

Precision Sheep: EIP-Agri Operational Group For Precision Farming In Semi-Intensive Dairy Sheep Farming Systems

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Introduction

Dairy sheep farmers in Tuscany region (Italy) are coping with a generalized loss of competitiveness due to several factors. In the recent years, the low milk price and the wildlife damages (Righini 2018; Banti 2017) but also a lack of innovation transfer and extension services for the improvement of ewe's milk production and quality (Mele 2015; Bonari & Mantino, 2015) exacerbated the sector decline. All this considered, the main objective of the EIP-AGRI Operation Group (OG) "Precision sheep" - Measure 16.2, 2019 Tuscany Region RDP - is to improve the efficiency of ewe livestock for the Pecorino Toscano DOP cheese production. Thus, management practices based on the principles of precision agriculture and precision feeding will be introduced in the farms with the support of innovative tools. Innovative practices already tested at experimental level will be validated on farm considering the specific characteristics of a range of farms delivering to three different cheese factories. The innovation transfer will be conducted using a participatory and multi-actor approach and by means of a mobile-based Decision Support System (DSS) to support the flow and the exchange of information among the actors along the value chain. The innovative solutions promoted by the project were chosen based on the results of the surveys conducted in 2018 by the 16.1 measure "Precision Sheep", which allowed to point out the specific requirements of ewe's milk producers. In particular, the adoption of precision farming and precision feeding practices will allow to optimize the use of the local resources and the competitiveness of the dairy sheep farms for the production of the Pecorino Toscano DOP cheese.

The specific objectives of the OG are: (i) to increase the productivity and the quality of pasture and fodder; (ii) to encourage the adoption of the rational grazing and to optimize the use of self-produced concentrates, considering the availability and the quality of the pasture and the forages and (iii) to improve the reproductive efficiency of the ewes through flock management based on ICT systems.

Materials and Methods

In 2018, within the 16.1 measure of RDP "Precision Sheep", 60 dairy farmer members of three cooperative dairies companies Caseificio di Manciano (GR), Caseificio di Val D'Orcia (SI) and Caseificio di Sorano (GR), were subjected to a survey aimed at understanding which improvements are needed in the dairy sheep farming system of South Tuscany. Main data collected were about the farm size and organization, soil type, facilities, crop and pasture management, livestock management, technical assistance level, adopted technologies and willingness of improving innovation on farm. Data were used to highlight strengths and weaknesses in dairy sheep farming to be addressed in the 16.2 measure RDP in order to improve its profitability and sustainability. The innovation-transfer project is structured in 8 WPs (Figure 1). The beta version of the DSS developed in 16.1 measure will be improved (WP3) to support the application of precision feeding (WP4) and precision farming strategies (WP5),

using forecasting models and analysis of data concerning the agronomic and the flock management. The DSS will be available to farmers and advisors that will join the project, and its usability and efficacy will be assessed in three representative farms of the area (WP6). The DDS will support farmers in improving feeding and grazing management as well as crop and pasture cultivation. The tool will provide information about the amount and the quality of the milk delivered to the dairy and will suggest solutions to improve the quality and productivity based on updated diets. Precision farming will be based on the use of retrieved data from Sentinel-2 and Unmanned Aerial Vehicle (UAV), in order to support farmers in the management of forage crops and sheep grazing, considering different crop metrics. Farmers and advisors will be trained to the use of the DSS and a final survey will help to evaluate the tool (WP2).

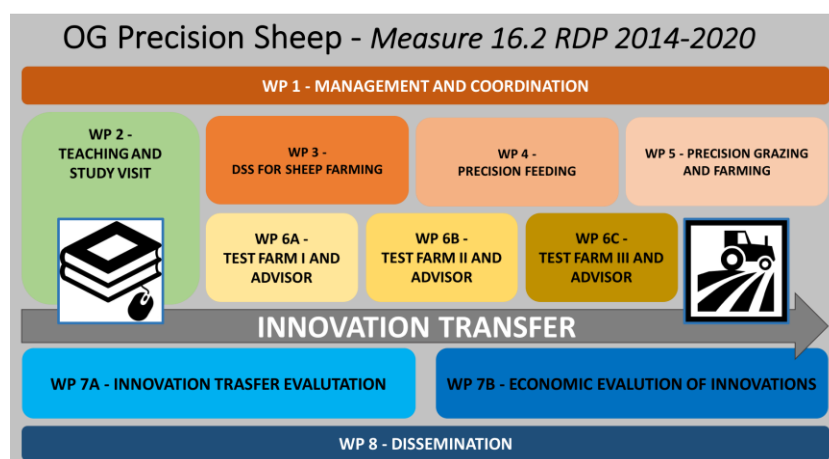


Figure 1. Framework of the “Precision sheep” project.

Results

Results from the survey of first stage 16.1 measure highlighted that farm crop rotations mainly include annual crop for forage, with a low level of diversification and a scarce presence of perennial crops. Concerning facilities and infrastructures, we highlighted a lack of storage capacity and automatic systems for feeding. The average sheep’s fertility is around 80%. We highlighted that most of the farmers receive financial and veterinary technical assistance. Conversely, the lack of advisors for agricultural and flock management is a barrier to the adoption of innovations and to the opportunity of extending the productive season, which would allow to increase the annual income. Moreover, the farmers are usually not familiar with the use of software to optimize the sheep’s diet and with the use of information technology. The opportunity arose from the results of the questionnaires is the willingness of the farmers to improve the level of technical assistance and of technology in their farm. Thus, through the introduction of precision farming and precision feeding strategies, supported by a DSS, the expected results of the OG Precision sheep are: (i) to increase the efficiency in the use of the inputs at farm level, (ii) the improve of the productivity of the ewe’s flock and (iii) the improvement of the milk quality and the cheese production.

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