

From buffalo data to actionable decisions

A human-centred AI layer makes herd data searchable, explainable and decision-ready.

THE CASE

Italian Mediterranean buffalo

329

HERDS ANALYSED

130,531

ANIMALS

1.96M

MILK RECORDS

FIELD VALIDATION

The BufalaCare project, developed within the 5G Academy of the University of Naples Federico II with TIM and Tenuta Vannulo, integrates human observations with farm sensors, cameras, scales and tags to support AI-driven livestock management.

The challenge

Rich longitudinal data is available. The operational challenge is turning it into answers

DATA COMPLEXITY

Productive, reproductive and milk-quality records span different sources, time periods and levels of detail.

AI BLACK BOX

Advanced models can produce useful outputs, but operators still need context and explanations to act on them.

FROM DATA TO DECISION

The system translates natural language questions into treacable, decision-ready answers leveraging domain reasoning

Two evidence layers, one knowledge model

FIELD VALIDATION

TenutaVannulo / Paestum

SCALE-UP STUDY

329 herds / 130,531 animals

10-YEAR DATA FOUNDATION

1,957,430 milk records

FIELD VALIDATION

Tenuta Vannulo / BufalaCare

The 2025 MeAVeAS contribution describes the Vannulo case in Paestum and the integration of human observations with farm sensors, cameras, scales and tags.

Source: Russo et al. (2025), MeAVeAS 2025

SCALE-UP DATASET

10 years / 329 herds

The 2026 ICAR case study scales the approach to 130,531 animals and 1,957,430 milk records collected over 2013-2023.

Source: Russo et al. (2026), ICAR 2026

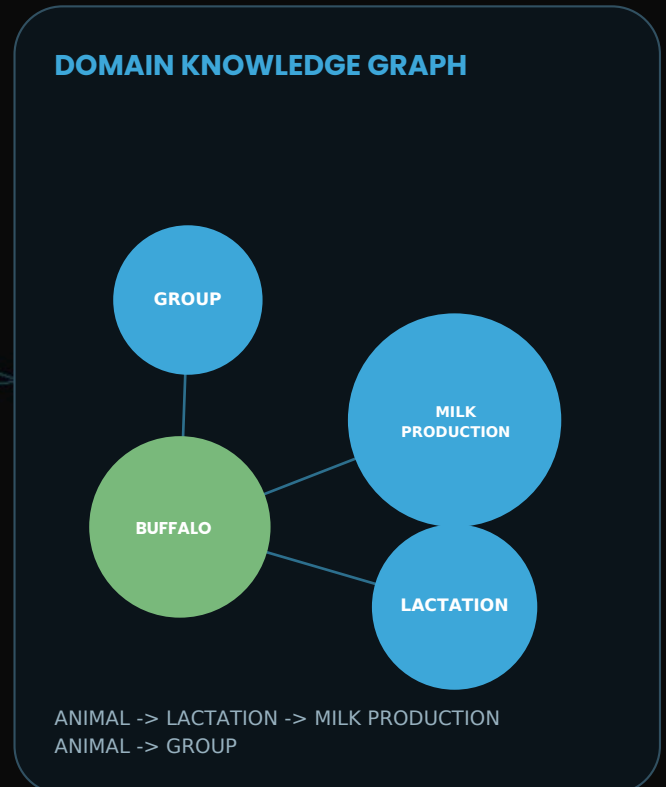
What changes for the user

Questions can be asked in natural language. The platform converts them into structured graph operations and returns relevant indicators without requiring advanced analytical or programming skills.

How the use case works

AI.CODIUM® structures domain knowledge, connects heterogeneous data and makes complex information accessible through natural language.

- 01 UNIFY**
Combine milk yield, milk quality, reproductive parameters and herd-level information in one semantic layer.
- 02 STRUCTURE**
Represent animals, lactations, production events and herd membership as connected graph entities.
- 03 QUERY**
Translate a natural-language question into graph operations that retrieve the relevant evidence.
- 04 RESPOND**
Return contextual answers, indicators and visual outputs that support practical decisions.



CORE CAPABILITY

A graph that becomes a dialogue layer

The model does not only store data: it connects domain relationships so users can ask questions, compare entities and retrieve insights in a human-readable form.

From questions to insight

The case shows how connected records become measurable outputs across herd

HERD BENCHMARKING

"Tell me the distribution of buffaloes per herd"

BIG >499: 28.88%

MEDIUM 100-499: 55.32%

SMALL <100: 15.81%

MILK PRODUCTION

"Milk yield by lactation order"

1st parity: 8.57 +/- 2.14 kg 3rd

parity: 9.67 +/- 2.56 kg Later

lactations: slight decline

Additional insights surfaced through natural-language queries

36.28%

WINTER CALVING

26.87%

SPIRING CALVING

35 mo

AVERAGE AGE AT FIRST
CALVING

2.88 -> 3.53

SOMATIC CELL SCORE

KEY REFERENCES

Russo, V., Trapanese, L., Di Bratto, M., Grazioso, M., Pasquino, N., Salzano, A., Mancini, A. (2025).

An innovative approach to raise and manage buffalo herds. In IEEE International Workshop on Measurements and Applications in Veterinary Sciences (Pisa).

Russo, V., Di Bratto, M., Trapanese, L., Mancini, A., Grazioso, M., & Salzano, A. (2026).

Analyzing milk recordings to support better decision-making through AI: A case study in Italian Mediterranean buffalo. 49th ICAR Conference 2026, Verona, Italy.

Explore Logogramma

Discover Bufala Care and Logogramma's conversational AI solutions.



logogramma.com