Goat Breeding Strategies

Joaquin Mueller
National Institute for Agricultural Technology
Argentina

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This presentation

✓ Genetic improvement strategies in low input goat production systems of developing countries.

✓ Community based breeding programs (CBBP).

✓ Breeding structures with examples.
Problems to apply conventional breeding programs in low input systems of developing countries

- Limited breeding infrastructure and breeding skills
- Difficulties with animal identification
- Difficulties for performance recording
- Difficulties for pedigree recording
- Rarely functional genetic structures
- Deficient strategic services (AI, genetic evaluation, laboratories)
- Weak national R&D organizations
¿What can be done?

✓ Instead of large national - breed based - programs we may target groups of farmers in a particular region
  • with similar problems
  • similar animals
  • similar breeding objectives
  • socially linked
  • common interests

✓ Community Based Breeding Programs (CBBP)
INVITED REVIEW

Community-based livestock breeding programmes: essentials and examples

J.P. Mueller¹, B. Rischkowsky², A. Haile², J. Philipsson³, O. Mwai⁴, B. Besbes⁵, A. Valle Zárate⁶, M. Tibbo⁷, T. Mirkena⁸, G. Duguma⁸, J. Sölkner⁸ & M. Wurzinger⁸

1 National Institute for Agricultural Technology (INTA), Bariloche, Argentina
2 International Center for Agricultural Research in the Dry Areas (ICARDA), Addis Ababa, Ethiopia
3 Swedish University of Agricultural Sciences (SLU), Uppsala, Sweden
4 International Livestock Research Institute (ILRI), Nairobi, Kenya
5 Food and Agriculture Organization of the United Nations (FAO), Rome, Italy
6 University of Hohenheim, Hohenheim, Germany
7 Food and Agriculture Organization of the United Nations (FAO), Cairo, Egypt
8 University of Natural Resources and Life Sciences Vienna (BOKU), Vienna, Austria
To establish a successful CBBP:

1. Enable a favorable project environment
2. Clarify the production system and breeding objective
3. Choose selection criteria and records
4. **Organize a breeding structure**
5. Make *a priori* evaluation

FAO, 2010

ICARDA, 2017
4. To organize the breeding structure

- Mate best females with best males to increase probability of getting better progeny for replacement
- Discuss with farmers the most efficient and practical structure

Farmer community with goats

Some examples:
Breeding structure: separate mating

✓ Establish a “nucleus” herd with best does and bucks available
✓ Mate them separately from “base” animals

✓ Problem:
  ✓ Who takes care of nucleus

✓ Example with goats in Tajikistan (ICARDA)
✓ A particular farmer/shepherd may take care of the nucleus and graze it elsewhere
Khorog, Tajikistan

Source: Mueller et al.
Breeding structure: temporal open nucleus

- Example with goats in Iran (ASRI-ICARDA)
- 8 Raeini herds of nomad clans
- Best 40 does and best 2 bucks of each herd selected for a nucleus
- All males born in base herd are sterilized
- Buck replacements selected on own performance

Source: Mueller et al. (2015)
Baft, Kerman, Iran CBBP
Separate mating of nucleus and base: the different nomad clans opted for different separation methods

Some preferred to construct a wire fenced corral, others preferred grazing the nucleus separately from base herd

Some were able to identify progeny from each buck

Worse buck in progeny test replaced with best young male.

Rotation of bucks between herds was planned

Source: Mueller et al. (2015)
Breeding structure: central open nucleus

- Example with goats in Argentina
- A nucleus herd with best animals available in the region was established in an experimental station.
- Communities were asked to select a member to act as multiplier, receiving bucks from nucleus.
- Multipliers supplied bucks to its community
- Eventually nucleus disappeared and a breed society was formed by multipliers.

Source: Mueller et al. (2015)
Breeding structure: “super-nucleus”

- Example with sheep in Peru (UNALM)
- 20 communities with communal herds and individual family herds
✓ Established a super-nucleus
✓ Best rams/semen available
✓ Best ewes from community herds (20 each) in exchange of AI
✓ Performance and progeny test in super-nucleus
✓ Land for super-nucleus provided by communities
✓ Labor provided by farmers in turns.

Source: Mueller et al. (2002)
Breeding structure: male nucleus

- Example with llamas in Bolivia
- Best males of community run uphills (“Anaqa”) by community members (in turns)
- When needed farmers go to Anaqa and select a male for mating downhills (“Jach’a uta”).

Breeding structure: mating station

- Example with alpacas in Peru
- Best regional males are classed as 1st, 2nd, 3rd and kept at communal mating station.
- Farmers take their alpaca females for mating to the station.
- Females are classed 1st, 2nd, 3rd and mated with correspondingly classed males.
- Structure organized by community farmers

Credits: Choquehuanca (2009)
Breeding structure: decentralized nucleus

- Best females are “nucleus” females.
- Keep only male progeny from best females, sterilize others.
- Performance test these males to select future sires.

Problems:
- How compensate the owner?
- Who tests and keeps these males?
Breeding structure: decentralized nucleus

- Example with sheep in Ethiopia (ICARDA)
- Males from best ewes identified and kept intact. Others sterilized.
- Owner of male is paid for rearing.
- Ram serves in community herd.
- When sold for meat, the cash is used to pay for rearing a new candidate.

Revolving Fund
Breeding structure: rearing and performance testing center

- Example with goats in Argentina
- Buck keeper system
- Specialized farmers keep only bucks (old or young candidates)
- The keeping service is paid in kind (kids – meat)
- Allows progressive selection/culling before seasonal mating

Male rearing center
Breeding structure: specialized nucleus farmers and mating station

Example with goats in Kenia (Farm Africa)

“Toggenburg Breeders” get 1 T male and 4 T females, to be paid in cash or kind (T progeny).

Selected male progeny sent to “Buck Station” where community farmers take their does for mating up to a maximum of ¾ T blood.

By 2015 approx 1000 pure T and 4000 farmers involved

Source: Ojango et al. (2010)
Experience: main planning aspects with negative effects on CBBP

- Lack of institutional commitment or genuine interest of farmers
- Costly identification and recording system
- High dependency of external funding
- Lack of access to strategic services
- Lack of project exit plan (unsustainable project)
- Too many farmers/stakeholders involved
- Deficient instruction, infrastructure, accessibility
Main aspects which contributed positively to the success of CBBP

- Institutional commitment
- Organized farmers
- Manageable amount of participants
- Reasonable identification and recording efforts
- Availability of strategic services (laboratories, geneticists)
- Support of enumerators / local extension officers
- Appropriate breeding structure
- Market for improved product
Summary of recommendations

✓ Farmers: work together, build organizations.
✓ Projects: involve all stakeholders from start, plan project exit.
✓ Implementation agents: go slow, plan tactically.
✓ Researchers: do not confuse farmers with your research objectives, be practical, provide technical options for farmers to choose from.
✓ Geneticists: explain the principles, apply common sense.
✓ Financing bodies: most programs require initial financing and technical support, but usually they are very cost effective and have many positive collateral effects.
Thank you very much for your attention

joaquinmueller@gmail.com