Minutes of a workshop on Developing Small Ruminant Breeding programs

Debre Berhan

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Background

Ethiopia is known for having the largest livestock population in Africa. Across the country, millions of cattle, donkeys, camels, chickens, sheep and goats live and work alongside people. The relationships between people and animals are long-standing, close and deeply embedded in culture and traditions.

Yet millions of rural people remain locked in poverty. They work long hours to feed themselves, they battle harsh natural environments, often far from roads, clinics and markets and they and their animals lead far less productive lives than their urban cousins.

The picture is not all bleak. Public services and infrastructure are fast expanding, markets are growing, fueled by urban and export demands for food, and agricultural growth and transformation is a driving goal of government. Communities are also taking power into their own hands, transforming local resources into assets that benefit them all. Animals are often at the heart of this transformation.

Small ruminants are extremely important in the livelihoods of smallholder farmers of Ethiopia. However, the small ruminant sector is faced with various challenges. Its performance is generally low but the situation could easily be improved with targeted interventions on the most limiting factors within the value chain. Productivity per animal and flock off-take are both low. For example, estimates of the average annual off-take rate from sheep and goat flocks indicated values of 33% and 35%, respectively (Njua et al., 2013).

Reproductive performance of small ruminant flocks in Ethiopia is low compared to global averages. Productivity is low for a range of reasons, including the following:

- High lamb and kid mortality - This reduces the population and represents a loss of potential income for the farmers. In Ethiopia, for example, up to 50% of all lambs/kids born die due to various causes
- Low growth rates - leading to late onset of puberty (first kidding at age of 18-24 months)
- Poor nutritional status - leads to long inter-kidding intervals (10-12 months)
- Uncontrolled breeding – management practices do not improve the populations because breeding is at random. Even the males with inferior traits mate with females.

Animals that tend to be sold in markets are the fast growing individuals leading to gradual erosion of genetic merit. There is very limited culling of poorly performing males and this further limits genetic improvement among traditional flocks. Broadly, challenges facing small ruminant improvement in Ethiopia are attributed to both technical and institutional challenges: breeding practices, feeding and health care are all sub-optimal, and market infrastructure and information is lacking. Marketing arrangements are predominantly informal and there are many marketing agents along value chains, which is both an opportunity and a challenge.

Although small ruminants are extremely important for rural population and demand for small ruminant meat is growing rapidly, compared to dairy and beef cattle, they have been largely neglected by policy makers. To achieve sustainable gains from small stock, without further degrading the environment, significant productivity increase are needed. This will require an integrated effort aimed at sustainably improving the genetic potentials, flock and pasture productivity, infrastructure, animal health, input and market services and enabling policies.

A powerful tool for enhancing productivity of livestock is genetic improvement; genetic changes are passed on to the next generation while changes in husbandry practices have to be sustained continuously. This tool, however, has been poorly utilized, and attempts in establishing straight breeding programs in developing countries—in particular for small ruminants—have remained unsuccessful. Reasons for the poor utilization of genetics in livestock improvement relate to lack of infrastructure, high initial investment and the longer time required for impacts to be made. Most of the agricultural, and particularly livestock, investments in developing countries are project-driven, and often the project duration is not sufficient to see impacts; and this leads to little investment in breeding programs on the ground. In the past, most breeding programs in developing countries were established centrally on governmental farms or large private breeding farms with little active participation of the producers who were 'receivers' of improved animals without being part of the decision- making processes. This often led to wrong definition of breeding objectives or a loss of adaptation to the more challenging environmental conditions leading to high mortality rates.

In the last decade or so, a new approach—community-based breeding programs (CBBP)—has been suggested as an alternative to the conventional centrally managed and top-down breeding programs. This approach explicitly takes account of farmers' needs, views, decisions, and active participation, from inception to implementation. Success comes from proper consideration of farmers' breeding objectives, infrastructure, participation, and ownership (Mueller 1991; Sölkner et al. 1998; Wurzinger et al. 2011).

