought to have been first domesticated 10 000 years ago in the Zagros mountains of the Fertile Crescent. Thousands of years of human migration, trade, military conquest and colonization spread livestock from their original homelands, exposing them to new agro-ecological zones, new cultures and new technologies. Natural selection, human-controlled breeding and cross-breeding with populations from other centres of domestication gave rise to great genetic diversity.

A new phase in the international movement of animal genetic resources began in the early nineteenth century, when the transfer of breeding animals around the world was boosted

by the emergence (at first in Europe) of organized breeding, and by the invention of the steamship. Much of this movement was within Europe or between the colonial powers and their overseas possessions. European breeds became established in the temperate zones of the Southern Hemisphere and in parts of the dry tropics, but did not thrive in the humid tropics (except in some highland areas) because of their poor adaptation to the heat, the low-quality forage, and the local diseases and parasites. Genetic resources were also transferred between different tropical regions. An important example is the introduction of South Asian Zebu cattle into Latin America during the early twentieth century. Pure tropical breeds have been little used in temperate countries, but composite breeds based on genetic material from South Asian cattle are widely used in the southern parts of the United States of America and in Australia. A number of other composite breeds that have

FIGURE 2
Distribution of Holstein-Friesian cattle



PART 1

made important contributions to animal production in Africa and elsewhere (e.g. Dorper sheep, Boer goats and Bonsmara cattle) were also developed as a result of these processes of gene flow. Some pure African breeds such as Tuli and Africander cattle have spread to Australia and to the Americas. Another interesting example is the Awassi sheep from the Near and Middle East, which has spread to several countries in southern Europe, to some tropical countries and to Australia.

Developments in the late twentieth century – increased commercialization of the breeding industry, rising demand for animal products in the developing world, production differentials between developed and developing countries, new reproductive biotechnologies that facilitate the movement of genetic material, and the feasibility to control production environments independently of the geographical location – have led to a new phase in the history of international gene flows. International transfer of genetic material now occurs on a very large scale, both within the developed world and from developed to developing countries. These gene flows are focused on a limited number of breeds. There is also some movement of genetic resources from developing to developed regions for research and to be kept by hobbyists or niche market suppliers (e.g. alpacas).

Today, the world's most widespread cattle breed, the Holstein-Friesian, is found in at least 128 countries (see

Figure 2). Among other livestock species, Large White pigs are reported in 117 countries, Saanen goats in 81 countries, and Suffolk sheep in 40 countries (Figure 3).

Several important conclusions can be drawn from this brief overview of historical developments. First, the countries and regions of the world have long been interdependent in their utilization of genetic resources. Second, the scale of transfers and the rate at which the genetic composition of livestock populations is transformed have increased dramatically in recent decades. Third, these transfers have the potential to narrow the genetic resource base of the world's animal production. At both national and international levels, there is a need to assess the significance of these developments so that actions can be taken to promote sustainable utilization, and, where necessary, target threatened resources for conservation.

FIGURE 3
Distribution of transboundary sheep breeds

