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Small ruminants research and training needs assessment according to stakeholder's perspective in Andalusia (South Spain)

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Abstract. The current situation of small ruminants' sector in Spain is framed within a long process of restructuring associated with different national and international socio-political and economic challenges. In this framework, numerous studies confirm the importance of considering the opinions and perceptions of farmers to achieve all these challenges and highlight the weakness of agricultural research and training programs offered to meet farmers' demands for specific knowledge. This must be facilitated by policy programs where agricultural research and training institutions play a key role. In order to fulfil that gap, the Institute of Agricultural Research and Training in Andalusia (IFAPA) organized several focus groups with different farming and livestock sectors to identify their priorities on research and training to be included in its Sector Program 2018-2021. In the case of small ruminants and framed with the National project RTA2015-00070-C03-02, we proposed to identify and quantify small ruminants' sector real needs on research and training, to achieve greater productivity, competitiveness and sustainability. Thus, qualitative and quantitative methods were used during July 2018. Data were collected by a structured survey undertaken to 30 experts and a focus group organized with 25 livestock stakeholders (associations, cooperatives, research public institutes, universities, administration, etc.) related to the Andalusian livestock sectors. Results show that farmers have an integral view of their business by stating that they have to improve technological as well as commercial matters in order to be competitive.

Keywords. Research and training needs – Small ruminants' innovation – Livestock stakeholders' perceptions – Andalusia (Spain).

Évaluation des besoins en matière de recherche et de formation des petits ruminants selon le point de vue du secteur en Andalousie (Sud de l' Espagne)

Résumé. La situation actuelle du secteur des petits ruminants en Espagne s'inscrit dans un long processus de restructuration associé à différents défis sociopolitiques et économiques nationaux et internationaux. Dans ce cadre, de nombreuses études confirment l'importance de prendre en compte les opinions et les perceptions des agriculteurs pour relever tous ces défis et soulignent la faiblesse des programmes de recherche et de formation agricole offerts pour répondre à la demande des agriculteurs en connaissances et innovations spécifiques. Cela doit être facilité par des programmes politiques dans le cadre desquels les institutions de recherche et de formation agricoles jouent un rôle clé. Pour cela, l'Institut de Recherche et de Formation Agricoles d'Andalousie (IFAPA) (Espagne) a organisé plusieurs groupes de discussion avec différents secteurs de l'agriculture et de l'élevage pour identifier leurs priorités de recherche et de formation à inclure dans son programme sectoriel 2018-2021. Dans le cas des petits ruminants et dans le cadre du projet national RTA2015-00070-C03-02, nous proposons d'identifier et de quantifier les besoins réels du secteur des petits ruminants en matière de recherche et de formation, afin d'atteindre une meilleure productivité, compétitivité et durabilité. Pour cela, des méthodes qualitatives et quantitatives ont été utilisées en juillet 2018. Les données ont été recueillies par une enquête structurée réalisée auprès de 30 experts et un groupe de discussion organisé avec 25 acteurs du secteur de l'élevage (associations, coopératives, instituts publics de recherche, universités, administration, etc.) liés aux secteurs de l'élevage andalous.

Mots-clés. Besoins de recherche et de formation – Innovation des petits ruminants – Perceptions des acteurs de l'élevage – Andalousie (Espagne).

I – Introduction

Small ruminant production represents an important productive sector in Andalusia (South Spain). The small ruminant's sheep and goat sector in Spain accounts for about 4% of Final Agricultural Production and 10.7% of Final Livestock Production. It is the most important livestock activity in Andalusia in terms of number of heads, sheep represent 13.9% (2,379,466) and goat gather 35.1% (1,100,012) of the national total with almost 3.5 million heads. In Andalusia in 2019 there were a total of 14,754 sheep farms (8,426) and goats (6,508) in its various modalities. Small ruminant breeding has also a high environmental value, since the breeding of indigenous breeds, especially goats, allows the use of many mountainous areas, which would otherwise remain untapped (Sayadi, 2012). Sheep and goats' activities in Andalusia are also a crucial sector for human activity. In case the industry declines, large areas will be adversely affected, leading to the loss of a culture that has survived virtually unchanged for centuries (Dubeuf and Sayadi, 2014).

