CGIAR INITIATIVE ON Agroecology

Reproductive Management Tools for Small Ruminants' Flocks in Tunisia:

First Steps Towards a Widespread Adoption of Transabdominal Ultrasonography for Pregnancy Diagnosis

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Contents

1. General overview

- Transabdominal ultrasound pregnancy diagnosis is an ethical, low-cost, practical, and accurate reproductive tool for detecting pregnant females among small ruminants' flocks.
- A pregnancy diagnosis using an ultrasound machine transabdominally can accurately be confirmed between 30 and 90 days of pregnancy. In some cases, it could be confirmed as early as 25 days and as late as 120 days.
- It is mainly used for detecting pregnancies and barren females in the flocks – These two main findings will allow farmers to better manage their flocks by:
  - Evaluating the conception rates in a flock after a mating season or artificial insemination;
  - Providing females with their specific nutritional needs and health care depending on their physiological state, stage of pregnancy, and number of foetuses;
  - A quick detection of non-pregnant females after natural mating or artificial insemination (AI) – This will allow farmers to separate non-pregnant from the flock for a second mating or AI round;
  - Avoiding abortions by eliminating pregnant females from prostaglandin-based oestrus synchronization protocols;
  - Culling non-fertile females, after checking their history.
- Mass ultrasound pregnancy diagnosis has been adopted across many countries within different projects for improving small ruminants' breeding and productivity (Ethiopia, Jordan, Sudan, Pakistan, etc.). And it is now being introduced to Tunisian small ruminants' breeders' communities within ICARDA's Integrated Herd Health Package (I2HP) under CGIAR's initiative for an agroecological transition in small ruminant farming systems, as ultrasonography is a low-input, eco-friendly technique for managing livestock reproduction.

Figure 1. Delivery of ultrasound pregnancy diagnosis service across different countries (Tunisia, Jordan, Pakistan, Ethiopia, Sudan)

2. What did we do?

- In Tunisia, this tool has been introduced by ICARDA team to communities in five Tunisian governorates, namely El Kef, Siliana, Beja, Bizerte, and Zaghouan.
- The beginning was in **El Kef and Siliana** with 18 reference farmers adherent to the Integrated Herd Health Package under the Agroecology initiative. A first introduction was made to all farmers between December 2023 and January 2024 for non-seasonal pregnancies, and was followed by other transabdominal ultrasound pregnancy diagnosis sessions after natural mating season in response to farmers' requests, between June and October 2024. Within this first tentative, **a total of 170 females** were examined for pregnancy.
- This clean reproductive tool was also used during the "Green Fertility" trial in **El Kef and Siliana** to assess females' fertility and compare the conception rates of females which grazed in the VOT forages prior to mating to females which grazed in the fallow land. Within this trial, 51 ewes were examined for pregnancy on a first session (04th July 2024) then 29 ewes were examined on a second session (31st July 2024) – With **a total of 80 ewes**.
- A collaboration was made between ICARDA team and Office of Livestock and Pasture (OEP) in Saouef, **Zaghouan** to examine females from the two sheep breeds Barbarine and D'man for pregnancy. **A total of 80 ewes** were examined for pregnancy between June and October 2024.
- Another collaboration was made between ICARDA team and the farmers' cooperative "Groupement de Développement Agricole des Éleveurs de Brebis du Nord (GDAEBN)" to examine ewes and does from different flocks and breeds for pregnancy in **Beja and Bizerte** governorates. The main purpose of the sessions that followed this agreement was to give farmers guidance on the best management decisions to take after the spring, summer, and autumn mating seasons. **A total of 1,034 females** were examined for pregnancy between September and December 2024 – The body condition scores of ewes and does were also noted in purpose of better managing the feeding practices of the flocks.
- Totally, **out of 2,011 females in the flocks, 1,364 were examined.** This total of 2,011 females in the targeted flocks, although not all were examined for pregnancy, will benefit from evidence-based breeding decisions and optimized flock management.

