



AFRICAN UNION  
**INTERAFRICAN BUREAU  
FOR ANIMAL RESOURCES**



# **SELECTION AND BREEDING PROGRAMS IN AFRICA**



## KEY MESSAGE

- *Improving the productivity of local breeds through selection is an investment towards ensuring food security and resilience.*

## INTRODUCTION

Many African countries argue that investments in developing local animal genetic resources (AnGR) breeds could benefit small-scale, subsistence or resource poor farmers, and as well contribute to the development of the poorest regions of the Continent. The historical records show that many deliberate efforts have been made to change the genetic constitution of Africa's indigenous AnGR through genetic selection. The justification for focusing on the method of genetic selection has often rested on the premise that local AnGR which have evolved in the diverse environments represent unique combinations of genes which confer not only productive qualities but also adaptive capability.

Given that the effectiveness of the selection strategies depends heavily on the degree of compatibility between production systems, the animal component and physical environment, the social, political and economic environments and the AnGR sector in general and specific producer targets, it is generally accepted, that the overall efforts in Africa, with respect to selection programs for local breeds, have been inadequate, and largely unsuccessful. Several reasons have been adduced for the largely unsuccessful efforts in genetic improvement in AnGR using the selection method. One of the most cited is the lack or inadequate participation of local farmers in the designing, planning and implementation of the selection programs.

There is an increasing demand and call for genetic selection programs in many countries in Africa because when well run these programs can add considerable value to local AnGR breeds. Application of modern selection and breeding practices could result in local breeds contributing far more to food and agricultural production than they currently do. The use of local breeds is the most sustainable option over the long term as long as constraints in the production systems cannot be overcome and these local breeds have proven capable of survival and providing essential products and services, most often with minimal external inputs and veterinary interventions.

Results of past selection programs show that to achieve a long-term selection programme, sustained funding over a long period of time is necessary. Therefore, the situation calls for substantial infusion of financial support from governments in Africa, and that from external sources will continue to be most essential. Results also show that where they exist, selection genetic programs for local AnGR breeds are often inadequate and breed

development goals do not adequately reflect their multiple roles and values.

## **POLICY RELATED ISSUES**

Among issues raised concerning selection and breeding programs for AnGR in Africa are:

- Farmers' selection objectives seem to be often superimposed with national objectives that are generally narrowly defined and largely focus on production characteristics, including milk and meat, as opposed to farmers' concerns for the need to incorporate the values and constraints that farmers encounter.
- Another reason has been given to the effect that selection programs of local breeds being restricted to research stations and much of the gains realized are not being transmitted to farmers' herds and flocks.
- Inadequate considerations for the provision of infrastructural and institutional arrangements have also been cited as another reason why long term selection programs failed. The general absence or weakness in most countries' policies and legal frameworks for AnGR is believed to be reflecting negatively on policies and regulations intended to support selection programs.
- To achieve sustainable genetic improvement, certain activities are essential, such as livestock recording, evaluation of data and supporting the farmers with selection tools. In most countries in Africa, functioning infrastructure to support selection activities is often lacking, or is underdeveloped.
- An important threat to indigenous AnGR is the lack of markets and supporting infrastructure. Wealthier farmers, especially those in peri-urban areas, are able to capture a large share of the local and export markets. It is difficult for poor farmers in remote villages, where the majority of indigenous AnGR are kept, to penetrate such markets. The consequence is that farmers keep livestock for subsistence, but most importantly for 'non-market' functions such as insurance, as a form of investment to be drawn upon during emergencies, for cultural reasons, for traction, for manure production, etc.
- In many countries, awareness of the diverse and significant contributions of AnGR is relatively low among policy-makers, which has resulted in the failure to adequately invest in essential institutional development and capacity building to enable countries to fully utilize and develop their AnGR. A consequence of lack of awareness creation is reckless AnGR management among producers which contributes to the loss of genetic diversity.
- Introduction of exotic germplasm into African countries has been (and continues to be) seen as the solution to low animal productivity even in areas where the exotic genotypes are ill adapted. In many cases, this trend has been responsible for the extinction or severe erosion of the genetic diversity in traditional breeds. This has, in most part, been due to lack of (or inappropriate) assessment of the economics of

these interventions. In particular, conventional evaluations of the impact of exotic breeds have often not considered subsidies provided by donors and governments nor have they been based on sound cost-benefit analysis which includes veterinary and other extension support services as well as 'indirect' costs. More specifically, these evaluations have not included an assessment of the increased risk, loss of indigenous farm animal genetic diversity (including specific genes that may have future global economic importance), and disturbances to ecological balance through impacts on other components of the production system.