Furthermore, the current situation of the small ruminants sector in Spain is framed within a long process of restructuring associated, among others, with the changes incorporated by the successive reforms of the Common Agricultural Policy (CAP), the greater liberalization and globalization of markets, the volatility of prices of raw materials and inputs, as well as the continuous changes of consumers demands towards multiple commodities and services. In this framework, numerous studies confirm the importance of considering the opinions and perceptions of farmers to achieve all these challenges; highlight the weakness of agricultural research and training programs offered to meet farmers' demands for specific knowledge (García *et al.*, 2018, Cruz *et al.*, 2019, Sayadi *et al.*, 2019); and the high importance to satisfy their needs on research and training to favour the innovation and their competitiveness (Cruz *et al.*, 2018, Sayadi *et al.*, 2019). This must be facilitated by policy programs where agricultural research and training institutions play a key role (Cruz *et al.*, 2018). To address these deficiencies, the Institute of Agricultural Research and Training in Andalusia (IFAPA) (Spain) organized several focus groups with different farming and livestock sectors to identify their priorities on research and training to be included in its Sector Program 2018-2021.

In the case of small ruminants and framed with the National project RTA2015-00070-C03-02, we propose to identify and quantify small ruminants' sector real needs on research and training, to achieve more productivity, competitiveness and sustainability.

II – Materials and methods

The information handled in this work is based on a mixed qualitative-quantitative methodology. Firstly, based on a detailed bibliographical review and the experience of the authors in research and training in livestock, in general, and the small ruminant sector, in particular (Ruiz *et al.*, 2011, Sayadi and Calatrava 2007), some research and training (R & T) topics have been identified and elaborated that could be considered priorities for the livestock sector. This review has been based on scientific articles, sector reports, etc. Subsequently, a structured questionnaire has been elaborated, basically consisting of two questions. The first asks for the importance and priority given to these identified research and training topics in the coming years according to the demands and needs of the livestock sector in general in Andalusia, and secondly, to develop specifically those specific R & T lines considered fundamental according to the livestock sub-sector needs in which the respondent is most involved and best knows (bovine, goat, sheep or beekeeping).

This importance and priority of the topics has been quantified in a scale valuation from 1: "not at all important, no priority" to 9 "very important, maximum priority". The questionnaire was sent during the month of May to 35 experts in Andalusian livestock of different profiles (5 advisers; 15 technicians of cooperatives and professional livestock associations, 5 administration technicians; 5 livestock researchers and trainers and 5 breeders), receiving responses from 30 of them. After

receiving this individual response, a livestock focus group was organised in Seville in July 2018 with the participation of 25 entities (associations, cooperatives, Public Research Bodies, universities, administration, etc.) related to the Andalusian livestock sector in order to identify their perceptions regarding the priority lines of research, training and transfer in the coming years.

Subsequently, throughout the focus group, each livestock sub-sector has been given the opportunity to reflect its opinion. Finally, the most important and priority research and training activities were debated, agreed and validated. In this work, the priorities for research and training in the coming years relating to the small ruminant sector are presented according to the opinion of the experts and taking into account the discussions and interventions throughout focus group.

III – Results and discussion

Table 1 includes the average values, in order of importance, of the values assigned by the experts regarding priority lines of research and transfer according to demands of the small ruminant sector in Andalusia, expressed on a scale from 0 (no priority) to 9 (maximum priority). We can see how all the topics of research and training have a value and priority higher than the middle point of the scale (>5).

The two lines identified by the experts with highest priority, with an average importance or priority greater than 8, in terms of research, transference and training, have been “Selection and improvement of autochthonous Andalusian breeds and the conservation of their genetic material” and the development of a mix of “New tools and methodologies for animal characterisation, sensory assessment and tenderness, milk or butcher yield, etc.”, with a great homogeneity (low typical deviation) of responses among experts (Table 1).

They also assigned great importance to matters, such as the “Improvement and modernisation of livestock facilities” and the “Improvement of efficiencies, products and processes in small ruminant’s farms”, with high average priorities of 7.98 and 7.76, respectively.

Experts are very aware of the importance of topics related to the market, commercialization channels and consumers. Specifically, the identification of more efficient ways of organizing the sector to improve marketing channels, contracts with large-scale distribution, short channels and development of proximity markets. Furthermore, the development and differentiation of new products and quality, and certifications based on territorial, environmental and sustainability attributes are also very important to increase productivity and competitiveness. Experts are also conscious about the importance of health management of livestock to maintain and improve the sanitary status of herds (i.e. goat sector: tuberculosis, paratuberculosis and contagious agalactia, etc.). “Obtaining and specifying basic technological packages for the improvement, selection and use of pastures and fodder and the preparation of animal diets” (6.75), and the “Use of new technologies in the field of pastoral livestock (GPS, drones...)” (6.69) as well as the “Development of technology and training to improve animal welfare, both on farms and in transport and slaughter” (6.64), are also mentioned by the experts as important topics to contribute to the satisfaction of research and training small ruminants needs. The “Experimentation in the use of by-products for animal feed” could be an interesting line (6.13) for the sustainable handling of waste and by-products of the farm and the territory. The above is in accordance with the approaches of bioeconomy and circular economy.

