



Photo: ILRI/Apollio Habtamu

POLICY BRIEF | RAM AND BUCK CERTIFICATION: QUALITY ASSURANCE FOR IMPROVED GENETICS AND ANIMAL HEALTH

KEY MESSAGES

- Identification of the best sires is a critical component of any genetic improvement program.
- Dissemination of improved genetics through selected rams and bucks from community-based breeding programs (CBBPs) is critical to achieve genetic gains at a wider scale.
- A standard procedure of ram certification ensures that high quality, healthy and physically fit sires are used, to protect the breeders' 'brand' and provide quality assurance for buyers.
- The viability and integrity of a ram and buck certification program will depend on sustainable institutional arrangements, including public private partnerships.
- Public support to subsidize the cost of sire certification is needed for an intermediate period until breeding cooperatives and unions can acquire more autonomy.

SUMMARY

Where they have been properly implemented, community-based breeding programs (CBBPs) of Ethiopian sheep and goat breeds have generated substantial genetic gains. Genetically superior sires from these breeding programs are used within the community flocks where they were selected or are sold as improvers to flocks outside of the community. Making sure that selected rams and bucks have the required attributes is crucial for their use, sale and exchange as improved sires.

Certification is a primary means to guarantee the quality assurance of disseminated sires within the framework of CBBPs. It is an essential element in the genetic improvement of valuable local breeds and supports their sustainable utilization. In response to this need, a certification procedure that involves an evaluation of the genetic superiority, physical wellness, behavioral fitness and health of sires has been co-designed and co-implemented by the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Livestock Research Institute (ILRI) and their partners in Ethiopia. Substantial experience has been acquired, which can be used to inform the up- and out-scaling of the process. Moreover, because certification should be considered a public good, public funding should be made available to subsidize the process.

Ayelech Alato with her winning sheep at the 10-year celebration of community-based breeding of sheep and goats in Ethiopia.

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INTRODUCTION

Ethiopia is endowed with one of the world's largest sheep and goat populations, comprising 42.9 million sheep and 52.5 million goats (CSA, 2021). However, productivity and meat production levels are far below their potential and earnings from livestock domestically and from export trade are not optimized. One limitation has been the absence of breeding programs that can enable smallholder farmers to access more productive animals selected from across the well-adapted local sheep and goat populations.

To overcome this problem, community-based breeding programs for sheep and goats were developed and implemented by ICARDA and its partners in several locations across the whole country over the last 10 years. In areas where CBBPs have been implemented properly, communities have benefited from the genetic gains and related socioeconomic benefits (Haile et al., 2020).

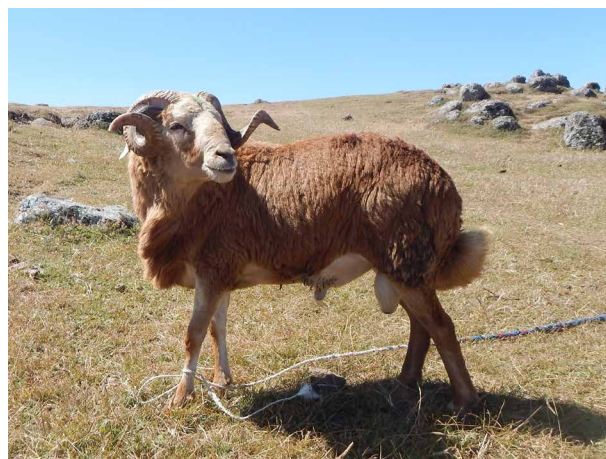


Alemayehu Haile, chair of one of the CBBP cooperatives in Bonga, Ethiopia, checks the body condition of a sheep from his community.

Photo ILRI/Apollo Habtamu

The benefits from CBBPs are mainly harnessed using the selected sires on large number of females. This allows selected males to pass on their genetic superiority to a large number of progenies and ensure genetic progress. To optimize their genetic merit, selected sires should be physically fit and free of the most prevalent contagious diseases.

An official program of certification of rams and bucks will provide assurance to users that they are using the right sires. The certification process requires technical evaluation and administrative arrangements that may involve a number of institutions and also policy measures that guide the process and its implementation. ICARDA and partners have initiated and implemented a sire certification procedure for rams and bucks to be used under natural mating or artificial insemination (AI). Substantial lessons and insights learned can be now applied to up- and out-scale the process to other breeds and livestock species, such as swine and cattle.



A breeding ram from Menz, Ethiopia.

