

Sustaining Livelihoods through Animal Genetic Resources Conservation



Almost two billion people rely on livestock to supply part or all of their daily needs. Livestock forms a component of the livelihoods of at least 70% of the world's rural poor including millions of pastoralists and graziers, mixed farmers and landless livestock keepers. In Africa, Asia and Latin America, the poor and the landless derive a higher proportion of household income from livestock sources than do other households.

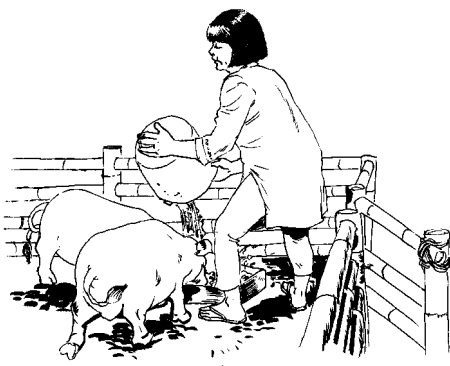
The complex, diverse, and risk-prone peasant livelihood systems of the poor living in marginal areas, and the marginalized living from scarce resources in higher potential areas, require animal genetic resources (AnGR) that are tolerant to harsh conditions, resistant to disease, productive and diverse.

Access by the poor to genetic resources is often limited by various social and cultural factors. Genetic erosion is also threatening the livelihoods of the poor by restricting their access to appropriate AnGR. By taking a sustainable livelihoods approach (SLA) to evaluate the importance of AnGR for the poor, it is possible to identify entry points and interventions to reducing poverty through AnGR management.

Livestock Keeping as a Livelihood

Animals kept by people for agricultural purposes—livestock—are considered as livelihood assets, and the keeping of livestock is part of the livelihood activity of the household. There are four main livestock keeping systems:

- full-time livestock keepers who depend primarily on livestock for their livelihoods (they may be nomadic, sedentary or transhumant);
- livestock-keepers who do some cropping but livestock remain their main means of living (may be transhumant or settled);
- crop farmers who also keep animals and usually stay in one place all year round; and
- the landless who keep some livestock often as a subsidiary activity and live on the edge of villages, towns or cities.



Women livestock keepers often fall into the small stock keeper or the landless livestock keeper categories depending upon their land endowment and right of use within the household.

Livestock keeping:

- provides cash income from sales of animals, their products, and/or their services;
- provides buffer stocks when other activities do not provide the returns required;
- provides inputs and services for crop production;
- captures benefits from common property rights, e.g., nutrients transfer through foraging on common land and manure used on private crop land;
- is used to provide transport, fuel, food and fiber for the household; and
- fulfills social and cultural functions through livestock ownership.

For poor households, the non-income functions of livestock keeping are particularly important. These functions or benefits include savings, buffering, and insurance. For example in southeast Mexico, the main function of backyard pig keeping was found to be as a convertible asset available and easily traded to make payments for health care, schooling, food and other household requirements. Productivity improvements may be important for some types of livestock keepers and a suitable objective in changing livelihood strategies of some rural people, but many situations will require a balance between productivity improvement and the need for secure savings and insurance, and other livelihood functions.

Animal Genetic Resources and the Livelihoods of the Poor

The sustainable livelihoods approach can be used to analyze the well-being objectives that people aspire to, the resources or assets they have access to, and the way in which they use those assets to achieve their objectives. Key to the approach is an understanding of the way in which institutions, both formal (government, laws, markets) and informal (culture, kinship etc.), shape people's access to resources.

Factors that affect the ways these functions are fulfilled include:

- differences between species, breeds, and individual animals;
- narrowed genetic base due to genetic selection;
- change in environments, and livestock owners' purposes for livestock keeping; and
- new demands for AnGR suitable to agroecological and livelihood-oriented production systems.

