



ANALYSIS

# Animal genetic resources and economic development: issues in relation to economic valuation

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## Abstract

The world's domestic animal breeds represent an important resource for economic development and livelihood security. Extensive genetic diversity in these breeds allows the existence of livestock in all but the most extreme environments globally, providing a range of products and functions. Unfortunately, a large number of breeds have been lost and many more are at risk of loss. An important research and development goal is the systematic evaluation of breeds in production systems where they are typically found, quantitative assessment of the genetic diversity they possess, the definition of relationships amongst breeds and the implementation of programmes for their effective management, including development of policies and strategies for conservation and sustainable utilisation. The key issues of threats to livestock genetic resources, justification for conservation, conservation strategies, priority-setting for conservation are summarised. The potential contribution of economic valuation in ensuring equitable sharing of benefits derived from domestic animal genetic resources (AnGR) is also discussed. Decisions will be required about which breeds are of highest priority, and which conservation or management options represent optimal use of resources for diversity conservation. There is urgent need for the development and application of economic and policy analysis tools to aid rational decision-making in the management of the global domestic AnGR.

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## 1. Introduction

The term animal genetic resources (AnGR) is used to include all animal species, breeds and

strains (and their wild relatives) that are of economic, scientific and cultural interest to humankind in terms of food and agricultural production for the present or in the future. There are more than 40 species of animals that have been domesticated (or semi-domesticated) during the past 10 000–12 000 years which contribute directly or indirectly to agricultural production (FAO,

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2000). Common species include cattle, sheep, goats, chickens, pigs, horses and buffalo, but many other domesticated species such as camels, donkeys, elephants, various poultry species, reindeer, rabbits, etc. are important to different cultures and regions of the world. These AnGR are vital to the economic development of the majority of countries in the world. In developing countries they also play an important role in the subsistence of many communities and the sustainability of crop–livestock systems. AnGR represent an important component of global biodiversity in terms of food security and sustainability of agricultural systems, yet many of the 6379 recorded breeds of livestock are at risk of loss (Hall and Ruane, 1993; FAO, 2000).

Arguments for the conservation of AnGR include economic, ecological, scientific and socio-cultural considerations. Economic arguments for conservation and sustainable use of AnGR can be an effective means of garnering the necessary public and political support, including development of appropriate policies (see Strauss, 1994; Rege, 1999a). In this regard, important tasks include: (1) assessing the economic contribution that AnGR make to various societies and providing economic arguments to help evaluate costs and benefits of conserving the genetic diversity; (2) assessing the impact of agricultural incentive payments, including subsidies, on domestic animal diversity; (3) economic analyses of alternative strategies and actions that might be taken to conserve domestic animal diversity and developing approaches for assessing priorities; (4) developing economic incentives to support conservation by individual farmers or communities; (5) assessing the economic contribution of efforts to conserve wild relatives of domestic animals; and (6) ensuring that projects with direct or indirect implications for the livestock sector include appropriate consideration of economic issues related to AnGR.

This paper summarises the issues of AnGR conservation and sustainable utilisation as a basis for understanding the context in which a range of economic analyses tools, including economic valuation, could contribute to improved management of AnGR. Our focus is the developing world where livestock make the greatest contribution to

human livelihoods and food security and where resides the greatest diversity of AnGR.

## 2. The role of AnGR in human endeavour

### 2.1. Current value of AnGR

Globally, domestic AnGR supply some 30% of total human requirements for food and agricultural production (FAO, 1999). They are particularly vital to subsistence and economic development in developing countries. They provide year-round flow of essential products, sustain the employment and income of millions of people and contribute draught power and manure for crop production. In rural areas, livestock are an important source of food and cash, and hence are crucial for the purchase of consumer goods and procurement of farm inputs.

Livestock are also a source of high value animal protein and micro-nutrients important especially in the diets of children and lactating women (Delgado et al., 1999). For example, studies have demonstrated substantial improvements in growth and health of infants and young children provided with milk or milk products in Mexico (Alien et al., 1991), Sudan (Vaughan et al., 1981), Malaysia (Chen, 1989), India (Alderman, 1994) and Kenya (Nicholson and Thomson, 1999). Other functions of livestock include production of such non-food items as hides, skins, wool, transportation and fuel (from dung) in some communities. Rege (1998) provided estimates of the value of meat, milk, hides and skins from sub-Saharan Africa's indigenous ruminant livestock and reviewed the value of farm energy and manure from livestock. Ruminant livestock also convert crop residues and fibrous materials of no value into protein of high quality. They also facilitate the use of marginal lands of little or no value for crop agriculture. Also important in some of these production systems are the asset and security functions of livestock. These refer to their role as capital investment yielding interest, for example, in the form of milk. They represent the only durable form of storing wealth, which is particularly important where there is no financial system to perform this function. In view

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