- Setting up of any selection programme for AnGR must start with the definition of a breeding goal and followed by the design of a scheme that is able to deliver genetic progress in line with the stated goal. Unfortunately, complete analysis of the entire breeding chain is often overlooked in many selection programs in Africa.
- The lack of expertise trained to design and run effective selection programs is a major constraint. Whereas in some countries formal training is available in local or foreign universities, the study programs are oftentimes too academic and too far removed from the issues of practical breeding in African countries. Major subjects that are oftentimes overlooked include the design of crossbreeding programs, the economic evaluation of genetic differences and breeding objectives, the economic optimisation of selection programs and the genetics of adaptation traits, such as heat tolerance and resistance to parasites.
- Data, especially data of good quality, are essential for national governments and institutions to accurately plan, fund and evaluate AnGR development activities. African policy makers are increasingly called on to use evidence-based research to inform development decisions. But this requires the rigorous collection of data as well as a coordinated system to analyze and disseminate it. Actually, the paucity of accurate, reliable and timely data has been a recurring issue in Africa. It continues to be a major constraint to the effective monitoring and evaluation of interventions and AnGR development programs across countries in Africa.
- Inadequate or lack of sustained funding is a major limitation to the implementation of selection programs. It may be that they are other more profitable, or less risky private investments, to be made in capital hungry countries than in breeding operations, although investment is growing along with the market development. Whereas in some regions governments often do not have difficulties in starting projects usually funded under donor agreements, there appears to be a lack of a long-term commitment on the part of the decision-makers to secure funds on a sustained basis to run these programs.

## LESSONS LEARNED ON THE DESIGN AND IMPLEMENTATION OF SELECTION AND BREEDING PROGRAMS IN AFRICA

### **Improve the policy development and a comprehensive legal framework for animal genetic resources**

It is essential that farmers and agriculture policy-makers fully understand the nature of their production systems in order to match appropriate AnGR with the specific conditions and limitations of each production system so as to achieve sustainable development. Elimination of policy barriers and the establishment of policies that support the development of local breeds and all production systems are desirable.

### **Promote Inventory and higher level characterization of AnGR**

It is essential to characterize the specific strengths of local breeds, the economic benefits of their present use and potentials benefits for their future use. Understanding of the extent, distribution, basic characteristics, comparative performance and the current state of each country's AnGR is essential for achieving their efficient and sustainable use and development. Data and information obtained from inventories, monitoring and characterization will enable farmers to determine which breed should be chosen and managed under the prevailing production conditions.

### **Design and implement Sustainable programs that ensure genetic progress**

Well-organized selection programs should contribute to the competitiveness of the breed in the long run, especially in small populations and when only a small number of good males are available. Where local breeds are transboundary, there should be programs to benefit from cross-border cooperation. Although breeding goals can be slightly different between countries, effective population size should increase through cross-border cooperation to allow for the development of regional objective. Selection programs should also contribute to value those aspects of the breeds and their farming systems that are not yet recognized by the market, such as cultural, social and environmental roles.

## SETTING THE POLICY AGENDA

The Agenda setting for genetic improvement of AnGR should include:

### **Increase investments to enable full utilization and development of AnGR**

Financial resources need to be mobilized from within countries and from donors to support AnGR management and to enhance understanding of linkages between livestock development and food security and poverty eradication. Significant investments are necessary for breed characterization to be undertaken in the major production systems as prerequisite to selection. Also, government institutions should be able to assist farmers to obtain credit to enable them to invest in genetic improvement of their livestock.

Strengthening of research institutions through enhanced investment by both the public and private sectors should be regarded as a priority.

### **Encourage stakeholder contribution (public private partnership)**

It is important to establish mechanisms within countries to enhance interaction among all the main stakeholders in the livestock sector, including public agencies and private sector interests, farmers, farmer organizations, research and education institutions. The enhanced involvement of the private sector, non-governmental organizations and foundations will be highly beneficial.

### **Emphasize capacity development**

There is a need to enhance the capacity to use and develop AnGR by integrating traditional and modern approaches and technologies across the full range of available production systems. National and regional needs and priorities aimed at enhancing capacity to better use and develop AnGR in all production systems should be identified. There is a need for national policies, institutional development and capacity building to ensure strong national programs for AnGR and regional support to assist countries to build their capacity.