AnGR and contributions of livestock to the livelihoods of the poor

Contribution	Factors that differentiate between breeds
Regular cash income from sales of animals or their products	Consumer preferences may favor or reject products from certain breeds. Intermediaries will offer different prices for products and animals of different breeds.
Regular cash income from sales or use of animals	Certain uses met by breeds with desired characteristics (size, power, docility) and adaptation to environment (heat tolerance, walking ability, water requirements).
Buffer stocks	Survivability is important; also disease resistance and climatic tolerance; reproductive rate for accumulation of assets.
Inputs and services to crop production	Certain services best provided by breeds with required characteristics (size, power, docility), and adapted to environment (heat tolerance, walking ability, water requirements).
Capture of benefits from CPRs	Adapted to environment and behavioral characteristics (heat tolerance, walking ability, water requirements, foraging and scavenging ability).
Transport, fuel, food, fiber for keepers	Productivity capacity and reproductive rate. Social and cultural functions that provide status and identity. Appearance traits important (hide and skin color, horn size and shape, confirmation, etc.).



Many of the animal genetic resources most important to the poor are not improved breeds, but local breeds that still have important adaptation traits to unfavorable environments and that are able to thrive on low external input-type management.

Natural Capital Assets

Animal genetic resources are part of the natural capital assets of poor rural families. Access to these resources is crucial to many of their natural resource management activities, and hence their livelihood strategies. Access to appropriate AnGR resources in many cases had been negatively affected by the intense selection for desired traits, market demand and policies.

Institutions and Social Relations

Formal and informal social institutions provide the socio-economic context within which livelihood activities are carried out. The processes and structures of these institutions can largely influence access and use of animal genetic resources.



Trends in External Factors

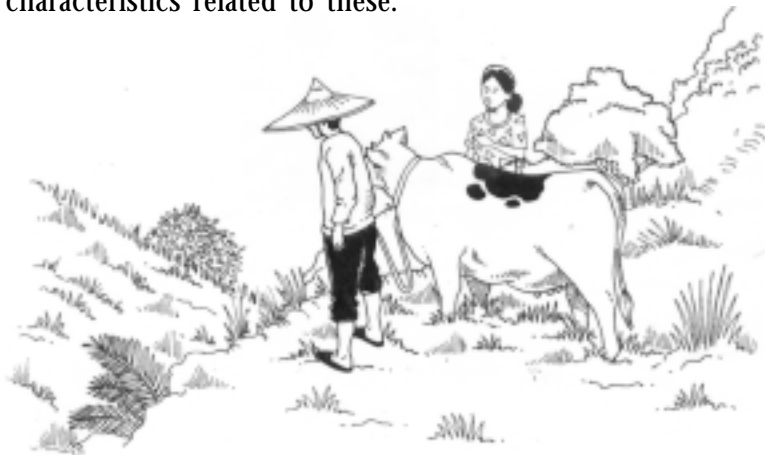
Trends in population demographics and location, e.g., urbanization, also technological changes in agroecosystems and marketing systems, can negatively affect AnGR. Commercial production systems tend towards uniformity of inputs, resources, and outputs, while livelihood-oriented systems thrive on diversity.

Shocks

Sudden changes in climatic conditions (droughts, floods), the impact of wars and social unrest, and the advent of new or sporadic diseases and epidemics could mean the loss of AnGR that are low in number. Poor families are less able to respond to these types of shocks.

AnGR Conservation for Sustainable Livelihoods

AnGR conservation aimed at sustaining livelihoods needs a holistic approach to breed attributes that recognize the array of contributions livestock make to livelihoods and the breed characteristics related to these.



'Local' breeds often have advantages in that they fulfill non-income and socio-cultural needs as a result of selection for adaptive and appearance traits. Breeds that have been subjected to genetic selection for productivity traits—'improved' breeds—generally improve their performance with increasing management levels. Crossbreds ('local' with 'improved') may express a combination of traits (adaptive and productive), and may or may not conform with local peoples' requirements for traits related to socio-cultural

functions. Hence, the importance of local breeds as AnGR is not only their ability to fulfill livelihood functions, but also their genetic contribution to adaptive and other traits to crossbred animals.

