Chapter 3.1 Challenges for animal breeding

The major challenge for food production in Agriculture is the on-going growth of the human population towards 9 billion in 2050 (United Nations Development Goals, 2005). Livestock systems play an important role in agriculture by producing high quality food. In developing countries animals provide not only meat, milk and eggs, but also fibre, fertiliser for crops, manure for fuel and draught power. In developing countries productivity and fitness traits are the major challenge for animal breeding to facilitate production of food by animals and for food supply. In developed countries with intensive animal production systems, health and welfare traits create a new challenge for animal breeders.

Breeding challenges are influenced by a wide range of factors. They are determined by the needs and priorities of the owners of the animals, the consumers of animal products, the food industry, and increasingly the general public. Finding the right balance between the different demands is a continuous process, and requires anticipation of future conditions and careful planning to establish effective breeding programs.

Challenges for animal breeding in small populations

In small populations breeding opportunities for food production are limited. In such populations nearly all animals have to be used as parents for the next generation (at least the females) to get enough offspring. Then, there is no opportunity to select for traits related to food production. In small populations, the main concern is to maintain the population by conserving the genetic diversity and to manage inbreeding. As will be explained later inbreeding causes a lower fitness and increases the incidence of recessive genetic defects. This also implies that in small populations nearly all males and females have to produce offspring. Selection for breeding goal traits is hardly possible in these small populations.