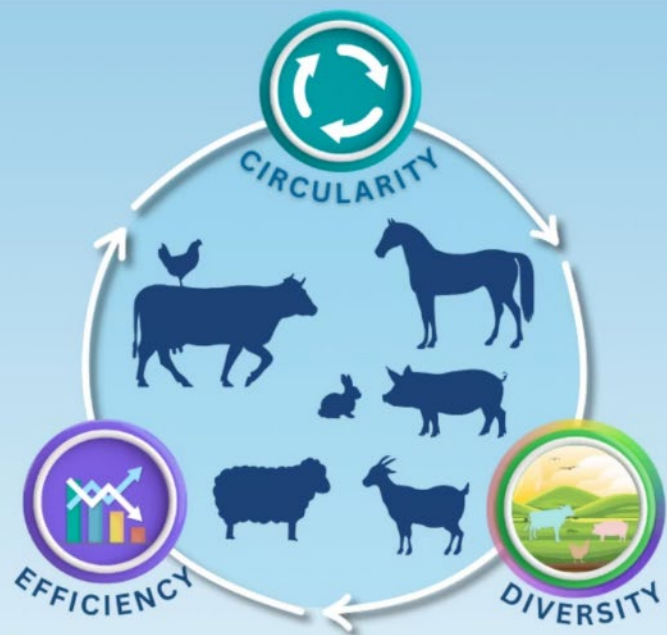


## LIVESTOCK FARMING SYSTEMS IN NEXT GENERATIONS



CAN WE IMAGINE  
THE FUTURE?



# Pathways for the future of Livestock systems

## an ATF perspective

Isabel CASASUS, ATF Vice-President & CITA Aragón

Giuseppe BEE, ATF Vice-President & AGROSCOPE

Ana GRANADOS CHAPATTE, ATF Vice-President & EFFAB

# Vision for Responsible Livestock

## Core Principles

- Keep resource use within planetary boundaries
- Enhance biodiversity and ecosystem services
- Ensure high animal health and welfare standards
- Support farmer wellbeing and vibrant rural livelihood
- Provide affordable, safe, nutritious food

## Strategic Alignment

Aligns with the European vision for agriculture and food, supporting socio-economic resilience in rural areas and a competitive livestock sector. These priorities are essential for the future of livestock and will inform the forthcoming Livestock Strategy.

# Three Pathways to Progress

## Efficiency

By sustainable intensification and agroecological approaches we optimize the outputs per unit of input while maintaining animal welfare and resilience.

## Circularity

Integration and resource regeneration, closing nutrient loops and valorising biomass unsuitable for human consumption.

## Diversity

Resilience through biological and systemic variety, conserving genetic diversity and promoting multifunctionality.

# Efficiency: Sustainable Intensification / Agroecology

1

## Genetics & Breeding

Selection for multi-trait efficiency including feed use, climate mitigation (emissions) and adaptation, resilience and robustness, reproductive traits, longevity and welfare.

2

## Nutrition & Feeding

Precision nutrition, novel feed resources, microbiome optimization and mitigation of emissions .

3

## Animal Health & Welfare

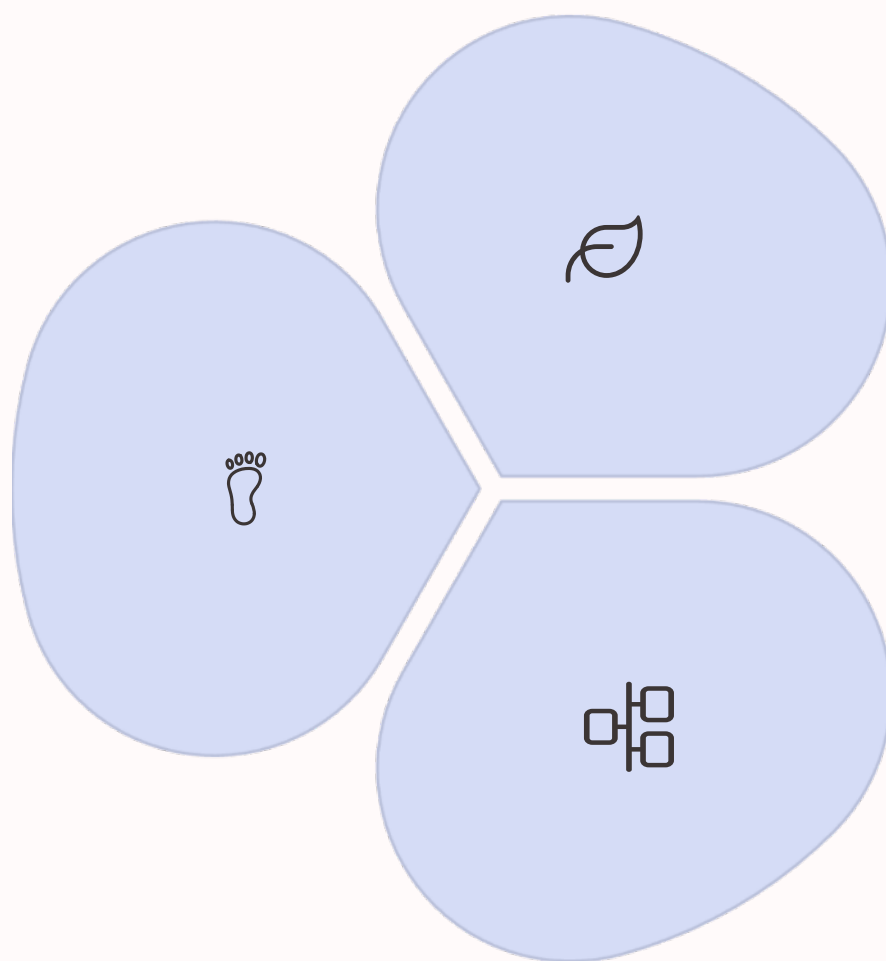
Disease prevention, precision health and welfare monitoring and alternatives to antimicrobials.

