

Pilot Operationalization of the Certification of Improved Rams and Bucks

ILRI Campus, Addis Ababa – November 19, 2019



Section A. General Overview

Reliable and Trustworthy Sires in Sheep and Goat Breeding in Ethiopia



Community-based selection of improved rams and bucks

Excellency in establishing a national stud of rams and bucks

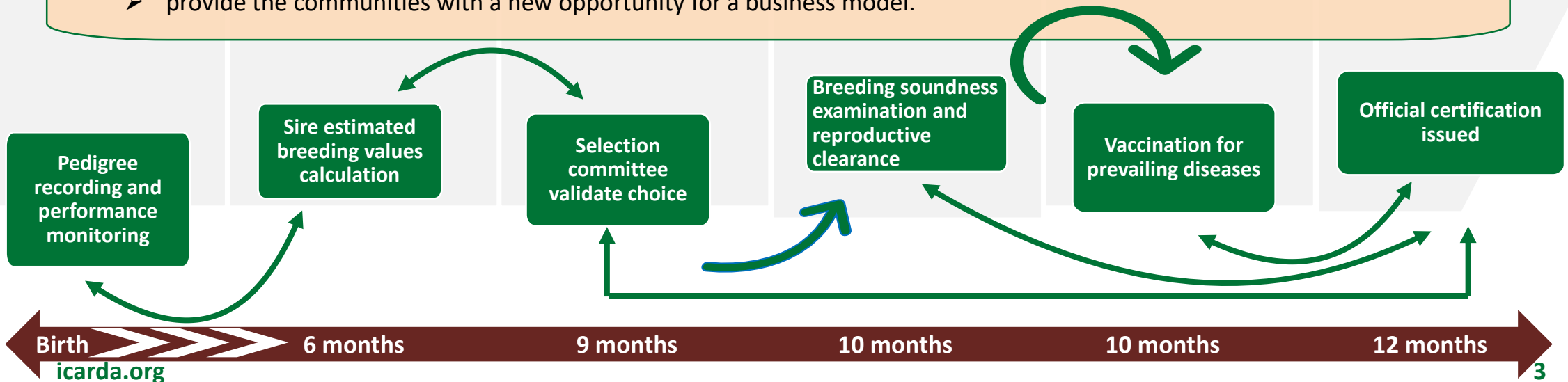


Ministry of Agriculture, NAGII, ICARDA, ILRI

The quality and the value of selected sires are the backbone of breeding programs. Emerging breeding programs are hindered and can prematurely vanish when farmers cannot access high quality males with adequate breeding, reproductive and health standards

Establish a certification process both technical and institutional that would:

- contribute to the transformation of Sheep and Goat breeding programs in Ethiopia,
- reduce the risk of potentially unsuitable rams being used for breeding,
- provide the communities with a new opportunity for a business model.



When & Where is Certification Required

When

- ☛ Pre-sale check
- ☛ Pre-breeding use
- ☛ Insurance

Where

- ☛ Rams selected in the framework of sheep breeding programs supported by the federal and regional; authorities in Ethiopia;
- ☛ Rams selected in the framework of sheep breeding programs supported by the Ministry of Agriculture;
- ☛ Other initiatives



Technical Certification Packages

- ☛ Estimation of breeding values for preferred traits
- ☛ Physical and clinical examination
- ☛ Semen assessment
- ☛ Evaluation of mating ability
- ☛ Vaccination against known reproductive diseases



Estimated Breeding Values

- Breeding value is the relative functional value of an animal, defined by its genes, in a breeding programme
- Mathematical definition of the breeding value
 - $BV = 2(OFF - PM)$
 - BV = deviation of an individual due to its breeding value
 - PM = average of reference population,
 - OFF = average of the offspring of the individual,
- BLUP animal model: the recent estimation method

$$Y_{ijk} = Xh_i + Zs_j + e_{ijk}$$

Y_{ijk} = Obs vector of trait with dimension $(n \times 1)$

X = Design matrix for fixed effect with dim $(n \times p)$

Z = Design matrix for random effect with dim $(n \times q)$

h_i = A vector for fixed effect of dimension $(p \times 1)$

s_j = Vector of random effect with mean zero and variance (σ^2_s) of dimension $(q \times 1)$

e_{ijk} = Random error vector

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Reliability of estimated breeding values:

- Heritability of the trait,
- Availability of information on the trait,
- Efficiency of estimation method



On-Farm Data Collection

Annex 1. Ram Pre-Breeding Examination: On-farm Data Collection Form

Vet/Examiner		Farmer/community				Date	
There should be a tick, measurement, comment, or 'NE' (not-examined) in each white box.							
Ear tag/tattoo/ID		Ram 1:		Ram 2:		Ram 3:	
Breed/Estimated breeding value							
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	L	R	L	R
Epididymis head	L	R	L	R	L	R	
Epididymis tail	L	R	L	R	L	R	
Scrotal circumference (cm)							
Semen collection method		1 st collection AV / EEJ	2 nd collection AV / EEJ	1 st collection AV / EEJ	2 nd collection AV / EEJ	1 st collection AV / EEJ	2 nd collection AV / EEJ
Volume (ml)							
Gross density							
0 (clear) -5 (double creamy)							
Gross motility/ wave motion (0-5)							
Mating ability							



