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Genome editing and farmed animal breeding: social and ethical issues

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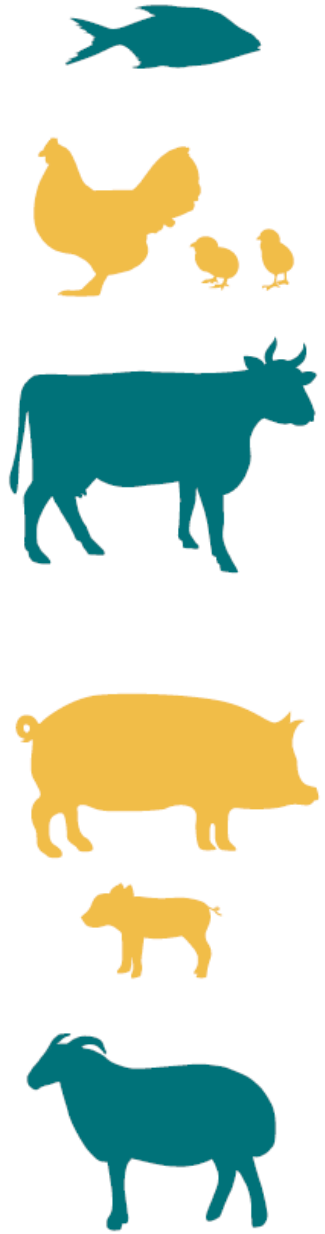

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The Nuffield Council on Bioethics

"We are a bioethics council…
…not a council of bioethicists."

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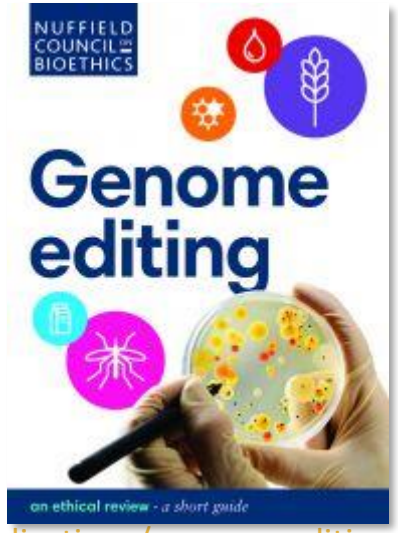
Examining emerging biotechnologies

Avoiding two ‘hypothecation errors’:

- of problems to technologies, and
- of technologies to problems

Priority questions:

- near term applications
- distinctive ethical considerations
- little public discussion



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Our inquiry (2019-21)

Multi-disciplinary working group: farming and food systems, animal biotechnology, biological research, veterinary epidemiology, law, philosophy, social science, sociology, animal welfare, and ethics.

- open call for evidence
- commissioned research
- site visit
- fact-finding meetings
- desk research
- stakeholder interviews
- public dialogue
- external review

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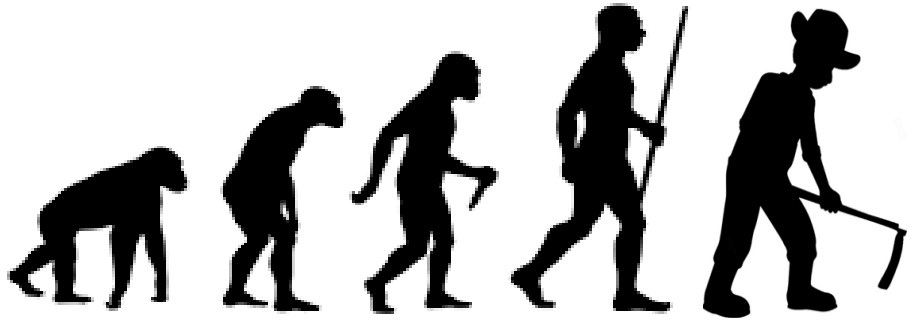
Domestication



Long (pre)historical perspective

- social and economic developments
- behavioural and biological (co)adaptations

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The global food and farming system faces several complex challenges…

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Ethical questioning

- Food and farming systems are necessary to secure basic interests
- A just food and farming system is one that secures the basic interests of those who are subject to it
- (Farmed animals have basic interests)

  "Humans and animals should have the opportunity to live their lives in a state of safety, security and wellbeing, with access to the experiences that constitute a good life, according to their form of life."

- We conclude
  - GE might be morally preferable in some circumstances, but
  - GE technologies are not *merely* tools
- So: how might *innovation, diffusion and normalisation* of novel biotechnologies affect justice in food and farming systems?