### **Create and implement advocacy and awareness strategies**

There is a need to better engage research and educational institutions as well as the commercial sector to increase awareness of the need to maintain AnGR for future use and to encourage participation in efforts to maintain diversity. Awareness building may require outreach programs and liaison with diverse groups, preparing promotional materials and information, showing farm animals at public events, and supporting advocacy groups for farm AnGR.

### **Encourage and empower breeder organizations or associations**

Establish, facilitate and support farmer interest groups, breed associations to build national capacity as they play an important role in designing and implementing breed use and selection programs, in the development and review of national policies and legislation related to AnGR.

### **Promote the identification and performance recording**

Mechanisms for individual identification and performance recording should be put in place, particularly for indigenous breeds. There is a need for training of personnel in performance recording and analysis and in animal breeding and statistical genetic evaluation. Strengthening breed registration systems to institutionalize and standardize data and information collection and recording to enable improved performance evaluation should be a priority.

### **Integrate proper management of genetic variation in selection programs**

Secure selection strategies and measures that make breeds 'self-sustaining', i.e. breeds that can be maintained without the need for external economic support should be promoted. Successful breed strategies or policies should guarantee the combination of production, market and non-market values. Several closely related breeds exist in neighbouring countries or other countries. By sharing experience and knowledge, the cooperation should result in more effective and cost-efficient actions/programs towards sustainable use and selection of the local breeds.

### **Subject National breeding objectives to scrutiny with a view to incorporate farmers' objectives**

National breeding objectives largely focus on production characteristics, including milk and meat. However, many farmers value indigenous local AnGR in different ways from the primary values assigned by national agricultural policy. Breeding objectives for local indigenous AnGR need to incorporate the values and constraints that farmers encounter.

## **POLICY OPTIONS AND RECOMMENDATIONS**

Proposed policy options and recommendations to minimize failure rates in the future, and to promote more effective approaches include the following:

- Governments should place awareness creation about the value of local AnGR breeds on their priority list of activities and interventions for protecting biodiversity, and at the same time making them useful to those dependent on it. The awareness created among policy makers regarding the essential contributions that AnGR make to food security and rural development, and the potential impacts resulting from the erosion of these resources, should alter the course of managing AnGR in the respective countries.
- Governments should put in place national policies and legal frameworks or have them strengthened where they already exist, to create enabling environments for the management of AnGR. The development of Strategies and National Action Plans for the management of AnGR should be expedited in all countries. The National Action Plans should include considerations on how to maintain local AnGR breeds and how to make them more self-sustaining. Mechanisms should be put in place for the countries to learn from each other on how best to utilize such policies.
- Regional economic communities should develop policies that promote collaboration among stakeholders, limit indiscriminate introduction and use of exotic breeds, raise awareness about the positive roles of farmers, monitor the effect of trade and trade related intellectual property regimes on the sustainable use and development of AnGR.
- Governments should financially support improved facilities and technical know-how on AnGR management in their respective countries. Specialized training in advanced and emerging technologies and methodologies related to the use and development of

AnGR should be integrated into the curricular of Universities and Technical institutions as part of effort to improve the skills of technicians and extension agents involved in genetic improvement programs. Capacity building among producers should also be a priority. The technical and organizational support to breeders associations will thus be more effective.

- Governments should create the right policy and economic environments that foster collaboration among various stakeholders, including those in the public and private sectors. The partnerships should be nurtured to the point where long term funding with involvement of the private sector (PPP) is feasible. The newly created trust between the private and public sector should trigger understanding of the need to develop selection programs for local AnGR within the private sector, and promote private sector involvement in AnGR initiatives.
- Governments and RECs should support the development of niche markets for products of local AnGR breeds to increase profitability and encourage the keeping of local breeds, support plans for production, contribute to services and market infrastructure to enhance support for farmers and local products, and to promote and encourage regional trade in AnGR and their products.

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African Union – Inter-African Bureau for Animal Resources (AU-IBAR)  
Kenindia Business Park, Museum Hill, Westlands Road  
PO Box 30786-00100 Nairobi, Kenya.  
Tel: +254 (20) 3674 000 Fax: +254 (20) 3674 341 / 3674 342  
Email: [ibar.office@au-ibar.org](mailto:ibar.office@au-ibar.org)  
Website: [www.au-ibar.org](http://www.au-ibar.org)