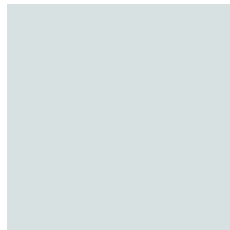
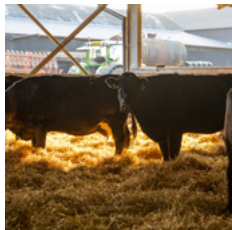
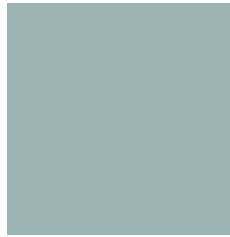




Public dialogue on genome editing in farmed animals

October 2022



Executive summary

This public dialogue was commissioned by the Nuffield Council on Bioethics and the Biotechnology and Biological Sciences Research Council, part of UK Research and Innovation, with the support of Sciencewise. The aim of the dialogue was to explore with participants their views on the role of genome editing in farmed animals (GEFA) in the future food and farming system in the UK. The dialogue centred around a series of four online workshops, held between 28th May and 9th July 2022. Eighty members of the public took part in the dialogue, and they were joined at different points by specialists who were able to provide additional information on the areas under discussion.

Starting points

Although the dialogue included participants who did not eat meat, fish or dairy products, many participants regarded these as an important source of sustenance and enjoyment. From the outset, however, participants recognised that they were protecting a *'wilful ignorance'* and felt disconnected from the way in which much of the food they ate was produced, and the circumstances of the animals involved.

Although participants recognised that slaughter was an inevitable part of farming animals for meat, they separated this from the question of the quality of the life the animals lived up to that point. They wanted animals to have a *'good life'* and thought that farming animals involves a duty to provide the conditions of such a life.

In the dialogue, participants adopted several ways of expressing and relating to complex clusters of ideas and attitudes. Food that was *'locally'* sourced and processed, that came with a trustworthy narrative was associated with higher animal welfare and higher quality produce. Conversely, *'industrialised'* food production, associated with larger producers, technologically intensive husbandry systems and high stocking densities, was thought to lack transparency. There was a common feeling that this was less healthy for the animals and for consumers.

Developing perspectives

As the dialogue progressed, two dominant perspectives emerged that ordered participants' priorities in different ways.

- One centred on concerns about the impacts of livestock farming and aquaculture on animals and the environment. This perspective foregrounded individual responsibilities to care for animals and limit their own impacts, for example, by changing their diets or buying responsibly sourced products.
- The other focussed on justice, affordability and fair access to animal products as a basic dietary entitlement, at both a local and global level. This perspective tended to see biotechnology innovation as inevitable, but it was linked with scepticism about the prospects of benefits reaching consumers, or farmed animals themselves.

These were not the only perspectives that emerged and were not the perspectives of distinct groups of participants; during the dialogue many participants combined or moved between them.

A role for GEFA in the food and farming system

Genome editing was seen by many participants initially as complex and difficult, though on reflection, sometimes offering a solution to certain challenges which could be preferable to alternatives that required constant intervention. Participants saw GEFA as less risky when it resulted in a distinct, observable change in one characteristic of the animal rather than affecting the functioning of the whole animal.

When thinking about the role of GEFA, participants saw greater potential where it led to benefits for farmed animals themselves, with benefits to humans often seen as derivative from these – for example potential applications that improved animal health, followed by those that protected human health.

Views on GEFA applications to address environmental challenges of farming were mixed. A common view was that these were human-made problems, which should be addressed by changes in human behaviour rather than laid on animals. However, there was also a view that applications that supported farmers to respond to the distinctive challenges facing agriculture in low- and middle-income countries had greater potential than those that increased production in high-income countries.

Participants saw GEFA applications carried out solely to increase agricultural productivity or to provide additional consumer benefits, such as making foods cheaper to produce or altering them to improve their nutritional value, as having less potential. Rather than changing the composition of foods, they would prefer nutrition to be improved through voluntary changes in diet.

In many cases, participants saw that GEFA could be used to produce traits that were indistinguishable from those that could be produced through conventional breeding. Nonetheless, there was a sense in which participants saw a genetically altered animal as a *'new entity'*. Participants, therefore, found the description of certain uses of GEFA as being like conventional farming to be instrumental, serving to obscure or *'undermine lots of valid questions and concerns'* that they believed should be debated.

Participants were often undecided (collectively and individually) about when it was justifiable to *'change the animal'* with GEFA and when it was more appropriate to focus on *'changing the system'*, which tended to be seen as morally preferable. In many cases, though, there was a belief that this was unrealistic, and so decisions had to be taken pragmatically.

There was a wariness among participants that introducing GEFA to address one challenge could lead to further challenges arising and set society on a path of *'continual tinkering'* with animal genomes. Participants saw greater potential in what they regarded as *'one-shot'* applications of GEFA to address closely defined challenges rather than interventions for traits that could be changed incrementally. But they raised concerns that potential long-term implications – including those on animals, farming and wider society – would not be taken into account when making short-term, pragmatic decisions.

When they considered alternative responses to societal challenges, participants saw potential in lower input approaches, such as agroecology and waste reduction, which they saw as more sustainable. However, they were concerned that lower input approaches may not be able to scale to meet the current or anticipated demand for animal products.

Responsibilities of consumers and public authorities

Participation in the dialogue led to a personal awakening of interest for many participants. Many wanted to deepen their understanding of the research, food and farming system, and resolved to make more thoughtful choices about their diets and lifestyles, or engage actively with questions of policy. To support this, they wanted products from genome edited animals to be labelled as such.

However, many believed it should not be their responsibility, as individuals and consumers, to shape the industry through their behaviours; it was reasonable for them to have been ignorant of the circumstances of animal husbandry because, as citizens, they were entitled to expect that public authorities would regulate these matters in accordance with their values. All participants thought that regulation should be used to promote the public good and not just to protect them from harm.

While participants viewed current measures governing animal research in the UK as robust, they wanted information to be more readily available. This should explain the procedures used in research and the outcomes of the research, with timely publication of all research findings. As with farming policy, participants wanted public aspirations and societal objectives to influence research on GEFA.

What should happen now?

Participants want policy makers to set out a clear vision for the future of food and farming system, and to encourage and support public debate on this.

To be responsible citizens, participants want policymakers to explain the purposes for which GEFA might be used, so they can understand its impacts and wider consequences, as well as what the range of options are, in order to be able to assess its value and potential impacts.

Participants want policy makers to consider promoting alternatives without privileging novel technological solutions. Although genome editing was perceived by participants as an innovative technology, they worried that it would be used in the service of policy objectives that were unlikely to address long-term problems in the food system.

Participants want positive policy interventions in the food and farming system, not simply minimal protections beyond which it would be left to be shaped by market forces. The food system affects all people in fundamental ways. Both research and development, and the implementation and diffusion of new breeding technologies, should be treated in this light.