

Gene Editing in European Agriculture: Aligning Innovation, Welfare and Societal Values - Key Messages & Next Steps

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Context

The final EuroFAANG RI Gene Editing Think Tank (21st January 2026) brought together experts from breeding, genetics, aquaculture, social sciences, ethics, and research infrastructures. Discussions focused on **translation to practice, governance, public legitimacy, and long-term system impacts**, rather than technical feasibility alone.

Key Messages

1. Science Is Not the Main Bottleneck

Gene-editing tools in farmed animals are technically mature. The principal constraints in Europe are:

- **Regulatory uncertainty and misalignment with biological realities** : particularly where legislation does not reflect the biological equivalence of specific gene editing events and naturally occurring or conventionally bred variation.
- **High approval costs, inequality and market uncertainty**, which currently restrict implementation to a small number of high-value traits and large commercial actors.
- **Societal legitimacy**, which cannot be addressed through technical risk assessment alone but requires broader public justification and trust-building.

Gene editing should be positioned as **complementary approach to selective breeding**, not as a replacement. Traditional breeding maintains genetic variability at the population level, supporting long-term adaptability and resilience. Gene editing can accelerate or introduce specific, well-characterised edits within that broader breeding framework.

2. Regulation Must Evolve Beyond Pure Risk Assessment

Current EU frameworks rely on **event-specific detection and traceability** that are technically unworkable for editing events which are indistinguishable from natural variation.

Key messages from the discussion:

- The EU **NGT plants proposal** , i.e. the European Commission's 2023 legislative proposal to differentiate certain targeted genomic modifications from

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conventional GMOs based on their similarity to natural or conventional breeding outcomes, is likely to influence future frameworks applied to animals frameworks

- Scientific evidence and phenotypic data must be generated **before** political decisions are finalised
- Building capacity to phenotype genome edited animals will be essential.
- Regulation needs space to address the **purpose, benefit, opportunity and the resource cost**, not only safety

International **regulatory harmonisation** is essential to avoid trade deadlocks.

3. Animal Welfare Is Central—but Requires Long-Term Monitoring

Animal health and welfare traits were widely viewed as the most socially legitimate applications of gene editing. This includes traits such as disease resistance, prevention of painful conditions, or sterility approaches that reduce ecological and welfare risks.

However:

- **Long-term effects** refer to impacts that may only become visible across generations or under varying environmental conditions.
- **Cumulative effects** refer to the combined impact of traditional selection, initial edits, and potential future edits within the same genetic line.

For these reasons:

- Welfare benefits must be demonstrated with measurable indicators (e.g. reduced morbidity, improved physiological resilience).
- Monitoring systems should track edited lines over time within real production environments.
- Participatory monitoring frameworks — involving breeders, farmers, researchers, and regulators — are critical to transparency and trust.

In vitro systems can reduce animal use and refine hypotheses before in vivo trials. However, they cannot fully replicate whole-animal physiology, behaviour, or environmental interactions.

4. Public Acceptability Depends on Justification, Not Just Safety

Public concerns focus less on technical risk and more on:

- **Intentions behind the technology**
- Who benefits and who bears the risks
- Is access to the technology equitable
- Whether gene editing reinforces or challenges intensive production models



“Naturalness” concerns are normative: they relate to perceptions about appropriate human intervention in living organisms, not simply scientific definitions of mutation.

Education alone is insufficient to address these concerns. Sustained, values-based dialogue is required, acknowledging that legitimacy depends on perceived purpose and proportionality of intervention. Some emerging governance approaches internationally are exploring structured evaluation of societal benefit alongside risk assessment.

5. Governance Must Include Broader Voices

Effective governance cannot be limited to technical experts and regulators. Missing perspectives include:

- Civil society and diverse public groups
- Social scientists, ethicists, and humanities scholars

There was broad agreement that:

- Political institutions should articulate broad societal boundaries of acceptable intervention.
- Regulators should operate within this democratic mandate rather than resolving foundational ethical questions case-by-case.
- Governance frameworks should be cross-sectoral and coordinated, ensuring alignment between animal health, environmental policy, agricultural systems, trade considerations, and food policy — rather than treating these domains separately.
- Engagement must be continuous and embedded within institutional structures to avoid fragmented or reactive decision-making.

Priority Next Steps for Europe (5–10 Years)

Regulatory & Policy

- Develop **fit-for-purpose EU regulatory frameworks** for gene-edited animals, aligned with biological realities
- Explore mechanisms to integrate **benefit and purpose evaluation** alongside risk assessment
- Work toward **international regulatory alignment** to enable trade

Research & Evidence

- Continue generating **robust scientific and phenotypic data** to support future regulatory decisions



- Address knowledge gaps on **adaptation, disease resistance, and heritability**, especially in ruminants
- Assess **long-term and cumulative impacts** of combined selection and multiple edits

Infrastructure & Capacity

- Strengthen **European research infrastructure** for genome editing and phenotyping
- Establish **shared data standards** and accessible resources to avoid concentration of capacity
- Support the transition from EuroFAANG RI toward **sustainable, open networks** (e.g. GenoPhenix)
- Increasing capacity to be pro-active rather than re-active to sector wide challenges

Society & Engagement

- Move beyond one-way information provision and foster sustained, participatory dialogue that addresses values, fairness, and societal purpose.
- Engage stakeholders early, including farmers, veterinarians, educators, and future professionals
- Build governance approaches that treat animals as **sentient stakeholders**, not just production units

Overall Take-Home Message

The future of gene editing in European farmed animals will depend less on technical breakthroughs and more on **how convincingly it aligns with societal values, animal welfare, and long-term agricultural transformation goals**. Responsible progress requires **regulatory evolution, shared infrastructure, transparent benefit articulation, and sustained public engagement**.