From a livelihoods perspective, identifying and addressing the AnGR requirements of poor livestock keepers are important. This is best done through community-based AnGR management.

Ranking Trait Expressions of Livestock Breeds

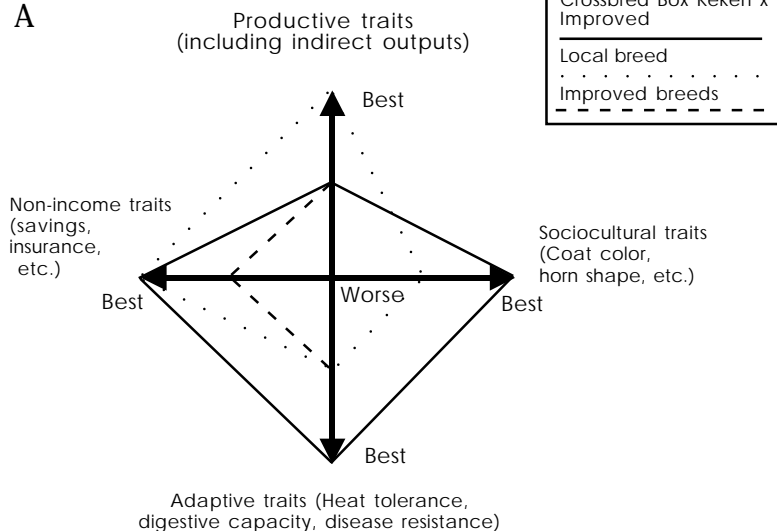
To make rational decisions that take a holistic account of livelihood functions, breeds could be compared using ranking (best to worst) of trait expression in common environments. Four general criteria can be identified—productive traits (PT), adaptive traits (AT), sociocultural traits (ST), and non-income traits (NT). As the sum of rankings for PT + AT traits increases, the importance of genetic conservation for future use in different livestock production systems also increases. As the sum of rankings for ST + NT traits increases the importance of genetic conservation for socio-economic and cultural reasons increases. By plotting the sum of rankings on a kite diagram with PT and AT on the vertical axis and ST and NT on the horizontal axis, the relative merits of breeds for conservation may be compared. Rankings can be elicited from different types of livestock keepers who may keep the breeds under different conditions. In this way, AnGR conservation needs can be differentiated for poor, not so poor, and better-off livestock keepers. As an example, the figures present a comparison of local, crossbred, and improved pig breeds from the perspectives of keepers who keep pigs for livelihood and semicommercial functions in southeast Mexico.

It is important to note that for the PT, AT, and NT traits the genetic basis of the same phenotypic traits ranked under different environments is not necessarily the same. For example, live weight gain in chickens, a PT trait, will be dependent upon different combinations of genes for its expression under a scavenging system where birds have to look for their own diets and under an intensive system where a balanced high protein diet is provided. Hence, comparisons are only possible under the same environmental conditions. However, different livestock keepers apply different husbandry hence their requirements for AnGR are different.

