



EU-LI-PHE: Building the Future of Livestock Phenomics in Europe

A Policy Booklet for Decision-Makers
and Stakeholders

COST Action CA22112 | 2023-2027

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EU-LI-PHE: BUILDING THE FUTURE OF LIVESTOCK PHENOMICS IN EU

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2023–2027

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01 INTRODUCTION

Europe's livestock sector is entering a data-driven era. Sustainability, animal welfare, and productivity depend increasingly on how well we can measure, understand, and use information about animals – their behaviour, health, environment, and genetics.

Yet today, a major gap remains: while we can sequence genomes cheaply and precisely, we still lack the same depth and speed in measuring phenotypes – the observable traits of animals.

Phenomics is the science that fills this gap. It allows us to capture, analyse, and interpret complex animal data using sensors, imaging, wearables, and digital platforms.

The **European Network on Livestock Phenomics (EU-LI-PHE)** COST Action brings together scientists, industry experts, breeders, and policymakers from across Europe to coordinate this effort. It aims to build the foundations for a **shared European approach** to livestock phenomics.



THE GAP

We can sequence a genome for EUR 50.

We still cannot measure a phenotype with the same speed, scale, or standardisation.

AT A GLANCE

2023-27

Duration

CA22112

COST Action Reference

50+

Countries

5

Working Groups

Phenomics is where animal science meets data innovation – and where Europe can lead the global transition toward smarter, more sustainable livestock systems.

02 WHAT IS LIVESTOCK PHENOMICS?

Phenomics refers to the systematic measurement of animal traits using advanced technologies. These traits - milk composition, growth, fertility, emissions, feed efficiency, behaviour, health indicators – are what we can see, measure, or record about an animal. . But there is much more, traits that cannot be easily measured, others that, in combination, produce observable effects or that cannot be captured using traditional approaches. On the whole, they all describe the animal phenome.

Phenomics helps scientists and farmers understand how genes, management, and environment interact. It provides real-time data that can be used to:

WHAT PHENOMICS ENABLES:



BREEDING

Improve breeding decisions by linking genetics and performance data



HEALTH

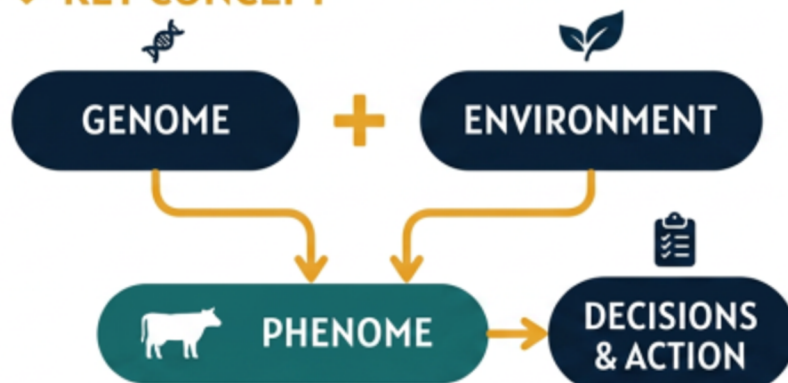
Detect health and welfare problems earlier through continuous monitoring



EFFICIENCY

Reduce environmental impact through precise feeding strategies

◆ KEY CONCEPT



PHENOMICS TOOLS

- Cameras & microphones for behaviour monitoring
- Sensors measuring temperature, movement, rumination
- Milk and feed analyzers detecting health changes
- Data platforms integrating on-farm measurements

Phenomics is the data backbone of future animal breeding and management.

03

WHY IT MATTERS FOR EUROPE AND FOR POLICY

Phenomics directly supports Europe's most pressing policy goals:



Green Deal & Farm to Fork

By improving the efficiency and monitoring of livestock production, phenomics reduces greenhouse gas emissions, resource use, contributing to climate-smart agriculture and environmental sustainability.



Animal Welfare & Health

Non-invasive, continuous measurements help farmers ensure better living conditions and early disease detection, aligning with EU welfare and One-Health priorities.



Competitiveness & Innovation

Phenomics underpins digital and biological innovation in Europe's agri-food sector, strengthening competitiveness and supporting rural economies.



Digital & Data Sovereignty

Developing FAIR (Findable, Accessible, Interoperable, Reusable) animal data spaces keeps Europe at the forefront of digital agriculture and ensures responsible data use within EU values.