Experts are also interested (average importance between 5 and 6) in research and training programmes on: the “Evaluation and design of policies to promote the dissemination of innovations that favour the competitiveness and sustainability of livestock production systems, related agri-food companies as well as rural territory”, “Studies on the effects of globalisation on livestock farms”, “Appreciation of the profession of goatherd and/or shepherd and the evaluation of the action of pastoral

livestock in protected areas”, as well as the “Valuation of positive externalities and ecosystem services linked to grazing practices in the extensive sector”. The “Assessment of the environmental impact of small ruminant livestock (energy efficiency, greenhouse gases, biodiversity, etc.) and the design of promotion activities to increase social recognition of the livestock breeding activity is also required to improve and satisfy social demands and to improve livestock product prices at origin”.

Table 1. Priority on research and training of livestock small ruminants according to experts' perspective

Research and training priorities	Average	Typical Deviation
Selection and improvement of autochthonous Andalusian breeds and the conservation of their genetic material.	8.35	1.09
New tools and methodologies for animal characterisation, sensory assessment and tenderness, milk or butcher yield, etc.	8.13	1.12
Improvement and modernisation of livestock facilities.	7.98	1.18
Improving efficiencies, products and processes in small ruminant's farms.	7.76	1.23
Search for more efficient ways of organizing the sector to improve marketing channels, and increase productivity and competitiveness, search for new marketing channels in origin and contracts with large-scale distribution.	7.56	1.21
Analysis of the potential of short channels and development of proximity markets.	7.34	1.23
Development of new products, differentiated quality, and certifications based on territorial, environmental, and sustainability attributes, typicity, etc. to improve visibility and consumption.	7.29	1.24
Health plan and study of the control of the diseases that generate the most losses in small ruminants' sector.	6.89	1.91
Obtaining and specifying basic technological packages for the improvement, selection and use of pastures and fodder and the preparation of diets.	6.75	1.48
Use of new technologies in the field of pastoral livestock (GPS, drones ...).	6.69	1.29
Development of technology and training to improve animal welfare, both on farms and in transport and slaughter.	6.64	1.26
Experimentation in the use of by-products for animal feed.	6.13	2.39
Evaluation and design of policies to promote the dissemination of innovations that favour the competitiveness and sustainability of livestock production systems, related agri-food companies as well as rural territory”.	5.79	2.33
Studies on the effects of globalisation on livestock farms.	5.68	1.93
Appreciation of the profession of goatherd and/or shepherd and evaluation of the action of pastoral livestock in protected areas.	5.53	1.17
Valuation of positive externalities and ecosystem services linked to grazing practices in the extensive sector.	5.47	1.31
Assessment of the environmental impact of small ruminant livestock (energy efficiency, greenhouse gases, biodiversity, etc.). Promote recognition by society so that it translates into an improvement in the price of products at origin.	5.39	1.19

IV – Conclusions

Research and training play a fundamental role in the development of the livestock sector and directly influence the productivity increase and product quality, contributing, in addition, to the maintenance of environmental sustainability and the satisfaction of social demands.

The success of any innovation performed through research and training programs in the small ruminant sector is strongly influenced by local attitudes and environmental conditions as well as farmers' interest and involvement in topics covered. Several studies confirm the importance of considering the opinions and perceptions of farmers to translate research results and knowledge into practice. In this paper, the research and training needs of the small ruminant livestock sector have been identified and prioritised based on expert's knowledge. Subjects related to genetic improvement and conservation of autochthonous Andalusian breeds and animal characterisation new technologies, improvement of technical and economic efficiency, issues referred to market, new commercialization channel and product differentiation, the design of new mechanisms to value the pastures and shepherding activities, the internalization to breeders of the multiple externalities generated by small ruminants activities and the development of more efficient policies to promote the dissemination of innovations that favour the competitiveness and sustainability of small ruminant production systems and satisfy new social demands and concerns, are among other topics placed high on livestock farmers' list of training priorities. It seems that the interviewed stakeholders have an integral view of their business by improving technological aspects as well commercial means of reaching the market.

The research and training institutions have to include and re-orient their programs and sectorial strategies based on these findings to reduce the existing technological and adoption gap among the livestock farmers.

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