4

## Technology & Data

Real-time sensor networks for performance monitoring, digital twins and AI-driven decision support

# Reducing Environmental Footprint



## Key Objectives

- Improve biological efficiency
- Reduce GHG and nutrient losses
- Improve economic viability

## Tools

- Develop adequate LCA and multi-criteria models integrating economic, environmental and welfare indicators at farm and regional scales.

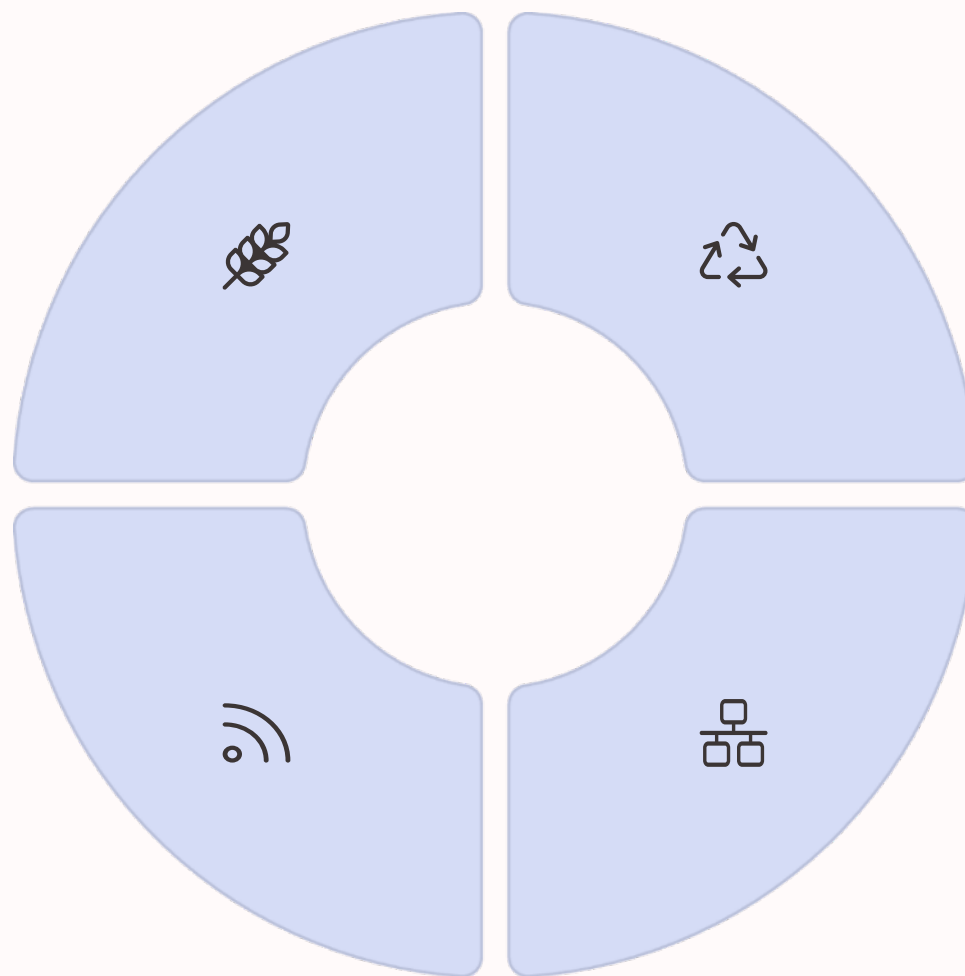
# Circularity: Closing the Loop

## Crop–Livestock Integration

Redesign mixed systems for nutrient cycling and grassland and crops management.