In Ethiopia there has been different attempts at developing breeding programs either for selective breeding or crossbreeding. Different institutions also follow varying approaches including nucleus and community-based schemes. The different efforts need to be harmonized, and pilot activities taken to scale to bring about sustainable change to lives of rural people. With this in mind, ICARDA in partnership with ILRI, ATA and EIAR convened a workshop during December 17-18, 2015 in Debre Berhan. The objectives of the workshop were:

- To review and synthesize lessons learned in sheep genetic improvement activities so far,
- Design a detailed plan for small ruminants genetic improvement and dissemination of improved genetics
- Identify enabling environment for the breeding programs to succeed
- Agree on roles, responsibilities and the timetable for the implementation of the breeding programs

Four sheep (Begait, Bonga, Horro and Menz) and two goat (Abergelle and Arsi-bale) breeds were identified during an earlier held national expert consultation for consolidating regional priorities of livestock genetic gains organized by ATA during 06—07 October 2015.

Participants included breeders and animal production experts representing different institutions. The outcomes of the workshop included the following five focus areas:

- Existing knowledge on the breeds has been reviewed and compiled;
- Initial inception sites of the breeding programs identified;
- Breeding objectives of the communities for each breed were discussed and suggested, subject to verification by the target communities;
- Suitable breeding structures were suggested; and
- Enabling environments to sustain the proposed breeding programs were highlighted.

A detailed framework of the breeding programs for each of the six breeds is given below.

Summary of breeding plans for major sheep and goat breeds of Ethiopia

Breed	Existing knowledge	Sites	Breeding objective	Breeding structure	Enabling environment
Abergelle goat	• Breed characterized at both phenotypic and genetic level • CBBP initiated at two sites • Aybra goat breeding station established	Bilaqu and Saziba village sites and Aybra breeding station	Meat and Milk production	Single tier community based breeding program; Link CBBP with the nucleus at Aybra	• Technical backstopping by research system • Establishment and/or strengthening cooperatives • Support services are needed in a number of technical areas: o To strengthen preventive veterinary services such as vaccinations and deworming o Disease surveillance by researchers (e.g coenurosis was recently identified) o Napier grass and cowpea were introduced by ARARI; further work is needed o demonstration of fattening using cowpea hay is underway; needs to be expanded o promote major goat markets; market outlets and routes, infrastructure, legalization and licensing of informal goat traders and intermediaries o encourage /support cooperative to be actively involved in goat marketing o Access to price information is critical and should be emphasized o Supply of formulated feed by Cooperative Unions o Micro-finance services as and when needed

Arsi-bale goat	• Breed characterized at both phenotypic and genetic level • Ongoing open nucleus breeding program	Two villages around adami tulu (dodicha and Haleku); two sites in the highlands of Arsi (around Bekoji district) and Bale (Robe-Sinana and/or Dinsho district)	Meat and milk production	Single tier community -based breeding program	• Technical backstopping of the breeding programs o Creating institutional linkages (Farmers and Kulmsa ARC, Arsi University, Sinana ARC, HwU, Adami Tulu ARC, LFRDB) o Training on recording, record keeping and animal husbandry o Breeding value estimation at center level • Support of community actions by BoLFRD and extension agents by o Facilitating to establish cooperatives together with district cooperative promotion office o Providing health service o Supplying forage seeds o Creating market access • Establishment of support services o Community health workers training o Linking the newly established cooperative to hotel, Universities, processors and exporter o Establishing and strengthening forage nursery sites o Availing ODKs • Capacity development for the whole program at site, regional and cross-national level (training of trainers) o Employing enumerator and/or data technicians o Linking locally enrolled MSc students with the programs o Providing training of trainers • Supportive policies and regulations o Implementing guideline and bylaws of cooperatives • Micro-finance support particularly targeting cooperatives
Begait sheep	No work on characterization of the breed done; because of perceived better meat production of the breed it has been distributed to different parts of Tigray for	Humera and Begait ranch nucleus flocks (genetically linked); six cooperative village breeding groups in	Meat production	Dispersed village nuclei linked with central nucleus flock	• Formation of team and formulation of breeding program (refine proposed scheme) • Formation of Permanent technical advisory team • Supporting cooperative group (link with financing, cooperative management,.) • Gender awareness creation and especial support for coop. breeding group • Identification of major diseases, developing strategic disease control, delivery of health services • Feed resources development (planting improved forage, improving rangeland, establishing communal grazing management committee,), concentrate delivery service facilitation, developing feeding strategy

