Agriculture, Biosecurity, Nutrition
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of the United Nations

Farm animal biodiversity

Sustainable management and genetic improvement of local breeds are essential if countries are to meet their future food needs

In her office at FAO headquarters in Rome, Irene Hoffmann is finalizing the presentation she will give at a livestock conference in Antalya, Turkey in September. She's been allotted 20 minutes at a workshop on *Farm animal genetic resources - strategies and achievements*, and the presentation already runs to more than 40 slides of maps, graphs and charts. "That's always a problem when you have a lot to say," says Hoffmann, chief of FAO's Animal Production Service. "In animal genetic resources, it always seems to be a race against time."

The bar chart on Slide 22 underscores the urgency. Of the more than 7,600 livestock breeds in FAO's Global Databank for Farm Animal Genetic Resources, 190 have become extinct in the past 15 years and a further 1,500 are considered "at risk" of extinction. Country reports to FAO's first *State of the world's animal genetic resources*, to be published in 2007, show that 60 breeds of cattle, goats, pigs, horses and poultry have been lost over the last five years, an average rate of one breed a month.

In Antalya, and through a dozen other meetings held from Brazil to Belgium during 2006, Irene Hoffmann and other officers of FAO's Animal Genetic Resources (AnGR) Group are raising awareness of the threat to the world's farm animal diversity and of the need to make better use of local breeds. In the process, they are gathering support for an inter-governmental conference next year that is expected to adopt a global strategy and an action plan for managing AnGR. "Sustainable management and genetic improvement of local breeds are essential if countries are to meet their future food needs and respond to changing production environments," Hoffmann says. "It is time to begin putting in place policies to protect the resources remaining - before too many are lost forever."

High input, high output. FAO says the biggest single factor affecting farm animal diversity is the globalization of livestock markets. Most of the world's rapidly growing demand for livestock products is being met by intensive production systems based on a few species and

breeds of high-input, high-output animals. For example: a very few commercial breeds provide more than one third of global pig supply while a handful of commercial layer breeds provide some 85% of egg production. By some estimates, high-output dairy cattle breeds or their crosses account for two-thirds of world milk supply.

Production increases from a small number of breeds have been remarkable, but intensive production systems often bring with them erosion of local AnGR. When pressure on land resources increases and livestock are kept more intensively, small farmers usually opt for crossbreds that offer higher returns to labour. Keeping less productive breeds becomes simply uneconomical.

The primary challenge in AnGR today, Hoffmann says, "is explaining why countries and the international community should conserve breeds that farmers have abandoned or are critically endangered - the value of the vast majority of animal genetic resources is poorly understood by both scientists and policy makers." A comprehensive valuation of farm animal diversity must include assessment of both its use values - such as that derived from food and fibre or other products or services - and non-use values, which can include the satisfaction people derive from the mere existence of the diversity. Another key issue is "option value" - retaining the flexibility to cope with unexpected

events such as climate change or new diseases.

Translating those complex relations into a single indicator such as market price is virtually impossible. Complicating the valuation of AnGR is the fact that farm animals have the characteristics of both private and public goods - the use of a single breeding animal is exclusive, but the gene pool of domestic animal populations can be used by other farmers and future generations.

Policy re-think. From analysis of country reports to the *State of the world's animal genetic resources*, FAO has identified major areas for action at national and international levels to promote sustainable use and conservation of AnGR. The first is a re-think of livestock sector policies that "distort the playing field" on which indigenous breeds compete. In many developing countries, policies favour the use of imported exotic breeding stock, allowing large scale commercial producers to capture a big share of domestic markets. That trend, along with stricter sanitary regulations, is excluding small-scale farmers who keep most of the indigenous AnGR. Farmers are further disadvantaged by subsidies on feed, artificial insemination and other inputs that tend to favour exotic breeds.

While such policies may ensure an affordable supply of safe animal products, they have also disadvantaged less intensive production systems and low-income farmers. Attenuating those impacts may require regulations that account for the negative externalities of intensive livestock production - for example, charging waste disposal or disease surveillance to producers, and incentives for biodiversity conservation.

Developing countries also need to make full inventories of the extent, distribution, basic characteristics, comparative performance and current status of their indigenous breeds. Few countries have such data, hindering the capacity of policymakers to decide which breeds to improve or protect and how to allocate the limited funds available for conservation. Since AnGR are not static, continuous monitoring is needed to prevent breeds from becoming endangered before farmers, government and the international community are aware of any significant decline (increasingly, FAO says, the narrowing genetic base is becoming a problem even for commercial breeds).

Once at-risk breeds have been identified, governments should implement cost-effective monitoring and conservation measures. However, many breeds are at greatest risk in developing countries that have few resources for designing and implementing conservation programmes. Many countries report that they have no comprehensive conservation programme, or even policies, on AnGR.

One promising strategy that appeals to both policy-makers and producers is linking conservation to utilization. In-situ conservation - continued use of the animals in on-farm operations - helps increase the numbers of breeds to safe levels by associating them with a product in demand. In Japan, niche markets have been established for the meat of native cattle breeds, which attracts consumers who effectively pay for their conservation.

Breeding programmes. Developing countries' capacity to use and develop animal genetic resources would also be enhanced, FAO says, by integrating traditional and modern approaches across the full range of livestock production systems. Breeding is the most important component. Today's high-output animals have been selected for at least 20 generations in pure-breeding systems, which require controlled mating, performance testing and sophisticated data processing. In entire developing regions such as West Africa and large areas of Asia, there are no systematic breeding programmes for indigenous breeds, often due to the fact that breeding in many pastoral and mixed farming systems relies on informal animal exchanges.

FAO says breeding for low-input production systems will remain a task for the public sector but could be supported by producer cooperatives or community-based initiatives. Interest in local breeds is growing along with evidence that, with better management and the inclusion of non-market benefits - e.g. parasite resistance - in productivity assessments, local breeds can outperform exotic livestock. However, most countries have no legal framework for the registration of animals of indigenous breeds or for establishing breeding associations. Setting up such programmes in communities with no history of systematic breeding requires significant capacity building and training.

"Given the current dynamics in livestock production systems and the limited availability of resources for conservation in the public sector, a certain loss of local breeds will be inevitable," Irene Hoffmann says. "Countries and the international community should be conscious of which losses are likely to happen, which losses they are prepared to accept, and what investment is needed to ensure conservation."