EU-LI-PHE

COST EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

COST Action CA22112

# Turning livestock data into sustainable decisions

European Network for Livestock Phenomics



Livestock phenomics combines high-dimensional measurements of animals, their environment and production to understand variation and support better decisions for sustainable livestock systems.

## Phenotyping technologies

Advancing and harmonizing tools to measure animals, their biology, behavior and environment at scale.

## Genome-to-phenome integration

Connecting genomic information with complex traits to uncover biology and predict performance.

## Computational and data resources

Building FAIR data, standards and analytical methods to turn complex data into knowledge.

## Economic, regulatory and societal impact

Assessing impact, informing policy and co-creating solutions with stakeholders and society.

### Together, we advance outcomes for Europe

- Healthier animals
- Better welfare
- More resilient farms
- Lower environmental footprint

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From evidence to action

# Challenges Identified in Livestock Phenomics Sector

## Key Challenges Identified at the EU-LI-PHE Midterm Stakeholder Conference

### Fragmentation of Data and Lack of Interoperability

Livestock data are collected across different platforms, devices, institutions, and production systems. Inconsistent formats, protocols, and standards limit data sharing, comparability, and integration, reducing the potential for large-scale analysis and collaborative research.

### 2. Gap Between Technological Development and Adoption

AI, sensors, and digital platforms offer new opportunities for animal monitoring and precision management. However, adoption remains incomplete due to implementation costs, technical complexity, usability barriers, and uncertainty about the benefits for farmers and other end-users.

### 3. Regulatory Complexity and Uncertainty

Although European data regulations provide opportunities for responsible data sharing, stakeholders may encounter uncertainty regarding data access, ownership, responsibilities, and implementation requirements. Clear guidance and consistent application of regulatory frameworks are needed to support innovation.

### 4. Limited Digital Skills and Capacity

The effective use of phenotyping techniques requires competencies in digital tools, data management, and AI. Skills gaps, particularly among farmers and other end-users, can limit technology adoption and reduce the benefits of digital transformation.

### 5. Trust and Data Governance Concerns

Concerns about data ownership, privacy, liability, transparency, and dependence on external service providers may discourage stakeholders from sharing information. Transparent governance models and fair data-sharing arrangements are essential to build trust.

## Key Findings and Cross-Cutting Insights

### From Big Data to Smart Data

The emphasis should shift towards high-quality, standardized, well-dokumented, and actionable data that can support reliable analysis and informed decision-making.

### Artificial Intelligence as an Enabler

AI can support animal health monitoring, behavioral assessment, and precision livestock management. Its application should be supported by scientific validation, transparency, and demonstrated benefits under real-world conditions.

### Collaboration Across Sectors

Cooperation between academia, industry, policymakers, farmers, and technology providers is necessary to bridge the gap between research and practical implementation.

### Ethics and Animal Welfare

Animal welfare, responsible data use, transparency, and societal expectations should be incorporated throughout technology development, validation, and deployment.

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# Stakeholder-Specific Policy Recommendations

## 1. EU and National Policymakers

- **Strengthen regulatory coherence:** Support consistent implementation of the EU Data Act and Data Governance Act and provide clear guidance on data-sharing requirements.
- **Develop interoperable infrastructures:** Support European agricultural data spaces, common standards, and secure cross-border data exchange.
- **Invest in digital skills:** Fund accessible training programs in digital agriculture, data management, and AI.
- **Support implementation and validation:** Finance pilot projects and demonstration activities to assess technologies under real-world conditions.
- **Encourage stakeholder engagement:** Involve farmers, researchers, industry, and civil society in the development and implementation of relevant policies.

## 2. Research and Academia

- **Harmonize methodologies:** Develop standardized genotyping protocols, data collection procedures, and data-quality practices.
- **Promote interdisciplinary research:** Strengthen collaboration between genetics, animal science, informatics, engineering, veterinary medicine, and data science.
- **Validate technologies in practice:** Evaluate solutions across diverse farming systems to establish reliability, usability, and practical value.
- **Promote open and responsible science:** Encourage reproductivity, appropriate data documentation, and responsible data management.
- **Improve knowledge transfer:** Translate scientific findings into practical guidance for policymakers, industry, and farmers.

## 3. Industry and Technology Providers

- **Develop user-centric solutions:** Create reliable, affordable, scalable, and accessible technologies that address real-end-user needs.
- **Ensure interoperability:** Adopt common standards and support integration with existing farm management systems.
- **Establish fair data-sharing models:** Clearly define data access, ownership, permitted use, and responsibilities.
- **Build trust through transparency:** Communicate the capabilities, limitations, and validation of digital and AI-based tools.
- **Strengthen partnerships:** Collaborate with research institutions, farmers, and public stakeholders to accelerate responsible innovation.

## 4. Farmers and End-Users

- **Participate in co-design:** Contribute practical knowledge to the development and testing of phenotyping technologies.
- **Adopt validated solutions:** Prioritize technologies with demonstrated economic, operational, animal-health, and welfare benefits.
- **Engage in responsible data sharing:** Participate in data-sharing initiatives when transparent arrangements and appropriate safeguards are in place.
- **Strengthen digital competencies:** Engage in accessible training, demonstrations, and technical support.
- **Provide practical feedback:** Share experiences to improve the usability, reliability, and relevance of technologies.



## Cross-Stakeholder Priority

**All stakeholder groups should work towards a shared European approach based on interoperable data, trustworthy AI, transparent governance, real-world validation, and continuous stakeholder engagement.**

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# What policymakers and stakeholders can enable

## 1. Interoperable standards

Enable shared data definitions, ontologies and formats to ensure compatibility, integration and reusability across borders and sectors.

## 2. Trusted data governance

Promote responsible, secure and transparent data use with clear rules on privacy, ownership, access and benefit sharing.

## 3. Accessible infrastructure and skills

Invest in interoperable tools, digital infrastructure and training to build capacity and make high-quality data and methods widely available.

## 4. Inclusive multi-stakeholder adoption

Foster collaboration across researchers, farmers, industry, policymakers and society to co-design solutions and drive real-world impact.





## A network for better decisions

EU-LI-PHE connects expertise across livestock science, data, technology, policy and society to turn trustworthy evidence into practical solutions for sustainable livestock systems.

## Join the network

Shape the future of livestock phenomics in Europe.

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