Bonga Breeding ram

Full Guidelines on Physical and Clinical Examination

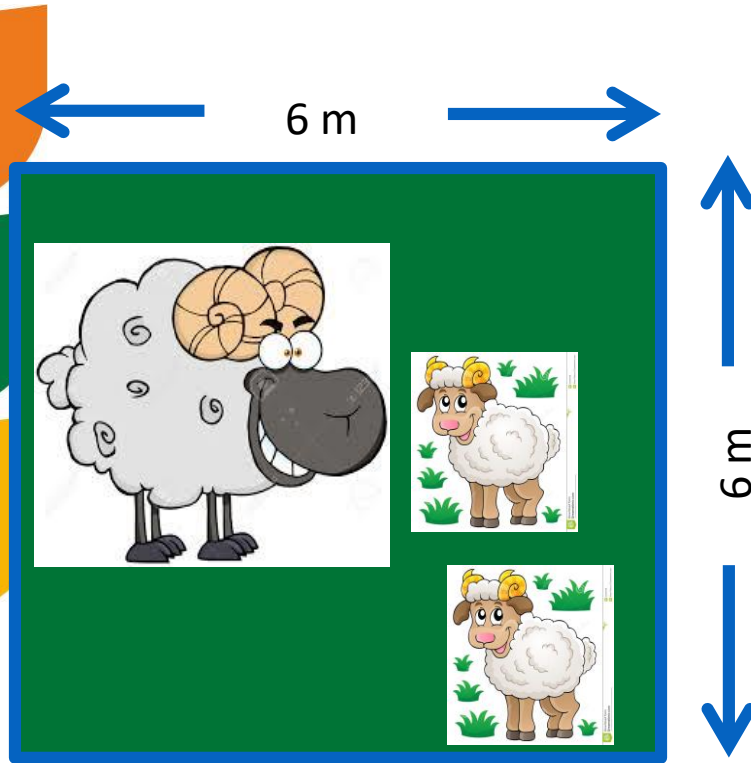
Rams' Breeding Soundness Evaluation

*Year round management for rams that are fit
for successful reproduction*



October 2016

Rams' mating ability



Libido test

In the presence of 2 estrous females record during 10 minutes:

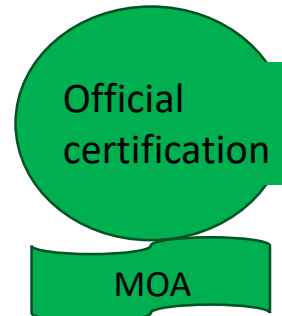
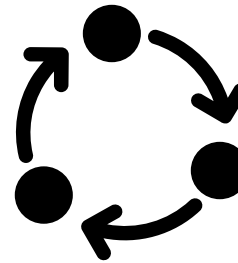
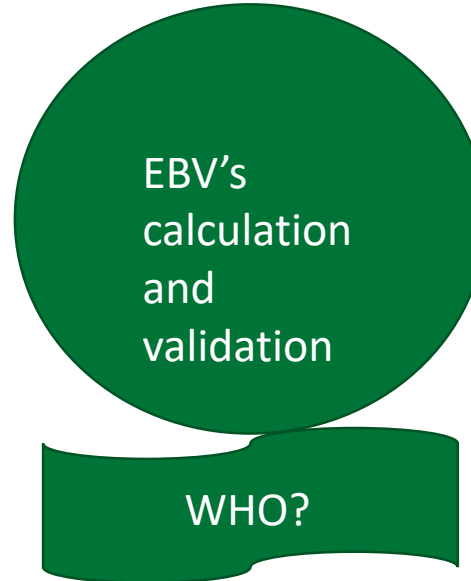
- Latency to first reaction (s)
- Total activity time (min)
- Vulva sniffing
- Flehmen
- Lateral approaches
- Mount attempts



Semen collection in artificial vagina or using electro-ejaculator



Optimal Institutional Make-up?



Model of Certificate

Annex 2. Ram Pre-Breeding Examination Certificate

Date of Examination: _____

Owner	
Address	

RAM	Ear tag:
	Breed:
	Date of birth/age:

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

NAD = No Abnormality detected, *delete as required

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	

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 (tick as appropriate)

This ram has been observed exhibiting normal service behavior and mating ability

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

Important: This certificate should be accompanied by a vaccination certificate against known reproductive diseases.





