



**Practice Abstract 21 -
An Affordable IoT-Based Animal Welfare Monitoring System
for Small and Medium-Sized Dairy Farms (SIP7)**

21. An Affordable IoT-Based Animal Welfare Monitoring System for Small and Medium-Sized Dairy Farms (SIP7)

Short Summary for Practitioners in English

Problem:

Heat stress hurts productivity on small dairy and meat cow farms every summer. When shelter temperatures climb above 30°C, cows eat less, produce less milk and gain weight more slowly. Precision agriculture systems that address this are built for large industrial operations and cost tens of thousands of euros, well out of reach for the 50-60 head farms that make up much of Romanian and European livestock production. Small farms have been left behind by digital agriculture.

Solution:

SIP7, developed by ANAMOB and SmartRDI within the Farmtopia project, delivers an affordable IoT-based Agricultural Digital Solution built around three components: smart animal ear tags that measure temperature and humidity, a central control box that decides when the herd needs cooling based on the local Thermal-Humidity Index, and an automated sprinkler system that sprays water only on the feeding front, never on the sleeping area. A mobile application in the farmer's language lets them configure the system, watch animal welfare in real time and receive notifications. Around 1,250 EUR one-time hardware plus 500 EUR seasonal software places the solution 10 to 100 times below industrial precision-livestock systems, deliberately, so that small and medium farms of 10 to 60 heads can access welfare technology previously available only to large industrial operations. Everything was co-designed with the participating farmers from day one.

Benefits:

The solution was piloted for two production cycles on two Romanian farms breeding the Băltata Românească dual-purpose breed. Measured against three-year historical baselines (2021-2023), one of the farms delivered +9.4% daily milk per animal, +6.1% daily meat per animal, and a net profitability trajectory of +11.9%. The second farm sustained per-animal productivity gains across both hot seasons even during a year in which a documented herd restructuring disrupted the milking herd, direct evidence that the effect of the solution is measurable at the individual-animal level. Animal welfare improvements were validated through continuous per-animal temperature and humidity monitoring, automated sprinkler activation on Thermal-Humidity Index thresholds, farmer observation of calmer feeding and reduced panting, and reported improvement in milk quality during hot periods.

Practical Recommendations:

The solution is best suited to small and medium cow farms of up to about 60 heads. It requires minimal digital literacy: the mobile app is in the local language with clear notifications. The ear tags are lightweight, non-invasive and reusable across seasons. Sprinklers are capped at five minutes per hour and never spray the sleeping area. Neighbouring farms can share infrastructure (gateway, cloud services, maintenance), cutting per-farm cost, which suits cooperatives and DIH networks. Operational costs are only charged during the hot season, matching real usage.

Further information

- n/a

About this practice abstract and Farmtopia

Publisher: ANAMOB & SmartRDI

Authors: Viorel Marin (ANAMOB); Radu Marin (SmartRDI)

Contact: radu.marin88@gmail.com;
vmarin@anamob.ro

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Farmtopia: The project is running from September 2023 to August 2026. The overall goal of Farmtopia (**GA No.: 101083541**) is to democratize digital farming to empower small and medium farms.

Website: <https://farmtopia.eu/>

ANAMOB: As part of the Farmtopia project, POLIMI will be the leader of Task 2.1, dedicated to the development of a set of Sustainable Collaborative Business Models (SCBM) that can enhance the adoption of Agricultural Digital Solutions (ADS) among small farmers.

Website:: <https://anamob.com> ;
<https://smartrdi.com>

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