"Investing in phenomics is investing in the sustainability, transparency, and competitiveness of European livestock."

04

ABOUT EU-LI-PHE (COST ACTION CA22112)

EU-LI-PHE stands for European Network on Livestock Phenomics. It is a COST Action, running from 2023-2027, connecting researchers, breeders, technology providers, and policymakers to promote phenomics coordination and communication.

MAIN OBJECTIVES

- Create a European roadmap for livestock phenomics.
- Promote data standards and interoperability between research, farms, and industry.
- Strengthen collaboration between phenotyping infrastructures.
- Address ethical, regulatory, and societal issues around data ownership and welfare.
- Build capacity and skills, especially in Inclusiveness Target Countries (ITC).

THE FOUR WORKING GROUPS

WG1

Technology & Infrastructure

Sensors, imaging, and data collection, and managing data pipelines across species.

WG2

Genome-Phenome Integration

Linking genotypic and phenotypic data to improve genomic prediction and breeding.

WG3

Data & Computing

FAIR data, AI readiness, and approaches to data platforms and computing technologies.

WG4 & 5

Policy, Regulation & Society Stakeholder Engagement

Ethics, transparency, and IPR, and property of data ownership.

05 KEY TERMS EXPLAINED



Phenotype

Core Concept

Observable characteristics of an animal (e.g. milk yield, body weight, behaviour, health indicators).



Phenomics

Data-Driven

Large-scale, automated measurement of phenotypes using digital tools and sensors.



Genotype-Phenotype Integration

Breeding

Connecting DNA data with observable traits to improve breeding accuracy and prediction.



FAIR Data

Data Standards

Findable, Accessible, Interoperable, Reusable - principles for responsible data sharing.



Precision Livestock Farming

On-Farm Tech

Using real-time data and sensors to manage individual animals more efficiently.



“Understanding these terms is essential for navigating the EU-LI-PHE framework and its contributions to European livestock innovation.”

06 WHAT EU-LI-PHE DELIVERS

Building a foundation for a European Network on Livestock Phenomics ecosystem

DEL 01

Phenotyping Infrastructure Map

Mapping existing phenotyping infrastructures and technologies across species.

DEL 02

Common Data Standards

Development of shared data standards and ontologies for phenotyping across species.

DEL 03

Roadmaps & White Papers

Publication of roadmaps identifying research and investment priorities.

DEL 04

Training & Scientific Missions

Training schools, workshops, and STSMs to build capacity across Europe.

DEL 05

Stakeholder Engagement

Engagement of industry, breeders, and policymakers through dedicated events.

DEL 06

Open Collaboration Platform

Promoting cross-species learning and open sharing of methods and data.

EU-LI-PHE acts as a coordination engine - connecting European expertise, aligning infrastructures, and defining where policy and investment can have the greatest impact.

07

POLICY RECOMMENDATIONS

Actionable guidance for EU-level livestock and food system policy

REC 01



Invest in European Phenomics Infrastructures

Support national and EU-level funding for on-farm phenotyping, digital sensors, and integrated data platforms.

REC 02



Create Trusted Livestock Data Spaces

Develop FAIR and secure systems for sharing animal data between research, industry, and policymakers.

REC 03



Align Phenomics with CAP and Horizon Europe

Include phenomics objectives in agricultural innovation and sustainability calls.

REC 04



Encourage Training and Skills Development

Fund data-science training for animal researchers and foster participation from ITC and SME partners.

REC 05



Strengthen Ethical and Legal Frameworks

Support the creation of EU-wide guidelines on data ownership, animal privacy, and benefit-sharing.

REC 06



Collaboration and Knowledge Exchange

Use EU-LI-PHE as a hub for linking science, policy, and practice - from farm to Brussels.

08 GET INVOLVED

EU-LI-PHE welcomes policymakers, funders, industry representatives, and researchers to participate in its workshops, working groups, and stakeholder events.

“ Together, we can make Europe a global leader in sustainable, data-driven livestock production. ”

HOW TO PARTICIPATE



Join a Working Group

Contribute your expertise to WG1-WG5 on technology, data, or policy.



Attend Events

Participate in workshops, training schools, and stakeholder meetings.



Apply for an STSM

Short-Term Scientific Missions support knowledge exchange across Europe.



Join the Network

Connect with 50+ countries working on livestock phenomics innovation.

CONTACT



Website

www.euliphe.eu



Email

Contact via website