Section B. Pilot Certification of Improved Rams 2020-2021

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International Center for Agricultural Research in the Dry Areas

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A CGIAR Research Center



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Pilot Certification Program in Menz and Bonga in 2020-2021

- ☛ The sires' certification program will be implemented at a pilot stage in 2 sheep CBBP sites namely Bonga and Menz;
- ☛ All yearling rams to be selected during the different selection rounds will be subjected to the certification process;
- ☛ We anticipate between 60 and 90 rams per site and per year;
- ☛ Prior to the kick-off of the sires certification in the two sites, ICARDA will finalize and publish the certification technical guidelines.



Transition Institutional Arrangements: 1. National actors

- ☛ The National Animal Genetic Improvement Institute (NAGII) will take over the whole certification process starting from 2022;
- ☛ During the transition phase (2020-2021), the transition institutional arrangements will involve:
 - The regional research centers in Debre Birhan and Bonga for data compilation, genetic certification, breeding soundness examination and the reproductive ability;
 - Veterinarians in regional animal health services should be involved with the regional research centers in breeding soundness examination and the assessment of the reproductive ability;
 - The animal health services under the Livestock Agency for vaccinations against major prevailing diseases;
 - Certification issuance will be under the authority of the Livestock Agency within the Agricultural Bureau;
 - During the transition phase, NAGII will work on elaborating the electronic registration of certificates for recording, monitoring and traceability purposes;



Transition Institutional Arrangements: 2. ICARDA

- ☛ ICARDA will monitor the full implementation of the pilot program from the technical and institutional perspectives;
- ☛ ICARDA will finalize, validate and disseminate the guidelines for technical and institutional arrangements for the certification of improved rams and bucks;
- ☛ ICARDA will facilitate the subsequent engagement of the communities, national actors and private sector;
- ☛ ICARDA will continue marketing certification to policy makers;
- ☛ ICARDA will develop a module on AnyCloud as a repository of certified rams;
- ☛ ICARDA will organize the kick-off certification pilot protocols in Bonga and Menz in April 2020.



Technical Requirements: 1. Genetic Certification

- ☛ The genetic-related information to be captured during the certification process is the following:
 - ID of the selected ram;
 - Pedigree of the selected ram;
 - Estimated breeding value;
 - Rank among selection batch;
 - Selection criteria (weights at different ages, growth rate, dam litter size...).

Technical Requirements: 2. Physical and Clinical Examination

- ☛ This step includes an assessment of the general physical examination. It includes:
 - Assessment of body condition score on a scale of 1 to 5;
 - General clinical examination of the eyes, nose, mouth, conformation and limb soundness, feet, external genitalia;
 - Auscultation of the heart and lungs;
- ☛ Scrotal circumference.
- ☛ Full guidelines for physical and clinical examination can be found [here](#);
- ☛ Physical and clinical examination is first assessed at selection and then repeated yearly for the released icarda.org sires.



Technical Requirements: 3. Semen Examination

- ☛ Semen is assessed for the following criteria:
 - Volume
 - Gross density
 - Gross motility
- ☛ It is very important to specify the method of ejaculate collection; electroejaculator or artificial vagina;
- ☛ Evaluation grid and on-farm data collection form can be accessed [here](#).

Technical Requirements: 4. Mating Ability

- ☛ Libido is difficult to assess and define;
- ☛ It can be limited to when the vet/examiner has observed normal service behavior and intromission when the ram is presented with females in oestrus;
- ☛ At least one successful service within 10 minutes of being presented to in-oestrous female should be expected;
- ☛ Alternatively, a formal libido test can be performed when the ram is placed with 2 females in oestrus for 10 minutes and observations on Latency to first reaction (s), Total activity time (min), Vulva sniffing, Flehmen, Lateral approaches and Mount attempts are recorded and quantified;
- ☛ During the post-release, farmers should regularly check that improved sires are displaying normal libido and reproductive behavior.



Technical Requirements: 5. Vaccination Against Reproductive and Other Prevailing Diseases

- ☛ In the absence of disease screening facilities across the whole country, certified sires (rams and bucks) should be vaccinated against diseases of national importance;
- ☛ The “must have” vaccinations, for which vaccines are available in Ethiopia are: Brucellosis, Sheep pox, Peste des Petits Ruminants and Foot and mouth disease;
- ☛ The “nice to have” vaccinations are for diseases commonly reported in Ethiopia but for which vaccines are not available: Maedi visna, Toxoplasmosis, Chlamydiosis, Border disease, Enterotoxaemia;
- ☛ During the post-release phase, the vaccination status of the released sires should be monitored.



Threats to Continue

- ☛ Lack of human capacity and lack of minimum infrastructure for diagnostics and for information flow;
- ☛ Indifferent or negative attitude of CBBP communities with regards the value of certified sires;
- ☛ Non-willingness of the end users to pay: 1. for the improved sires and 2. the extra cost of certification;
- ☛ Lack of a public-private partnership for the co-implementation of certification;
- ☛ Poor engagement of the policy makers;



Breeding for future generations...



Thank you