Photo ICARDA/Tesfaye Getachew

APPROACH AND RESULTS

The certification procedure (**Figure 1**) involves the following:

- **Step 1:** Sires for certification are selected by a designated committee in CBBP farmer cooperatives.
- **Step 2:** The sires are assessed at adjacent research institutions that are implementing CBBPs with the producers, where estimations of the sires' breeding values and preferred traits are generated based on the institution's breeding data management system. Eventually, this step should be handed over to the National Animal Genetic Improvement Institute (NAGII).
- **Step 3:** The sires undergo a physical and clinical examination, semen assessment, evaluation of mating ability. These are conducted by a trained team in the regional research center jointly with veterinarians from the adjacent animal health services.

- **Step 4:** The sires are vaccinated against known reproductive diseases by the regional divisions in charge of animal health.
- **Step 5:** Eligible sires are issued the final certification (**Figure 2**) by the district agricultural/livestock development office based on the results of a technical evaluation (**Figure 3**).

The analysis of the data, the various technical evaluations and provision of vaccines all incur a cost, which will require public subsidization support until the certification process can function autonomously. These costs, however, could be amortized through the returns generated from the use of the top ranked animals in artificial insemination (AI) programs. Mobile and low-infrastructure AI labs have been in use by ICARDA and partners in some of the areas where CBBP has been implemented. To date, acceptable fertility from AI has been achieved through use of diluted fresh semen.

Figure 1. Steps and actors of the rams and bucks' certification process

Source: ICARDA. Additional acknowledgment goes to BCVA & members of the Sheep Veterinary Society who attended an expert workshop in Edinburgh in June 2014

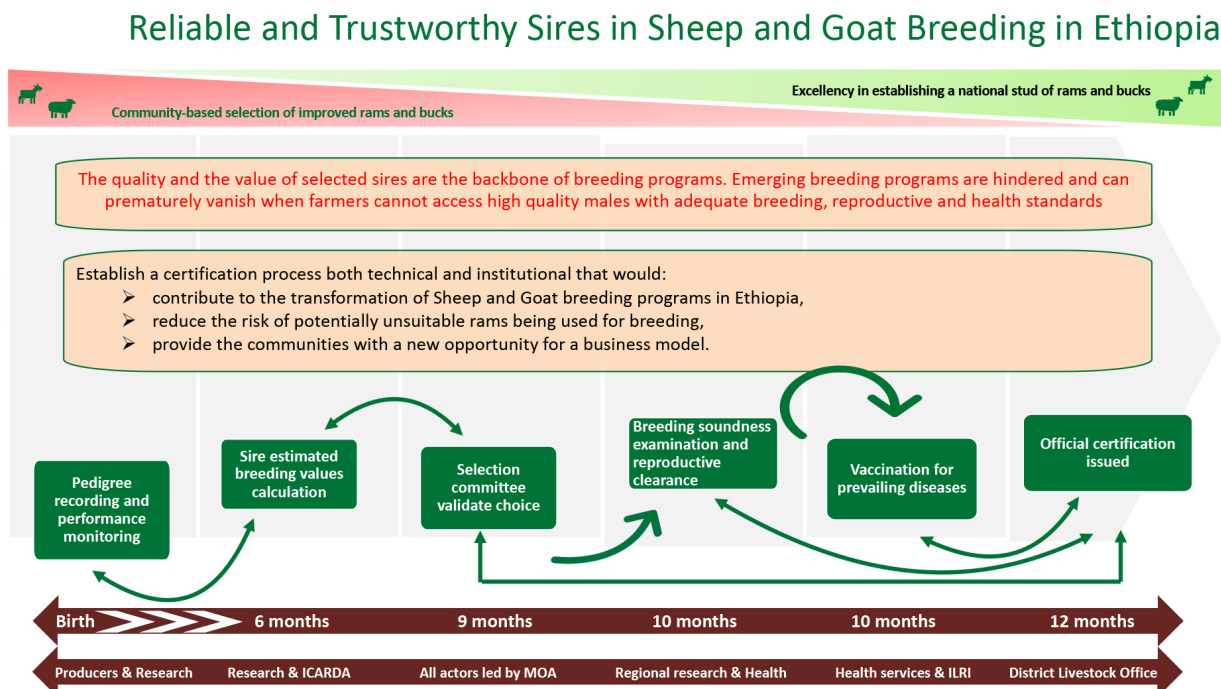


Figure 2. Model of the ram certificate issued in Bonga, Ethiopia

Source: ICARDA. Additional acknowledgment goes to BCVA & members of the Sheep Veterinary Society who attended an expert workshop in Edinburgh in June 2014