## Feed Circularity

Use co-products, insects, algae, and food waste as safe feed resources.



## Manure Valorisation

Technologies for nutrient recovery, biogas, and bio-fertiliser production.

## Regional Systems

Model nutrient flows between farms to optimize balance and reduce losses at the territorial level.

# Livestock as Biological Recyclers



## Circular Bioeconomy Vision

Livestock become key biological recyclers, closing nutrient cycles (C, N, P) across crop–livestock–bioenergy systems and valorising biomass otherwise unsuitable for human consumption.



## Cascading Use

Explore feed–energy–materials–fertilizer chains and integrate livestock into broader bio-based value chains.



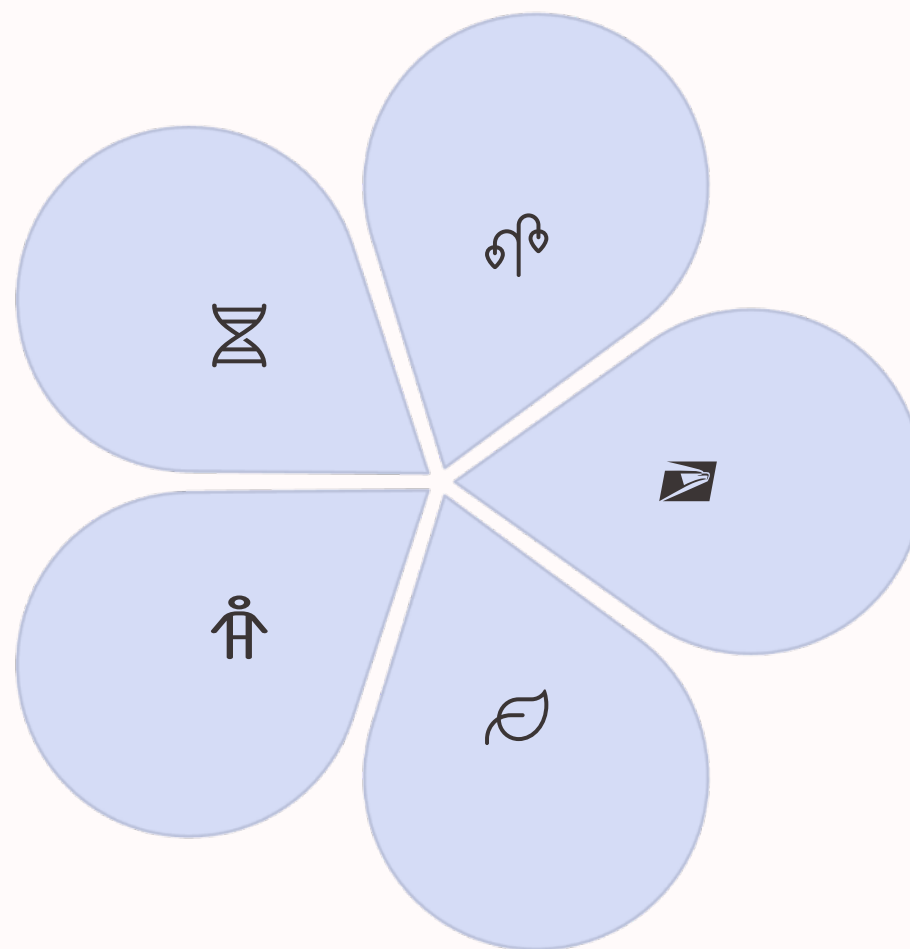
# Diversity: Foundation of Resilience

## Genetic Biodiversity

Preserve and enhance breeds and microbiome diversity for resilience.

## Socio-Economic Models

Design fair value distribution systems.



## Agroecology

Optimize natural processes to enhance soil health, pollination and pest control.

## Product Diversity

Support high-quality regional products and strengthen rural identity

## Ecosystem Services

Quantify carbon sequestration, biodiversity contributions and other services.



# Cross-Cutting Research Priorities

1

## Integrated System Research

Holistic models coupling efficiency–circularity–diversity with cross-sector feedbacks.

2

## One Health–One Welfare

Interdisciplinary work linking human, animal and environmental health; AMR and zoonoses control.

3

## Digitalisation & Data Sovereignty

Open, interoperable data systems ensuring EU control of algorithms and privacy.

4

## Social Sciences & Governance

Study farmer adoption, decision structures, policy incentives and social acceptability.

5

## Participatory Innovation

Create living labs linking farmers, industry, researchers and citizens.

# Expected Outcomes



Low-emission, climate-resilient livestock systems



Circular agri-food networks integrating animal and plant production



Biodiverse landscapes delivering ecosystem and cultural services



Healthy, high-welfare animals and responsible consumption



Strong EU research ecosystem for transformative livestock innovation