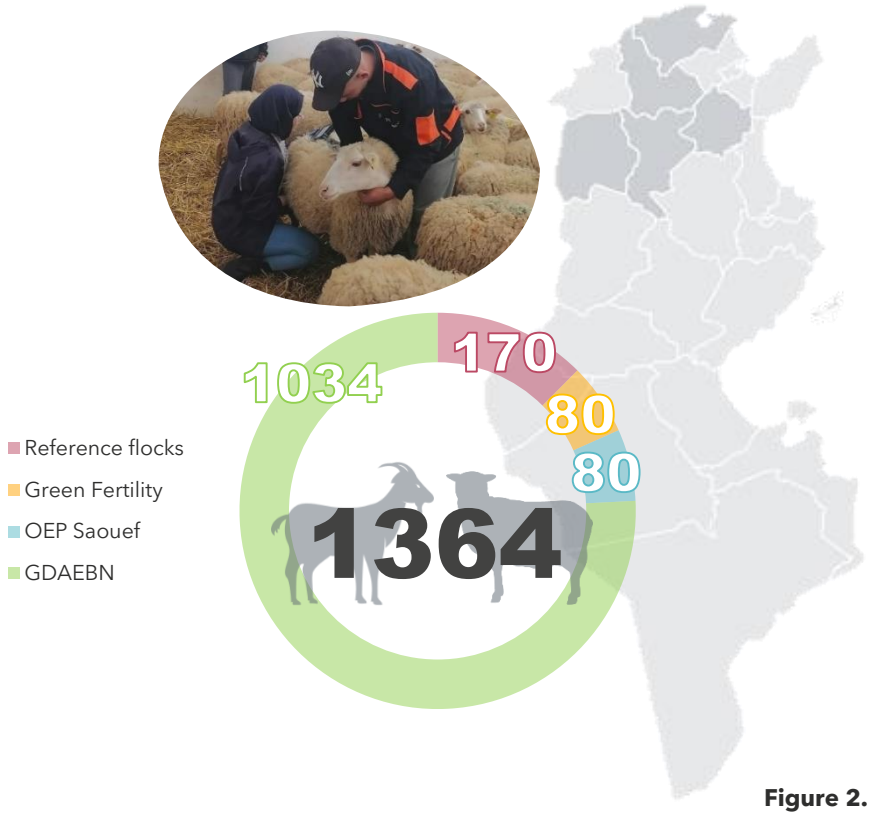

Figure 2. Outputs of ultrasound pregnancy diagnosis sessions in Tunisia

3. Farmers' feedback

- In the communities where we worked, farmers are becoming aware of the usefulness of this practical tool for flock management and for improving flock composition.
- Since the introduction sessions, farmers have been recording the findings from ultrasound pregnancy diagnosis and have been efficiently using them.
- They are increasingly requesting ultrasound pregnancy sessions for their ewes and does, citing three reasons for that:
  - The first reason is to separate pregnant females to provide them with their specific nutritional needs and health care in an optimal environment;
  - The second reason is to separate non-pregnant females for second mating round as quickly as possible;
  - The third reason is to help them decide whether to cull infertile females or to "give them a chance" to become pregnant again.

4. Concluding remarks

- Mass ultrasound pregnancy diagnosis is a green, ethical, and cost-efficient tool for managing the reproduction of small ruminant flocks.
- In Tunisia, this tool is being introduced to farming communities as a practical means to improve flock productivity and composition, as part of the implementation of the Integrated Herd Health Package under CGIAR's Agroecology initiative.
- It has also been utilized by researchers, under the same Agroecological initiative, to assess an on-field trials that were co-designed with farmers.
- Between December 2023 and December 2024, a total number of 1364 females in five Tunisian governorates were examined by ICARDA team for pregnancy using transabdominal ultrasound.
- Farmers are increasingly interested in adopting this reproductive tool and are becoming more aware of how to use it efficiently.
- Yet, the efforts described in this report represent only an initial step. Continued efforts, complemented by the involvement of additional stakeholders, are needed to achieve wider adoption of the tool and to maximize its positive impact.

5. Way forward

- Organizing awareness days for farmers in El Kef, Siliana, Zaghouan, Bizerte, Beja, and other districts to outline the main features, the benefits and the limits of transabdominal ultrasound pregnancy diagnosis, and how to efficiently make use of it. In addition to that, the first step that was made in 2024, as well as farmers' feedback, have to be shared with all participants…
- Ensuring a widespread dissemination of this reproductive tool across Tunisia by mobilizing other concerned stakeholders to get involve. Actually, its positive impact extends beyond farmers to include other stakeholders. For instance, mass ultrasound pregnancy diagnosis can enhance the business models of private veterinarians by diversifying their services and increasing their income, compared to diagnosing only a few ewes per flock…
- When applied in an integrated approach, mass ultrasound pregnancy diagnosis acts as a valuable indirect tool for genetic improvement, as in the Ethiopian Community-Based Breeding Program. It helps evaluate conception rates after artificial insemination (AI) for better management decisions for the flock, and for optimized AI protocols. This tool can effectively be applied to any future genetic improvement programs for small ruminants in Tunisia, facilitating better breeding strategies and improving productivity…

6. Acknowledgements

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