

Effective data management plays vital role for smallholder sheep and goat breeding programs

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Sheep and goat breeding plays a vital socioeconomic role in the agricultural sector across Central and West Asia and North Africa

(CWANA) and beyond, providing valuable resources such as meat, milk, and wool. However, insufficient or ill-adapted breeding programs and practices are compromising the conservation and improvement of animal genetic resources, resulting in lower quality and less productive herds, which in turn impacts farmers' incomes and livelihoods.

To address these issues, the CBBPs supported by ICARDA and its partners focus on empowering farmers to improve selection methods without undermining indigenous breeds' resilience and genetic integrity and without pricey interventions.

The collection, management, and analysis of data through the user-friendly app DTREO is key to the success of the programs. In collaboration with AbacusBio (New Zealand), CGIAR Sustainable Animal Productivity (SAPLING) initiative, the Accelerating the Impact of CGIAR Climate Research for Africa (AICCRA) project, and the National Agricultural Research Systems (NARS), ICARDA has been working on expanding and sustaining DTREO for ongoing and newly established CBBPs across Ethiopia.

"DTREO is a powerful and flexible digital genetic database that enables the efficient capture and analysis of performance and pedigree data to inform breeding decisions better," says Dr. Tesfaye Getachew, ICARDA's Small Ruminant Breeder and DTREO Manager.

"This plays a vital role in assisting the genetic evaluation process of communal herds. Proper genetic evaluation also helps identify and cull unproductive animals, preventing poor-performing animals from contributing to higher greenhouse gas emissions per unit of output," he adds.

Since 2019, ICARDA has trained 65 enumerators in Ethiopia to collect data on tablets and enter them in DTREO, enhancing the accuracy of

breeding values and offering quick feedback to communities through reports and graphics. In addition, data collected manually in the country over the previous decade have been uploaded to the digital platform, generating valuable datasets for further research.

Piloting DTREO in Jordan, Tunisia, and Mali through training and workshops

Given the successful establishment of DTREO in Ethiopia and the demand from breeding programs in other ICARDA program countries, ICARDA and its partners conducted workshops and training on better data recording and management systems in Jordan, Tunisia, and Mali to expand the use of DTREO. Providing such on-the-job training and workshops plays a crucial role in empowering local stakeholders to improve small ruminant management interventions and manage their CBBP more effectively.

Jordan

In July 2023, the National Agricultural Research Center (NARC) in Jordan, in collaboration with ICARDA, organized a field visit and a training program aimed at maximizing the effectiveness of the ongoing Awassi sheep breeding program. The program brought together a team of six scientists from ICARDA and NARC.

At the conclusion of the visit and the training, the team had the opportunity to engage in a fruitful discussion with the NARC director and had a valuable exchange of insights, ideas, and recommendations regarding the optimization of the Awassi sheep breeding program. The program is specifically focused on improving the production of Awassi sheep meat and milk, which is renowned as one of the top-quality sources in the Gulf region.

Most national efforts focus on the development of an elite Awassi flock at the NARC livestock station to produce superior sires and dams that are introduced into sheep producers' flocks. In parallel, the NARC is implementing a national strategy aiming at improving Awassi flocks at the household level through an insemination program using elite sire semen.

ICARDA and national authorities selected 23 pioneer farmers who have the potential to engage in digital and analog data collection and could be involved in potential CBBPs in Jordan. To support both the station and farmer programs and ensure outcomes are properly monitored and analyzed, ICARDA conducted training sessions for the national researchers on genetic analysis of data collected at multiple time points, which allows them to make time-specific breeding decisions.

Tunisia

In Tunisia, a data collection system has been in use since the 1970s but is mostly meant for larger state and ranching flocks, so it doesn't include small-scale holders despite a high demand for improved genetics by small and medium-scale keepers associations.

Continuous and improved genetic evaluations and animal ranking are the main challenges for small-scale farmers, hindered by the wide and inconsistent management of small herds. Addressing the issue requires a flexible and user-friendly digital system that can integrate different sources and sizes of information at the herd level. DTREO not only allows this but also offers the function to submit feeding and health data, which complements genetic data to offer a broader scope for analysis.

Given the regional demand for improved data capture, in April 2023, ICARDA's Small Ruminant Team conducted both virtual and face-to-face training on DTREO with over 11 researchers from ICARDA and

Tunisia national systems, as well as national development experts. The participants were introduced to the features of DTREO, including how to capture and save data offline, such as at the market or in fields, and upload to the database when an internet connection is available.

Mali

Mali, which shares borders with seven countries and is home to a rich genetic diversity of goats and sheep, plays a key role in the regional livestock trade.

However, the absence of robust breeding programs poses a threat to the gene pool and the unique traits of the local breeds. ICARDA and its partners are focusing their efforts on the establishment of a local goat CBBP in two villages of the Segou region, in the central part of the country, to improve breeds and strengthen the pool of quality genetic traits.

In 2023, enumerators from the community and national experts took part in initial animal identification and ranking experiments in 33 flocks and were trained to collect data on growth, reproduction, milk yield, and goat survival, which will later be loaded into the DTREO system.

Data collection is a game changer in agri-science

In Tunisia, the data collection process is already taking hold. Over 750 records from small to medium-sized flocks belonging to farmers' organizations in the Northwest have so far been uploaded into the database, marking a step forward in establishing a comprehensive and valuable database to pilot novel methods for analyzing performance and identifying superior animals.

In Jordan, DTREO is improving the country's database and breeding strategy by more thoroughly evaluating and improving the genetic potential and performance of the breeding stock.

"Empowering enumerators, breeders, and researchers with an advanced data collection and management tool enables them to make informed decisions regarding animal management, standard genetic evaluations, and selection and mating decisions. The global expansion and adoption of the DTREO digital database have the potential to revolutionize small ruminant breeding, driving significant improvements in breeding programs, enhancing productivity, accelerating genetic progress, and optimizing overall farm efficiency," says Dr. Tesfaye Getachew.

"The field visits and training sessions conducted by ICARDA and NARCs in Jordan, Tunisia, and Mali show how ICARDA's science can be a game changer across the region," he adds.

By leveraging the knowledge on data collection gained from their collaboration with ICARDA, stakeholders in Jordan, Tunisia, and Mali can now strengthen their national breeding and management programs and ensure sustainable agricultural development, and demonstrate the value of collaboration and knowledge sharing towards improving the lives of dryland farmers across the region and beyond.

Provided by International Center for Agricultural Research in the Dry Areas

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