Weatherproof sheep? How to enhance animal resilience to climate change

December 23 2019

Credit: AI-generated image (disclaimer)

Adverse impacts of climate change are increasingly felt across the world, with weather variability posing a serious threat to both crop and livestock production. Recognising the urgent need to address these challenges, the EU-funded iSAGE project continues developing strategies to enhance animal resilience and adaptability.

Supported mainly by iSAGE, a team of researchers has examined ways of breeding sheep and goats to cope with climate change. Their study was published in the journal *BMC Genetics*. The researchers looked at statistics of animal performance like daily milk yield, alongside weather measurements, including average daily temperature and humidity readings. They found significant variations in individual animals' responses to fluctuating weather conditions. "Individual animals differed in their response to changing atmospheric temperature and a temperature-humidity index."

A news item posted on the website of project partner Scotland's Rural College (SRUC) states: "With a significant proportion of the observed variation being genetic and heritable, researchers concluded that animal resilience to weather change could be improved through selective breeding." The journal article points to heritable variation "among dairy goats in their production response to fluctuating weather variables." It adds: "Results may inform future breeding programmes aimed to ensure efficient animal performance under changing climatic conditions."

Genetic mechanisms and resilience

Quoted in the SRUC news item, study co-author Prof. Georgios Banos explains their work: "We investigated the genetic mechanisms that make an animal resilient to weather conditions, allowing it to maintain performance when challenged with weather volatility. This will enable us to continue selectively breeding for enhanced performance—such as high production and health—and at the same time breed for performance stability when external environmental conditions change."

The ongoing iSAGE (Innovation for Sustainable Sheep and Goat Production in Europe) project was set up to improve the sustainability, competitiveness and resilience of the European sheep and goat sectors. Under the project, farmers, cooperatives, companies and academics

joined forces to address socioeconomic, demographic and ecological issues, as well as market challenges. The collaborative research also covered issues of animal genetics and climate change.

Scheduled to end in early 2020, iSAGE has assessed the sustainability of sheep and goat farms across Europe. It also conducted qualitative and quantitative surveys on such farms in Finland, France, Greece, Italy, Spain, Turkey and the United Kingdom, focusing on the future of small-ruminant sector performance. A project newsletter summarises the key results: "In general, all the small-ruminant farmers that participated in the survey appear optimistic that their performance will increase in the future, along their sustainability. However, they seem to give low priority to those factors (investment/innovations) that are actually the key drivers for future growth."

More information: iSAGE project website: www.isage.eu/ Enrique Sánchez-Molano et al. Genetic analysis of novel phenotypes for farm animal resilience to weather variability, *BMC Genetics* (2019). DOI: 10.1186/s12863-019-0787-z

Provided by CORDIS

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