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The potential of genome editing in farmed animal breeding

- Will GE become the presumptive technology for ‘genetic gain’?
  - mutilations (horns, tails, castration…)
  - disease resistance, environmental tolerance (PRRSv, *SLICK*…)
  - production traits (faster growth, sexing…)
  - environmental impacts (feed conversion, GHG emissions?)
- Probably not, but GE could accelerate genetic gain in some directions and make step changes in others… and there are significant uncertainties, so GE should <u>not</u> be used...
  - to enable animals to endure conditions of poor welfare
  - to produce animals constitutionally unable to enjoy an acceptable quality of life
  - where it will entrench damaging farming practices or compound undesirable outcomes

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How might members of the public respond?

- Questions
  - How much can be read across from first generation rDNA technologies to genome editing?
  - How much can be read across to animals from attitudes to crop plants?
  - How can people with different perspectives engage with each other to address common societal challenges?
- Review of literature found
  - Understanding of public attitudes lags behind new technologies and applications
  - Attitudes relate to complex factors that are difficult to unpick
  - There is comparatively little existing qualitative research

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Consumers and citizens

People's views depend on how you pose the question

- 'consumers' are concerned with product safety and freedom of choice
- 'citizens' are more concerned with animal welfare and justice

Informative labelling is important, but system change unlikely to be led by consumers

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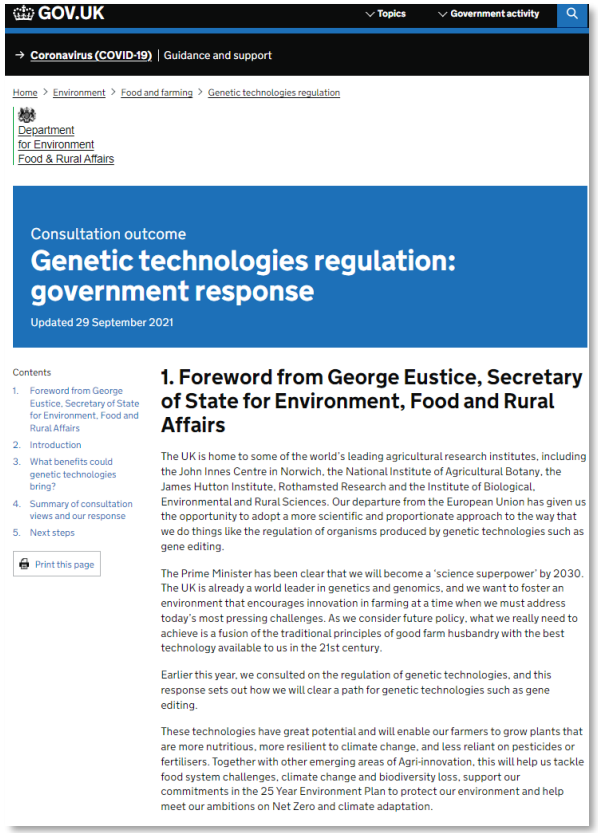
GMO regulation



GOV.UK Topics Government activity

Coronavirus (COVID-19) | Guidance and support

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Department for Environment Food & Rural Affairs

Consultation outcome

Genetic technologies regulation: government response

Updated 29 September 2021

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1. Foreword from George Eustice, Secretary of State for Environment, Food and Rural Affairs

The UK is home to some of the world's leading agricultural research institutes, including the John Innes Centre in Norwich, the National Institute of Agricultural Botany, the James Hutton Institute, Rothamsted Research and the Institute of Biological, Environmental and Rural Sciences. Our departure from the European Union has given us the opportunity to adopt a more scientific and proportionate approach to the way that we do things like the regulation of organisms produced by genetic technologies such as gene editing.

The Prime Minister has been clear that we will become a 'science superpower' by 2030. The UK is already a world leader in genetics and genomics, and we want to foster an environment that encourages innovation in farming at a time when we must address today's most pressing challenges. As we consider future policy, what we really need to achieve is a fusion of the traditional principles of good farm husbandry with the best technology available to us in the 21st century.

Earlier this year, we consulted on the regulation of genetic technologies, and this response sets out how we will clear a path for genetic technologies such as gene editing.

These technologies have great potential and will enable our farmers to grow plants that are more nutritious, more resilient to climate change, and less reliant on pesticides or fertilisers. Together with other emerging areas of Agri-innovation, this will help us tackle food system challenges, climate change and biodiversity loss, support our commitments in the 25 Year Environment Plan to protect our environment and help meet our ambitions on Net Zero and climate adaptation.

- When retained EU GMO regulation is removed, how will new breeding technologies be used?
  - in what circumstances?
  - with what aims?
  - in whose interests?
  - with what effects?
- A coherent policy context is needed to guide industry towards a clear vision of a desirable future food and farming system

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Broader policy context

- Food security
- Basic justice
- Proportionality and caution
- Engagement and procedural justice
- Cooperation and solidarity

Five principles and 14 recommendations, including:

- clear and meaningful **standards** for responsible and sustainable breeding (underpinned by research)
- better use of **data** about what is happening on farms to know how well they are being met; and
- **incentives and regulation** to guide breeders, farmers and retailers towards a desirable vision for the food and farming system and to guard against overreaching or externalising social costs.