Ram Pre-Breeding Examination Certificate (Bonga CBBP)

Date of Examination: _____

1. Physical examination

Body condition score (1-5)	NAD	Abnormal
Eyes, nose and mouth		
Conformation and limb soundness		
Feet		
External genitalia		
Scrotal circumference		cm
Overall results: SATISFACTORY* / UNSATISFACTORY*		

NAD = No Abnormality detected, *delete as required
Tick as appropriate

2. Semen examination

Collection method	AV*	EEJ**
Appearance/density	/5	
Gross motility	/5	
Overall results: SATISFACTORY* / UNSATISFACTORY*		

*AV: Artificial vagina; ** EEJ: Electro-ejaculator

3. Assessment of mating ability and libido

This ram has been observed exhibiting normal service behavior and mating ability	
his ram has not been observed exhibiting normal service behavior and mating ability	

Tick as appropriate

4. Classification

SUITABLE FOR BREEDING	based on meeting the requirements of section 1 only
SUITABLE FOR BREEDING	based on meeting the requirements of section 1 and 2 only
SUITABLE FOR BREEDING	based on meeting the requirements of section 1, 2 and 3
UNSUITABLE FOR BREEDING	

Name of District-Head Animal Production Office

Date

Certificate No

Signature and stamp

Bonga

Ram Pre-Breeding Examination: On-farm Data Collection Form (Doyogena CBPP)



There should be a tick, measurement, comment, or 'NE' (not-examined) in each white box.

Date of birth/Age (months)				
BCS (out of 5)				
If normal, then write N. If abnormal, then describe e.g. small, enlarged, soft, hard, lumpy, swollen...	Teeth			
	Feet			
	Rest of body			
	Brisket			
	Prepuce			
	Penis			
	Scrotum			
	Testicles size	L	R	
	Epididymis head	L	R	
	Epididymis tail	L	R	
Scrotal circumference (cm)				
Semen collection method	1st collection		2nd collection	
	AV	EEJ	AV	EEJ
Volume (ml)				
Gross density				
0 (clear) -5 (double creamy)				
Gross motility/ wave motion (0-5)				
Mating ability				
Vaccination		Date		
Brucellosis				
Sheep pox				
Peste des Petits Ruminants				
Foot and mouth disease				
Enterotoxaemia				

Figure 3.
On-farm assessment
criteria for certification
of rams and bucks
(Source: ICARDA)

IMPLICATIONS AND RECOMMENDATIONS

The optimal use of the selected sires from CBBPs either through AI or natural mating is dependent on the quality of rams and bucks identified as superior sires.

- Investing in the certification of sires will provide breeding communities and buyers with the assurance to access genetically superior animals which are physically fit, protected from known contagious diseases and are reproductively functional (semen quality and mating ability).
- Promotion of the use of certified rams and bucks for AI increases their genetic contribution and impact and thereby increases the return to the investment incurred by the certification steps. A different grading system in the certification process for sires to be used under AI or natural mating condition may need to be considered and would imply the willingness to pay for certification by the communities.
- To further ensure the integrity of the certification process and maintain uniformity across breeds and species, estimation of the breeding value, evaluation of the results of breeding soundness examination will need concerted action and support at the national level. While research centers are well-positioned to roll out certification as a complementary activity

to CBBPs, the certification program naturally falls under the prerogatives of NAGII and the animal production division of the Ministry of Agriculture. CGIAR centers (ICARDA and ILRI) can foster the transition between currently involved institutions and those endowed to make it perennial and sustainable.

- The sire certification process for the CBBPs should be considered a public good and therefore needs to be backed by the public system.
- Providing price incentives for the top best ranking rams to be used for AI and modest price incentives for the next level of ranked rams for natural mating use could help cover a portion of the cost of ram certification. The cost of certification may affect the up scaling of the process and wide use of improved sires and partial public funding of the process is required.
- The institutional arrangements to ensure the integrity of the certification process, means of alleviating the burden of the cost of certification (particularly the vaccination and semen quality assessment), and the adoption of differential pricing for certified sires for use in artificial insemination or natural mating are aspects which still need to be addressed.



Children with their does await their turn at a mobile artificial insemination clinic. Their does will be inseminated with semen from a certified buck.

Photo ICARDA/Tesfaye Getachew



Young certified bucks from Konso, Ethiopia. These bucks are products of an artificial insemination campaign in the area and are highly valued by the community. Photo ICARDA/Tesfaye Getachew

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Partners

The SmaRT-Ethiopia project is led by ICARDA in close collaboration with ILRI, Ethiopian NARS and other international partners.



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