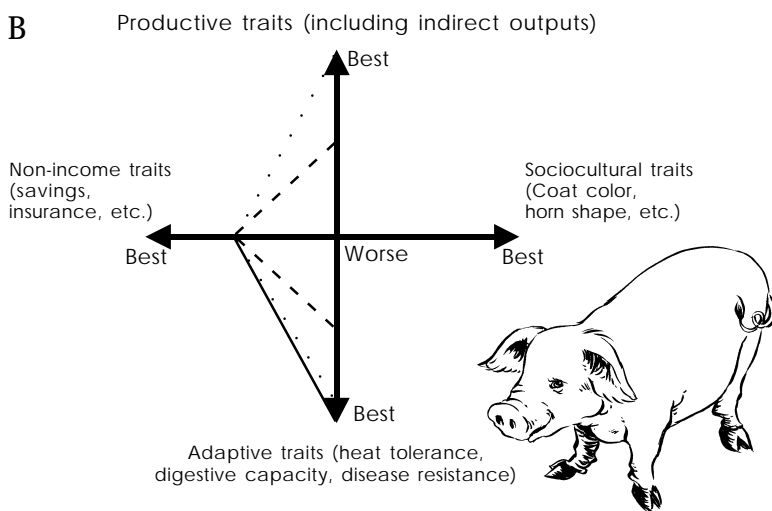


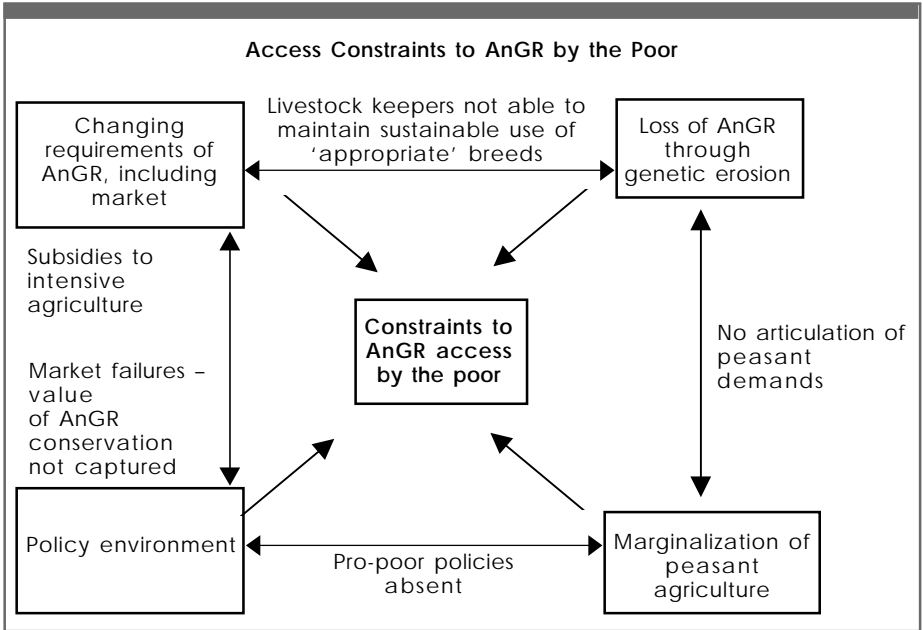
A comparison of three pig types in southeast Mexico for (A) livelihood functions and (B) semi-commercial functions

A



B





A livelihoods approach to AnGR management and conservation requires working directly with the poor to understand the complex interactions between AnGR and poverty, and to maintain or enhance the AnGR assets available to them. Central to this approach is the need to understand the functions of livestock as household assets, the purposes in investing resources in livestock keeping (income, non-income and sociocultural purposes), and the genetic traits that are important for meeting these purposes. AnGR conservation from a livelihoods perspective therefore should address the maintenance and enhancement of AnGR best suited to the livelihoods of the poor, and to ensuring equitable access to these resources.

References:

Anderson, S. 2003. 'Animal Genetic Resources and Livelihoods. Ecological Economics, Special Issue on AnGR.

Carney, D. 1998. Implementing the Sustainable Rural Livelihoods Approach. In: Carney D. (ed). Sustainable Rural Livelihoods: What Contribution Can We Make? Department for International Development (DFID), London, pp. 3-26.

Waters Bayer and Bayer. 1992. The Role of Livestock in the Rural Economy. Nomadic Peoples. Vol. 31.

Sourcebook produced by CIP-UPWARD,
in partnership with GTZ GmbH, IDRC of
Canada, IPGRI and SEARICE.

Contributed by:
Simon Anderson
(Email:
Simon.Anderson@IMPERIAL.ac.uk)