



## The use of sensors for assessing the environmental welfare conditions in large-scale dairy sheep and goats farms in Spain

Weather stations equipped with peripheric indoor sensors (temperature-humidity, air quality and bedding humidity) were installed on 12 dairy sheep and goat farms (Castilla y León and Catalonia, Spain)



to monitor the environmental welfare conditions. Stations transmitted data every 5 min to a free platform (Ecowitt) via wi-fi. The results obtained showed the robustness of the system, with a satisfactory general assessment (83%) and low failures (4-17%). Thermo-hygrometric index (THI) was used to assess the thermoneutral comfort ( $50 < \text{THI} < 70$ ). Internal THI of the farms were higher than external, although the difference decreased as THI increased and met at heat stress conditions. Correlation between THI and milk yield, after removing the effect of stage of lactation, was negative and THI explained 30% of the decrease in milk production. Values  $\text{THI} > 60$  had negative effects on conception rate according to the photoperiod, the THI explaining 40% of variation of conception rate during the increasing photoperiod (spring and summer). Heat stress ( $\text{THI} > 65$ ) had a negative effect on the mortality of the lactating ewes after lambing, the THI explaining 55% of its

variation. In conclusion, the implemented system of internal-external sensors was robust and useful for detecting the adequate conditions in sheep and goat according to their physiological stages and to apply protective measures, especially during summer and winter, when the shelters are less efficient to mitigate the climatic risks.



TEHCARE project has received funding from the European Union's Horizon 2020 Research and Innovation Program under grant agreement N°862050.