	crossbreeding with other local population	three weredas; commercial farms			• Formation of cooperatives • Capacity development of breeding program researchers and experts • Training of farmers and DAs
Bonga sheep	• Breed characterized at both phenotypic and genetic level • 16 Bonga sheep producer's cooperatives running CBBPs • On-farm performance data of the breed	16 villages in Bonga area; Bonga sheep breeding ranch	Meat production	Single tier community based breeding program; Bonga ranch used as testing station to candidate rams	• Technical backstopping by Bonga ARC on data collection, genetic evaluation/ selection • Improve gender participation and decision making in CBBPs (committee member, production) • Feed resources development • Develop technological package for fattening, targeting specific market • Establish market linkage for breeding and meat animal • Prevention based health intervention (vaccination, reproductive diseases, internal/external parasites) • Capacity development at different levels (gender balance, data collection (enumerators), data management and genetic evaluation (BARC), production management packages (farmers), business management (cooperatives) • Link the coops with Omo microfinance, identification of policy gaps (if any)
Horro sheep	• Breed characterized at both phenotypic and genetic level • 2 Horro sheep producer's cooperatives running CBBPs • On-farm performance data of the breed	2 villages in Horro gudru (Lekku and Gitlo); two more villages to be identified	Meat production	Single tier community based breeding program	• Technical backstopping by Bako ARC on data collection, genetic evaluation/selection • Improve gender participation and decision making in CBBPs (committee member, production) • Feed resources development • Develop technological package for fattening, targeting specific market • Establish market linkage for breeding and meat animal • Prevention based health intervention (vaccination, reproductive diseases, internal/external parasites) • Capacity development at different levels (gender balance, data collection (enumerators), data management and genetic evaluation (BARC), production management packages (farmers), business management (cooperatives) • Link the coops with Oromia credit and saving association, identification of policy gaps (if any)
Menz sheep	• Breed characterized at both phenotypic and genetic level • 3 Menz sheep producer's	Three Villages in Menz (Negasi-Amba,	Meat production	Single tier community based breeding program; on-station	• Required institutional/organizational arrangements o Technical backstopping of the breeding programs is expected from DBARC, ICARDA (continuous process) o Identify needs on infrastructural capacity building (reproductive lab, meat quality test lab, genetic lab and so on). We can think of one good sheep and goat reproductive laboratory furnished with all

	cooperatives running CBBPs • On-farm and on-station performance data of the breed • Nucleus flock at Debre berhan research center	Dargegn, Keyaferna Zole; Nucleus flocks DBARC and Amed guya		selective breeding	required qualified equipment that could serve as a primary training and excellence center for the nation. o The support of community actions by BoA and extension agents should be strengthened o Training for researchers (data management and analysis, lab techniques, training on reproductive technologies) • Establishment of support services o Enable cooperative breeders to have their own health services. Enable the cooperatives to get in touch with the feeds markets (there could be some new sources of animal feeds from the two bear industries at Debre-Birhan and we need to see possible options of getting cheap feed sources but also think how this could be utilized. Strengthen farmers cooperatives in provision of input supply (feed, improved seed, drug, health service) o On-job training of farmers and DAs o Increase the number of participant females, ensure participation of women in all stages of the breeding program • Supportive policies and regulations o Strengthen the cooperatives breeding program to embark on marketing and feed supply areas (Avail working policies and implementable regulations endorsed by the Government). • Micro-finance support particularly targeting cooperatives • Monitoring of the on-going breeding programs • Creating professional platform • Promotion of Menz sheep meat and establish link with local and export markets. • Establish health certification through breeding soundness exam and recording for the selected breeding rams • Strengthen and ensure the ram rotation procedures and culling procedures of unproductive (male and female sheep) • Look in to the management aspect by sheep producers (improved housing, better feeding, culling capacities); also see options to restrict bad season lambing discussing with the farmers • Identify infrastructural and equipment needs for the community (eg. office, collection yard, weighing facilities, shearing machine, probe for detecting pregnancy, hoof teamers, applicators, to be done by DBARC in the coming 3 months)