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Areas for further action

- Organising governance appropriately to secure responsible breeding practices
- Enjoining responsible behaviours in retailing and consumption
- Identifying coherent public interest by which to orientate future food and farming policy

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Public dialogue

- recognition of distinctive issues involved in animal biotechnology and public interest in these (demonstrated in rapid dialogue)
- public dialogue initiative (in partnership with BBSRC and Sciencewise) to explore place of GE in future food and farming systems
- 80 participants across UK convened during June and July – findings expected early September

UKRI Biotechnology and Biological Sciences Research Council

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sciencewise

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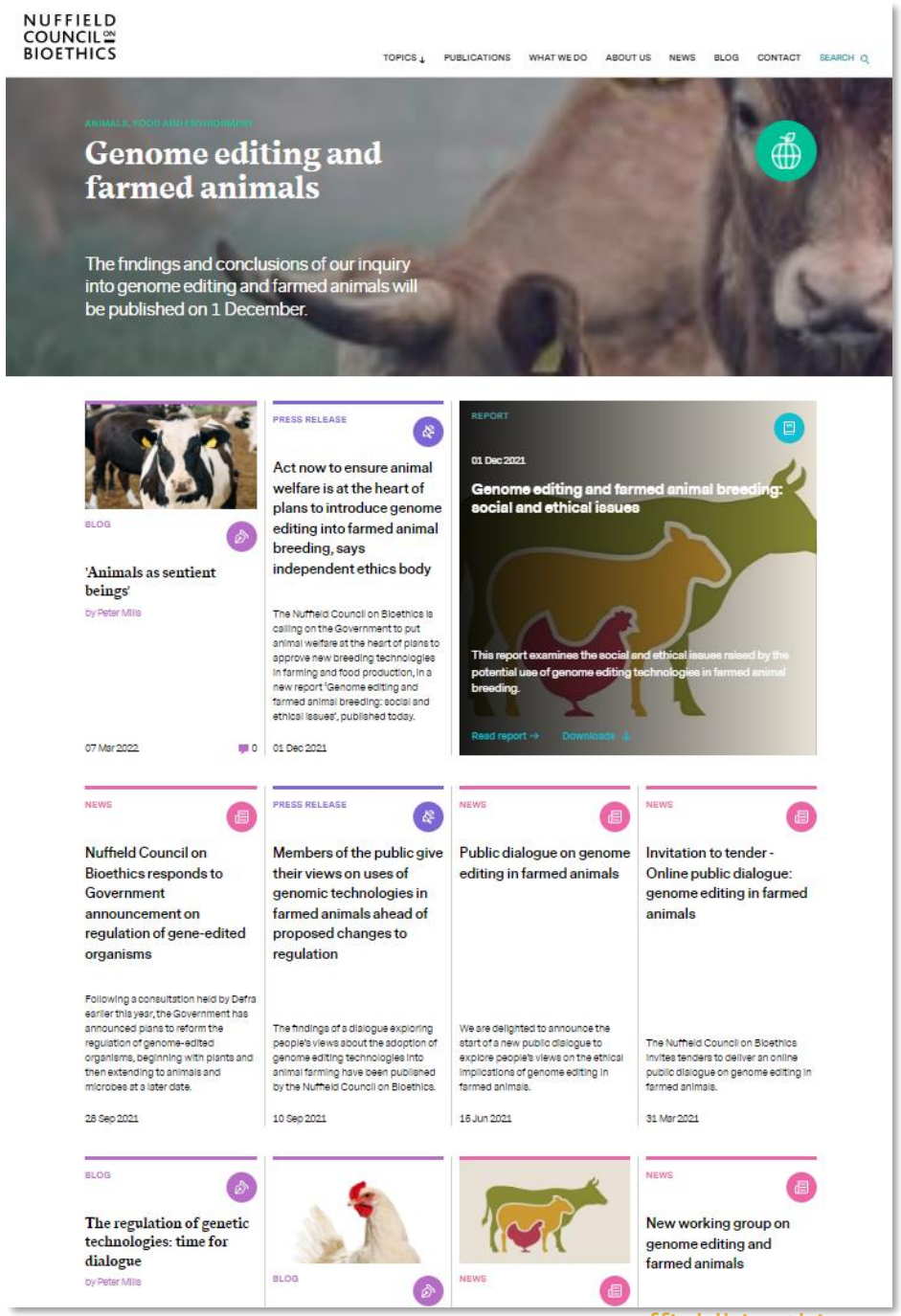

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Thank you.

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